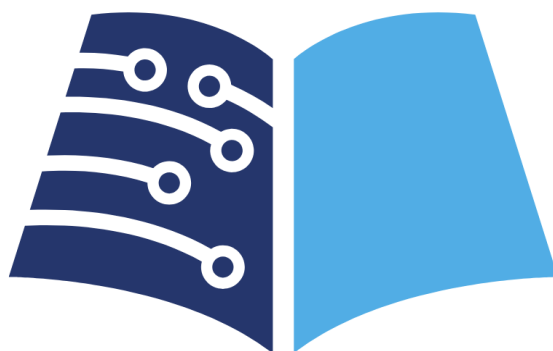




DIGITABILITY

**PROMOTING PEOPLE WITH DISABILITIES' EMPLOYMENT
BY ENHANCING THEIR DIGITAL SKILLS AND COMPETENCES TO SUPPORT
A REMOTE WORKING SCHEME**

BASIC KNOWLEDGE OF DEVICES



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Contents

1. Introduction.....	8
1.1 Learning Objectives	8
1.2 Duration.....	8
2. Working with Accessibility devices	9
2.1 MS Windows OS.....	9
2.1.1 Accessibility for people with Visual Impairments.....	10
Braille Display	10
Screen Magnifiers	13
Head-Mounted Displays	15
2.1.2 Accessibility for people with Hearing Impairments.....	17
Audio Devices	17
2.1.3 Accessibility for people with Physical Impairments	18
Adaptive Keyboards.....	19
Alternative Mice	22
2.1.4 Accessibility for people with Cognitive Impairments	29
Alternative – Custom Keyboards	29
Touchscreen Monitors.....	31
2.1.5 Exercises.....	32
2.1.5.1 Quizzes for Visual Impairments	32
2.1.5.2 Quizzes for Hearing Impairments	34
2.1.5.3 Quizzes for Physical Impairments.....	36
2.1.5.4 Quizzes for Cognitive Impairments.....	37
2.1.6 Resources	38
Visual Impairments	38
Hearing impairments	39
Physical Impairments.....	39
Cognitive Impairments	39
2.2 Mac OS	40
i-tec USB 3.0 / USB-C / Thunderbolt 3 Dual Display Docking Station	41
i-tec Thunderbolt 3 Travel Dock Dual 4K Display with Power Delivery 60W + i-tec Universal Charger 77 W42	
i-tec USB4 Metal Docking station Dual 4K HDMI DP with Power Delivery 80 W + i-tec Universal Charger 100 W.....	42
i-tec Thunderbolt 3/USB-C Dual 4K Docking Station + USB-C to DisplayPort Cable (1,5 m) + Power Delivery 60W.....	43
2.2.1 Accessibility devices for people with Visual Impairments	44
Braille Displays - Focus 40 Blue Braille Display by VFO	44

High-Contrast Keyboards - LogicKeyboard Large Print White on Black Keyboard	45
2.2.2 Accessibility devices for people with Hearing Impairments	45
Bluetooth Hearing Aids.....	46
Assistive Listening Systems (ALS).....	47
2.2.3 Accessibility devices for people with Physical Impairments.....	50
TrackBall Mice – Logitech MX Ergo Wireless Trackball Mouse	50
Switch Access Devices	51
AbleNet BIGtrack Trackball Mouse.....	53
2.2.4 Accessibility devices for people with Cognitive Impairments.....	53
Customizable Keyboards	54
Customizable Touchpads	55
2.2.5 Exercises.....	57
Quizzes for Visual Impairments	57
Quizzes for Hearing Impairments	57
Quizzes for Physical Impairments.....	59
Quizzes for Cognitive Impairments.....	62
2.2.6 Resources	64
Visual Impairments	64
Physical Impairments.....	64
Cognitive Impairments	65
2.3 Linux OS.....	65
2.3.1 Accessibility for people with Visual Impairments	66
BrailleNote Touch Plus.....	66
HIMS Polaris Mini	67
Logitech MX Ergo Wireless Trackball Mouse.....	67
HumanWare Brailliant BI 40X	68
2.3.2 Accessibility for people with Hearing Impairments	68
Bluetooth Hearing Aids → ReSound ONE.....	69
Vibrating Alarm Clocks → ClearSounds SHAKER Digital Vibrating Alarm Clock	69
Visual Alerting Systems → Silent Alert SA3000	70
2.3.3 Accessibility for people with Physical Impairments	70
Logitech MX Ergo Wireless Trackball.....	70
Origin Instruments HeadMouse Nano.....	72
QuadJoy Sip/Puff Switch.....	73
Wacom Intuos Pro Graphics Tablet	74
2.3.4 Accessibility for people with Cognitive Impairments	75

Enabling Devices Talkable IV Communication Aid	75
2.3.5 Exercises	76
Quizzes for people with Visual Impairments	76
Quizzes for people with Hearing Impairments	78
Quizzes for people with Physical Impairments	80
2.3.6 Resources	82
Visual Impairments	82
Hearing Impairments	82
Physical Impairments	83
Cognitive Impairments	83
3. Operating System Accessibility Management for Computers	83
3.1 MS Windows OS	83
3.1.1 Built in features & Settings	83
3.1.1.1 Visual Accessibility	83
Narrator	83
Magnifier	84
Windows Speech Recognition	85
Accessibility Settings	87
3.1.1.2 Hearing Accessibility	88
Closed Caption and Subtitles	89
Sounds Notifications	90
Mono Audio	91
3.1.1.3 Physical Accessibility	91
Windows Ease of Access Center	92
On-Screen Keyboard	94
Windows Speech Recognition	95
Voice Access	97
Text-to-Speech Software	98
Accessibility Settings	98
3.1.1.4 Cognitive Accessibility	101
3.1.1.5 Exercises	101
Visual Impairments	101
Hearing Impairments	103
Physical Impairments	103
Cognitive Impairments	105
3.1.1.6 Resources	107

Visual Impairments	107
Hearing and Cognitive Impairments	109
3.1.2 File Management	109
3.1.2.1 Visual Accessibility	109
File Management with Narrator	109
File Management with Magnifier	110
3.1.2.2 Physical Accessibility	111
File Management with Speech Recognition	111
3.1.2.3 Cognitive Accessibility	112
File Management with Text to Speech Software	112
3.1.2.5 Exercises	113
Visual Accessibility	113
Physical Accessibility	115
Cognitive Accessibility	117
3.1.2.6 Resources.....	119
Hearing and Cognitive Impairments	119
3.2 Mac OS	120
3.2.1 Built in features & Settings	120
3.2.1.1 Visual Accessibility	120
VoiceOver	120
Display Accommodations	122
Dictation	123
Speak Selected Text	125
Zoom	126
Siri	128
3.2.1.2 Hearing Accessibility	130
Hearing Devices Setup	130
Closed Captions	131
Visual Alerts	132
3.2.1.3 Physical Accessibility.....	135
Switch Control	135
Sticky Keys and Slow Keys	137
Dictation	138
VoiceOver	140
Pointer Control	141
Accessibility Keyboard	143

Siri	145
3.2.1.4 Cognitive Accessibility	147
Customizable Display	148
Time Limits and Restrictions within Parental Control	149
Speak Selected Text	150
3.2.1.5 Exercises	152
Visual Impairments	152
Hearing Impairments	154
Physical Impairments	157
Cognitive Impairments	159
3.2.1.6 Resources.....	161
Visual Accessibility	161
Hearing Accessibility	161
Physical Accessibility	162
Cognitive Accessibility	162
3.2.2 File Management	162
3.2.2.1 Visual Impairments	162
File Management with Voice Over	162
3.2.2.2 Physical Impairments.....	166
File Management with Siri	166
File Management with general Keyboard Shortcuts	168
3.2.2.3 Cognitive Impairments	171
3.2.2.4 Exercises	171
Quizzes for Visual Impairments	171
Quizzes for Physical Impairments	173
Quizzes for Cognitive Impairments	176
3.2.2.5 Resources.....	176
3.3 Linux OS	176
3.3.1 Built in features & Settings	176
3.3.1.1 Accessibility for Visual Impairments.....	176
Accessibility Features	176
3.3.1.2 Accessibility for Hearing Impairments.....	179
3.3.1.3 Accessibility for Physical Impairments	180
Adaptive Keyboard and Mouse Settings (AccessX)	181
3.3.1.4 Accessibility for Cognitive Impairments	184
Accessibility Features	184

3.3.1.5 Exercises	187
Visual Accessibility	187
Hearing Accessibility	188
Physical Accessibility	191
Cognitive Accessibility	192
3.3.1.6 Resources	194
3.3.2 File Management	194
3.3.2.5 Exercises	195
3.3.2.6 Resources	196
4. Other Working Tools – Smart Devices	196
4.1 Accessibility features in Android Tablets	196
4.1.1 Visual Accessibility	196
4.1.2 Hearing Accessibility	203
4.1.3 Physical Accessibility	205
4.1.4 Cognitive Accessibility	209
4.1.5 Exercises	210
Visual Accessibility	210
Hearing Accessibility	211
Physical Accessibility	212
Cognitive Accessibility	213
4.1.6 Resources	213
4.2 Accessibility features on I-Pad	214
4.2.1 Visual Accessibility	214
Change Colors	214
Enhance Readability	216
Enhance Visibility	218
Voice Descriptions	219
Use Braille	220
Voice Commands	221
4.2.2 Hearing Accessibility	222
Sound to Text	222
Enhance Hearing	224
Alerts	226
4.2.3 Physical Accessibility	227
Hands-free Navigation	227
Siri	227
Let iPad type for you	228

Connect other inputs	229
4.2.4 Cognitive Accessibility.....	230
Minimize disruptions and sensory input	230
Pair audio and text.....	233
4.2.5 Exercises.....	234
Visual Accessibility	234
Hearing Accessibility	236
Physical Accessibility.....	238
Cognitive Accessibility	241
4.2.6 Resources.....	243
5. Tests	243
Visual	243
Hearing	246
Physical	248

1. Introduction

This document aims to share knowledge on emerging technologies, systems, and devices designed to enhance the lives of individuals with disabilities. The initial chapter delves into the realm of assistive devices, offering both technological insights and theoretical foundations. It focuses on devices that can be seamlessly integrated with computers to enhance user experience, especially in professional settings. The second chapter casts a spotlight on the accessibility features inherent in major operating systems - Windows, Apple, and Linux - while also addressing practical aspects of folder management. The concluding chapter extends the discussion to include accessibility features tailored for tablet devices, recognizing their growing significance as secondary tools in the contemporary workplace.

To reinforce comprehension, each chapter concludes with a set of exercises designed to solidify the understanding of the presented material.

1.1 Learning Objectives

In completing this training document, the learner will be able to:

- Gain knowledge about accessibility devices catering to various disabilities
- Acquire insights into accessibility devices compatible with Microsoft, Apple, and Linux Operating Systems (OS)
- Familiarize themselves with valuable shortcuts specific to each OS
- Understand the built-in accessibility features available in each OS
- Learn practical tips for effective file management on each OS
- Explore accessibility features in select smart devices
- Access specific processes through informative videos tailored to each OS

1.2 Duration

Global duration – 3,5 academic hours

Estimated duration of each sub-section: lesson / useful resources for the lesson / practical exercises:

- lessons / learning – 2 academic hours

- exercises – 2/3 academic hours (40 min)

- useful resources – 1 academic hour

Each suggested duration may vary for each trainee.

2. Working with Accessibility devices

2.1 MS Windows OS

Windows Operating System (OS) is a user-friendly graphical user interface (GUI) based system developed by Microsoft Corporation. Introduced in 1985, it has undergone numerous updates, becoming a widely used choice for personal and business computing. Compatible with diverse hardware and software, it offers a built-in security system against malware and viruses and a robust file management system for easy organization. The OS enables concurrent operation of multiple applications, facilitating multitasking.

Key Features of Windows Operating System:

- Control Panel: Centralized system settings management for security, privacy, display, hardware, sound, and programs.
- Internet Browser (Microsoft Edge): Built-in browser with features like tabbed browsing, search suggestions, and web notes.
- File Explorer: File management tool allowing users to browse, open, and manage files and folders with search, copy, move, and delete functions.
- Taskbar: Horizontal bar at the bottom of the desktop providing quick access to applications and displaying open windows and programs.
- Microsoft Paint: Graphics editing software offering basic drawing tools, shapes, text, and image additions.
- Start Menu: Access point for frequently used applications, settings, and files, with a search bar for quick retrieval.
- Task Manager: System tool to view and manage running applications and processes, providing information on CPU and memory usage.
- Disk Cleanup: System tool freeing up hard drive space by removing unnecessary files and data.
- Cortana: Virtual assistant allowing users to interact with the computer using voice commands for information, reminders, emails, and tasks.

2.1.1 Accessibility for people with Visual Impairments

In our fast-paced, digitally connected world, accessibility is a fundamental aspect of technology. It ensures that everyone, regardless of their abilities, can engage with and benefit from digital devices. To achieve this, a range of input-output devices, both hardware and software, have been designed to cater to various needs. In this subsection, we will explore three key tools that enhance accessibility: Braille Displays, Screen Magnifiers, and Head-Mounted Displays.

Some devices that can be connected to Windows OS:

Braille Display



Figure 1. Braille Display Devices

Braille displays, known also as refreshable Braille displays, are touchscreen devices that provide real-time access to digital information to people who are blind or visually impaired. The screens consist of a series of small pins or cells that move up and down to form braille characters, allowing users to read digital content by touch.

Braille displays transform electronic text into Braille output, making digital content accessible to visually impaired users. Braille is typically used in combination with screen reader software to navigate and interact with computers, smartphones, and other digital devices. People can read and review documents, emails, web pages and more in Braille, enhancing their ability to access and process information independently.

When a Braille display is connected to a Windows computer, it is often automatically recognized and supported by the operating system. The user might need to configure settings related to Braille displays in the Accessibility Center or settings on their Windows computer, but this is usually done through the standard Windows configuration rather than downloading additional drivers.

Below are a few examples of Braille displays:

- HumanWare Braille Series

HumanWare's commitment to accessibility is evident in the Braille BI series, providing Braille displays that seamlessly integrate with Windows computers. Offering both USB and Bluetooth connectivity, these displays empower users with a reliable and adaptable interface for interacting with digital content.

- HIMS BrailleSense Polaris

HIMS BrailleSense Polaris stands out as a multifaceted notetaker equipped with a built-in Braille display. Beyond its Windows screen reader support, this device offers versatile connectivity options, allowing it to function seamlessly as a Braille display for Windows computers.

- Papenmeier Braillex Live

Papenmeier contributes to the landscape with the Braillex Live series, offering Braille displays that effortlessly connect to Windows computers through USB or Bluetooth. These displays provide users with a tactile experience, enhancing accessibility for those with visual impairments.

- Orbit Reader 20

For those seeking affordability without compromising functionality, the Orbit Reader 20 presents a compelling option. This Braille display, compatible with Windows, connects via USB, offering basic Braille functionality and making digital content accessible to a broader audience.

- APH Refreshabraille

The American Printing House for the visual impaired individuals introduces the Refreshabraille, a compact yet robust Braille display tailored to work seamlessly with Windows. With USB and Bluetooth connectivity, this device exemplifies accessibility in a portable and user-friendly form factor.

- Eurobraille Iris

Eurobraille's Iris Braille display rounds off our exploration, offering various connectivity options, including USB and Bluetooth. Its compatibility with Windows underscores the commitment to providing diverse solutions for individuals with visual impairments.

Compatibility Across Windows Versions

Braille display devices can be used with various versions of Microsoft Windows, but the level of support and compatibility may vary. Generally, Windows has included built-in support for basic braille functionality, and more advanced features have been introduced in later versions.

- Windows 7 provides basic support for braille displays. Users can connect their braille display devices to Windows 7 computers and use them for basic navigation.
- Windows 8 and 8.1 continue to support braille displays with improvements over Windows 7. Users can connect braille devices to these operating systems for enhanced accessibility.
- Windows 10 significantly improved support for braille displays. It includes a Braille and tactile graphics settings page in the Ease of Access section, allowing users to configure braille options more easily. Windows 10 also introduced Unified English Braille (UEB) support.
- Windows 11, the latest version of the Windows operating system, continues to support braille displays. It maintains and improves upon the braille support features introduced in Windows 10.

It's important to note that while Windows provides built-in support for braille displays individual braille display manufacturers may also offer drivers or software to enhance the functionality of their devices on Windows systems. Additionally, third-party screen reader software, such as JAWS (Job Access with Speech) or NVDA (NonVisual Desktop Access), can further enhance the braille experience on Windows by providing advanced screen reading capabilities.

Screen Magnifiers



Figure 2. Laptop computer Screen Magnifier 1



Figure 3. Computer Screen Magnifier 2

Software or hardware devices that enlarge screen content, including text, images, and graphics.

Screen magnifiers enlarge the screen, making content larger and easier to read for visually impaired users. Allow users to adjust magnification levels, color contrast and screen enhancements for better visibility. Screen magnifiers are highly valuable for tasks like reading documents, navigating the internet, and using software applications, allowing people with low vision to access and explore digital content with greater ease.

Screen magnifiers are usually software-based, and Windows provides built-in magnification tools through its Ease of Access settings. The user can enable and configure these features without the need for separate driver downloads.

Below are a few examples of Screen Magnifiers:

- Optelec ClearView C Flex by Vispero

Vispero offers the Optelec ClearView C Flex, a desktop video magnifier that provides adjustable magnification and contrast options.

- Eschenbach SmartLux Digital Handheld Video Magnifier

Eschenbach's SmartLux Digital is a handheld video magnifier that offers portable magnification for reading and viewing objects. It features a 5-inch LCD screen and various zoom levels.

- HumanWare Prodigy Connect 12

HumanWare's Prodigy Connect 12 is a handheld electronic magnifier with a 12-inch touchscreen. It provides magnification, text-to-speech capabilities, and the ability to capture and store images.

- Freedom Scientific TOPAZ XL HD Desktop Video Magnifier

Freedom Scientific offers the TOPAZ XL HD, a desktop video magnifier that provides high-definition magnification for reading and viewing documents. It includes customizable contrast options.

- Zoomax Snow 7 HD Handheld Video Magnifier

Zoomax's Snow 7 HD is a portable handheld video magnifier with a 7-inch screen. It provides adjustable magnification, color modes, and the ability to capture and save images.

Compatibility Across Windows Versions

Magnifier devices, whether hardware or software-based, can generally be used with various versions of Microsoft Windows.

- Windows 7 includes a basic built-in magnifier tool that allows users to zoom in on parts of the screen. While it lacks some advanced features, it provides basic magnification functionality.
- Windows 8 and 8.1 continue to support magnifier devices. They include an improved Magnifier tool with more features compared to Windows 7.
- Windows 10 includes an enhanced Magnifier tool with additional features such as a lens mode, full-screen mode, and various customization options. The Magnifier tool in Windows 10 is designed to work well with a range of magnifier devices.

- Windows 11, the latest version of the Windows operating system, continues to support magnifier devices. It builds upon the features introduced in Windows 10, providing an accessible and customizable magnification experience.

For individuals using magnifier devices, it's essential to check the specific compatibility and system requirements provided by the manufacturer of the magnifier hardware or software.

Head-Mounted Displays



Figure 4. Different models of Head-Mounted Display

Head mounted displays (HMDs) are wearable devices that offer a direct view of the visual interface right in front of the user's eyes. They can be either embedded, semi-embedded or artificial reality (AR) displays.

HMDs provide a broad range of applications, such as virtual reality (VR) experiences, artificial reality (AR) overlays and immersive simulations. These can be used for education, gaming, medical imaging and more. Within the context of accessibility, HMDs can help visually impaired people by offering enhanced information, such as text-to-speech feedback or visual spatial awareness cues, to improve their interaction with the physical world and digital content.

The specific requirements for head-mounted displays can vary depending on the device. Some may require specialized drivers or software for full functionality. However, in many cases, Windows will detect and recognize the display as an external monitor, and the user can use it without installing extra drivers.

Below are a few examples of Head-Mounted Displays:

- OrCam MyEye

The OrCam MyEye is a wearable device that uses a small camera to capture and process visual information. It can read text aloud, recognize faces, identify products, and provide audio descriptions.

- eSight

eSight is a wearable electronic device that uses a high-speed camera to capture real-time video and enhances the visual information before displaying it on OLED screens in front of the user's eyes.

- NuEyes e2

NuEyes e2 is a lightweight, wireless smart glasses solution. It features a high-definition camera and a display that presents enhanced and magnified images to the user.

- Cyber Eyez

Cyber Eyez is an augmented reality headset. It provides features such as text-to-speech, magnification, and object recognition, helping users navigate and interact with their environment.

- Aira

Aira is a service that combines smart glasses with a remote assistance platform. Users wear smart glasses equipped with cameras, and remote agents provide assistance by describing the user's surroundings, reading text, and offering guidance.

Compatibility Across Windows Versions

The compatibility of head-mounted display devices for visual impaired individuals with specific versions of Microsoft Windows can vary depending on the device and its supporting software. Generally, these devices may not be directly dependent on the version of Windows, as they often operate independently or connect with smartphones or dedicated processing units.

However, certain software components or companion apps that facilitate the functionality of these devices may have specific system requirements. For example, apps or software used in conjunction with head-mounted display devices may list compatibility with a range of Windows versions. It's crucial to refer to the product documentation or contact the device manufacturer for precise information on system requirements and compatibility.

As technology evolves, manufacturers may release updates or new versions of their software that are compatible with the latest versions of Windows. Therefore, it's recommended for the user to check the official website or contact customer support for the specific head-mounted

display device you are interested in to obtain the most accurate and up-to-date information regarding compatibility with Microsoft Windows.

2.1.2 Accessibility for people with Hearing Impairments

Windows offers compatibility with a range of audio devices, including hearing aids, cochlear implants, and assistive listening devices, enhancing the digital experience for users with hearing impairments. These devices can often be seamlessly integrated, allowing users to tailor their settings and preferences for a more accessible and personalized experience.

Some devices that can be connected to Windows OS:

Audio Devices

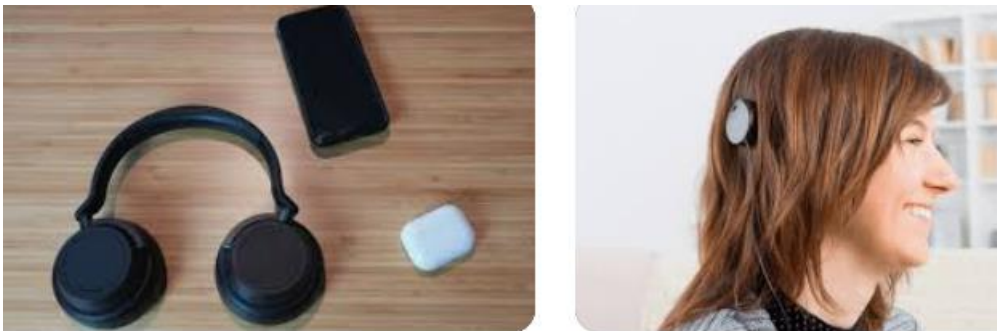


Figure 5. Different types of Audio Devices

Windows is compatible with a wide range of audio devices, including hearing aids, cochlear implants, and assistive listening devices. Users can connect and configure these devices to suit their needs.

- **Hearing Aids:** Many modern hearing aids are equipped with Bluetooth technology and can be paired with Windows computers or smartphones without the need for additional drivers. Windows typically includes built-in support for Bluetooth hearing aids. To set up the hearing aids, the user will generally follow the standard Bluetooth pairing process. Check the user manual provided with the hearing aids for device-specific instructions. The user should ensure that your Windows version has Bluetooth functionality, which is commonly available in Windows 7, 8, 8.1, 10, and 11. Popular hearing aid brands that offer Bluetooth connectivity include Widex, Phonak, Oticon, and ReSound.
- **Cochlear Implants:** Cochlear implants may require specific drivers or software provided by the manufacturer. These drivers or software are typically available on the manufacturer's website or through the product packaging. It's important for the user to

follow the manufacturer's instructions for installation and setup. Cochlear, Advanced Bionics, and MED-EL are some of the major manufacturers. Users should check the official websites of these manufacturers or consult with their audiologists for specific compatibility information and software downloads.

- **Assistive Listening Devices:** The requirements for assistive listening devices can vary depending on the type and brand of the device. Some may require specialized drivers or software, while others may work as standard audio output devices. To use these devices effectively, the user should check the manufacturer's documentation and their official website for information on driver installation and compatibility with Windows. Brands like Phonak, Williams Sound, and Sennheiser offer various assistive listening devices.

These can be seamlessly integrated into the Windows ecosystem. Users have the flexibility to connect and configure these devices according to their specific requirements, thereby enhancing their overall digital experience.

For instance, Windows provides Bluetooth connectivity support for hearing aids, allowing users to pair their devices effortlessly with their windows computers or smartphones. This connection empowers users to stream audio content directly to their hearing aids, reducing background noise and improving audio clarity.

Furthermore, Windows offers customizable audio settings, enabling individuals to fine-tune their listening experience to suit their preferences. These configurations can include adjusting volume levels, applying equalization settings, or prioritizing certain audio sources.

2.1.3 Accessibility for people with Physical Impairments

The importance of technology cannot be overstated. The technology devices serve as the bridge between human users and digital systems, making technology accessible, user-friendly, and adaptable to individual needs and abilities. They are vital components that enhance our digital experiences and enable inclusivity. From adaptive keyboards to alternative mice, these technologies ensure that everyone, regardless of their abilities or challenges, can interact with digital systems effectively. In an increasingly digital world, the importance of these technologies lies in their capacity to empower individuals, promote accessibility, and make technology a tool for all, ultimately enriching our lives and expanding opportunities for a diverse range of users.

Adaptive Keyboards

Adaptive computer keyboards are tailored to meet the unique needs and challenges of users with different abilities, providing alternative input methods and promoting accessibility. Such keyboards offer adaptable layouts, key sizes, and input methods to improve accessibility and ease of use.

Features-Use: Custom keyboards may have larger buttons, alternative entry mechanisms such as touchscreens or switches, and programmable key layouts. Individuals can customize these keyboards to match their specific needs, making it easier for them to type, move and interact with computers or assistive technology devices.

Many adaptive keyboards designed for physical impairments are plug-and-play devices, which means they are recognized by Windows without the need for additional drivers. In most cases, the user can simply connect the adaptive keyboard to their computer, and Windows should automatically detect and configure it for use.

Alternatives to the standard keyboard are:

- Ergonomic keyboards

Ergonomic keyboards are made to help the users' hands and wrists feel better when typing. They are designed to minimize the possibility of pain and problems such as repetitive strain injuries (RSI). The keyboards are divided into two parts so that when the user types, your hands are in a more comfortable position.



Figure 6. Ergonomic Keyboard 1



Figure 7. Ergonomic Keyboard 2



Figure 8. Ergonomic Keyboard 3

- Smaller, compact keyboards

Compact keyboards, like their name suggests, are smaller keyboards. The effective sizes of the buttons are similar enough to the sizes of a regular Laptop keyboard and, like a laptop, it saves space by removing the numeric keypad (this can be separate or some have one that comes out when required).

Compact keyboards can more easily fit between the arms of a wheelchair and they are often more comfortable to use for one-handed users.



Figure 9. A model of small Keyboards



Figure 10. Other types of small Keyboards

- Separate numeric keyboards

A separate numeric keypad is typically used with a solid keyboard and can be removed when not needed. It may also be positioned on either side of the keyboard, which may be useful for left-handed users.



Figure 11. Different models of Separate Keyboards

- Keyboards with larger keys

Keyboards that have larger keys (such as the BigKeys and Jumbo keyboards) facilitate key locating and provide a larger "target area". There are options with either uppercase or lowercase letter layouts.



Figure 12. Keyboard models with larger keys

There are other types of keyboards used for the needs of each user such as:

- Keyboards with more visible keys
- Maltron expanded keyboard
- Chording keyboard
- Braille displays
- Keyguards

Alternative Mice

An alternative mouse, at times referred as an adaptive or assistive device, is a specialized marking device that is designed specifically to offer an alternative method of control of a computer cursor for people with physical disabilities or for people who have difficulty using a regular computer mouse.

The requirement for specific drivers for alternative mice varies based on the type and brand of the mouse. Some may be recognized by Windows as standard pointing devices and work without additional drivers. Others, especially those with advanced features or specialized functions, may require the user to install drivers or software provided by the manufacturer.

Some common alternative mice are:

- Ergonomic Mice

The ergonomic mice often are available in left- and right-handed models and in different sizes to ensure that the mouse fits comfortably.



Figure 13. Different models of Ergonomic Mice

- Vertical Mice

The vertical mice relocate the carpus into a more natural "grip" position, transferring the motion to the stronger muscles of the shoulder.



Figure 14. Different models of Vertical Mice

- Bar Mice

The bar mice are positioned straight in front of the keyboard and have a "bar" that slides left and right and scrolls for up and down movement. The position of the bar allows the user to operate it with your thumbs and keeps your hands on or near the keyboard.



Figure 15. Different models of Mice Bars

- Rollerball Mice

Trackball, Trackerball or Rollerball mice remain stationary with the cursor controlled by rolling a ball with your thumb, fingers or palm. There is little to no wrist movement.



Figure 16. Different models of Rollerball Mice

- Larger ball tracking Mice

Larger ball tracking mice provide easy handling and can be especially helpful for users who lack fine motor skills, including those with learning disabilities, tremor or arthritis.



Figure 17. Different models of Large Trackball Mice

- Trackpads

Touchpads (or trackpads) are stationary pads that work by dragging (or swiping) your fingers on the surface; clicking may be done by buttoning or by pressing down/lightly tapping on the surface.



Figure 18. Trackpad 1



Figure 19. Trackpad 2



Figure 20. Trackpad 3

- Pen Mice & Graphics Tablets

The pen mice are hand-held like a pen. Tend to be quite bulky, similar in size to a marker pen. The left and right click buttons are perpendicular to the axis of the pen. Contrary to the above mentioned, the graphics tablets require a special tablet to write on, and the pens are more comfortable to hold because they tend to be more like normal pens.



Figure 21. Example of Graphic Tablet and Pen Mice

- Joysticks

Joysticks operate similarly to the controls on an electric wheelchair, with the location of the joystick defining the direction (and speed) of the mouse pointer.

Additional buttons on the joystick can function left, right and double-click, and other common shortcuts such as cut and paste.



Figure 22. Different models of Joystic Mouse

- Touchscreens

The Touch Screens use sensors on the screen to track movement and selections and they is a very direct method of interacting with the device. Tablets and smartphones are using

touchscreens, and many laptops as well. Touchscreens are also widely available for use with desktop computers.



Figure 23. Example of Touchscreen

- Head movement tracking

The head movement tracking uses the head motion to control the cursor. This may be done using a handheld device, like the head set in the picture, or by using a camera. By tracking head movement, the cursor is "driven" on the monitor in the same way that a joystick is used. Selections are made using a switch that can be controlled by a touch or bite (the blue light in the picture).



Figure 24. Head-tracking Device

- Eye Tracking Systems

The eye tracking systems monitor eye movement, using it to plot the position of the cursor on the screen. Remaining in one position causes a "click". This can be used to control programs as well as typing when used with the on-screen keyboard.

Eye movement tracking means that the cursor does not have to move on the screen and so is usually much faster than head movement tracking. Though originally designed for use by

individuals with very limited movement, eye-tracking hardware and software is now relatively inexpensive and can be an interesting alternative for people with temporary or situational disabilities; for example, a parent may be able to hold their baby and be able to interact with their computer.



Figure 25. A model of an Eye tracking Device

- Foot Mouse

Mouse systems with legs are usually designed to use both legs. One leg controls the cursor using a sliding selection on a mat.



Figure 26. Example of a Foot Mouse Device

To check if a specific adaptive keyboard or alternative mouse needs extra drivers for the user's computer, follow these steps:

1. **Read the User Manual**

Look in the user manual or device documentation that came with the keyboard or mouse. It might have instructions about installing drivers.

2. Visit the Manufacturer's Website

Go to the website of the company that made the device. Check if they offer drivers or software for the user's specific product. If they do, the user should download and install them.

3. Plug in the Device

Sometimes, when the user connects the device to their computer, Windows will automatically find and install the needed drivers. The user can test if the device works without extra drivers before trying to install them.

Remember that Windows usually comes with basic drivers for common input devices, and it can often recognize and set up regular adaptive keyboards and alternative mice. But, if the user's device has unique features, using the manufacturer's drivers can make sure it works fully and gives access to advanced functions.

2.1.4 Accessibility for people with Cognitive Impairments

In the world of technology, innovation knows no bounds, especially when it comes to making technology accessible for all. Customized keyboards designed to meet the specific cognitive needs of users are a shining example of this commitment. These keyboards go beyond the conventional, offering a simplified input experience, enhanced memory support, and minimized distractions.

Alternative – Custom Keyboards



Figure 27. Alternative Keyboard 1



Figure 28. Alternative Keyboard 2

Some companies offer customized keyboards designed for specific cognitive needs. These keyboards may have larger, color-coded keys, and can be programmed to simplify the input process.

These keyboards are tailored to address challenges related to memory, attention, and motor skills, and they can help people work more effectively on their PCs in several ways:

- **Simplified Input**

Customized keyboards often feature larger and more prominent keys with clear and easy-to-read labels. This can make it easier for individuals with cognitive impairments to locate and press the correct keys, reducing the chances of input errors.

- **Color-Coding**

Many of these keyboards use color-coded keys to help users associate specific functions or keys with distinct colours. This visual aid can assist in memory retention and cognitive processing.

- **Programmability**

Customized keyboards can be programmed to simplify the input process further. Users and caregivers can assign specific functions or commands to individual keys, making it more intuitive and reducing the complexity of using a standard keyboard.

- **Visual and Auditory Feedback**

Some custom keyboards offer visual and auditory feedback. For example, a keypress may trigger a visual or auditory cue to reinforce the action, which can enhance memory and recognition for users with cognitive impairments.

- **Reduced Distractions**

Custom keyboards often have fewer keys, removing unnecessary or potentially distracting keys that may confuse users. This streamlined approach can help users stay

focused on the essential tasks at hand.

Many alternative keyboards, especially those with unique features or layouts, may require specific drivers or software to ensure full compatibility with Windows. These drivers or software are essential to make the keyboard's special functions or customizations work correctly with the operating system.

Before purchasing such a keyboard, it's essential for the user to check the manufacturer's specifications and compatibility information. The manufacturer typically provides information about the required drivers or software that need to be installed on the user's Windows system for the keyboard to function properly. Additionally, they might offer support resources or downloads on their website.

In some cases, Windows might automatically recognize and install basic drivers for alternative keyboards, but for full functionality and customization, it's often advisable for the user to install the manufacturer's recommended drivers or software.

Touchscreen Monitors



Figure 29. Different types of Touchscreen Monitor

Touchscreen monitors can be seamlessly connected to a Windows laptop or PC through USB, HDMI, or DisplayPort, offering a tactile and intuitive interaction experience. This technology holds notable benefits for individuals with cognitive impairments, providing an accessible means of engagement. The intuitive nature of touchscreens simplifies tasks, and the tactile feedback, coupled with visual aids, enhances the overall user experience. Features such as multi-touch support, high resolution, adjustable stands, and anti-glare technology contribute to a more comfortable and adaptable interface. Notable models include:

- the Dell P2418HT,

- HP EliteDisplay E230t, and
- ViewSonic TD2230, each offering unique features to cater to diverse needs.

While Windows operating systems typically support touch input without additional downloads, users may explore specific software options to further enhance accessibility features. Consideration of compatibility and specifications ensures an optimal and tailored solution for individuals with cognitive impairments.

2.1.5 Exercises

2.1.5.1 Quizzes for Visual Impairments

Quiz 1

1. From the devices that you read in the Chapter **MS Windows → Accessibility for people with Visual Impairments**, please select/find the referred assistive devices:

A. Juicer

B. Braille Displays

C. USB Stick

A. CD Player

B. Screen Magnifiers

C. Power supply

A. Head-Mounted Displays

B. Motherboard

C. Refinery

Answers: B, B, A

Quiz 2

Select the most appropriate option for each question.

1. What is the primary purpose of Braille displays?

- A.** Enlarging screen content
- B.** allowing users to read digital content by touch
- C.** Offering virtual reality experiences

Answer: B

Quiz 3

Indicate whether the following statements are True or False.

- A.** Braille displays are touchscreen devices that use small pins or cells to form Braille characters for users to read by touch. Answer: (T)
- B.** Screen magnifiers enlarge screen content and are only hardware-based devices. Answer: (F)
- C.** Head-Mounted Displays may offer features like text-to-speech feedback or visual spatial awareness cues to assist visually impaired individuals. Answer: (T)

Quiz 4: Select the Correct Sentence

Choose the correct sentence among the provided options.

- A.** "Screen magnifiers are wearable devices that offer a direct view of the visual interface."
- B.** "Braille displays consist of a series of small pins or cells that move up and down".
- C.** "Head-Mounted Displays use a series of small pins to form Braille characters for reading."

(Answer: B)

2.1.5.2 Quizzes for Hearing Impairments

Quiz 1

Choose the correct term that corresponds to the described audio devices.

- A.** Visual Aids
- B.** Hearing Aids
- C.** Assistive Reading Devices

- A.** Optical Implants
- B.** Cochlear Implants
- C.** Audio Enhancers

- A.** Visual Assistance Devices
- B.** Assistive Listening Devices
- C.** Speech Recognition Devices

Answers: B, B, B

Quiz 2

Select the most appropriate option for each question.

1. What type of technology is often integrated into modern hearing aids for connectivity with Windows devices?

- A.** Infrared technology
- B.** Bluetooth technology
- C.** Wi-Fi technology

Answer: B

2. What may cochlear implants require for compatibility with Windows?

- A. Specific drivers or software
- B. General audio cables
- C. USB connectivity

Answer: A

3. How do users typically set up Bluetooth hearing aids with Windows computers or smartphones?

- A. Through an optical cable
- B. Following the standard Bluetooth pairing process
- C. Using specialized hearing aid software

Answer: B

Quiz 3

Indicate whether the following statements are True or False.

- A.** Windows typically includes built-in support for Bluetooth hearing aids.

Answer: (T)

- B.** Cochlear implants always work as standard audio output devices without the need for additional drivers.

Answer: (F)

- C.** Assistive listening devices require only Bluetooth to be connected to Windows.

Answer: (F)

2.1.5.3 Quizzes for Physical Impairments

Quiz 1

Choose the correct term that corresponds to the described adaptive keyboards in the chapter of MS Windows → Accessibility for people with Physical impairments.

A. Custom Keyboards

B. Processor

C. Electronic Circuits

A. Smaller, Compact Keyboards

B. Pen Mice & Graphics Tablets

C. Larger Ball Tracking Mice

A. Joysticks

B. Trackpads

C. Solid State Drive

Answers: A, A, B

Quiz 2

Select the most appropriate option for each question.

What is a common feature of adaptive keyboards?

A. Built-in speakers for audio enhancement

B. Programmable key layouts and larger buttons

C. Compatibility with virtual reality applications

Answer: B

What is a characteristic of rollerball mice?

- A.** They feature a bar that slides left and right
- B.** They are controlled by rolling a ball with the thumb
- C.** They use touchscreens for movement and selection

Answer: B

Quiz 3

Indicate whether the following statements are True or False.

- A.** Compact keyboards are larger than regular laptop keyboards.

Answer: (F)

- B.** Touchscreens are exclusively used in tablets and smartphones.

Answer: (F)

2.1.5.4 Quizzes for Cognitive Impairments

Quiz 1

Select the Correct Word

1. Alternative keyboards often feature larger and more prominent keys with clear and easy-to-read ____.

- A)** Labels
- B)** Locks
- C)** Legumes
- D)** Libraries

Answer: a) Labels

2. Many alternative keyboards use ____ keys to help users associate specific functions or keys with distinct colours.

- A) Under covered
- B) Color-coded
- C) Corroded
- D) Cooked

Answer: b) Color-coded

Quiz 2: Multiple Choice

1. Alternative keyboards are designed to help with challenges related to:

- A) Cooking
- B) Memory, attention, and motor skills
- C) Planting
- D) Musical skills

Answer: b) Memory, attention, and motor skills

Quiz 3

Select if the following sentence is True or False

1. Alternative keyboards may require specific drivers or software for full compatibility with Windows.

Answer: True

2.1.6 Resources

Visual Impairments

Braille Displays: Directions, usage and videos

- <https://www.youtube.com/watch?v=LMfQNkRR9N0>
- https://www.youtube.com/watch?v=SlxIEPEC_Qc
- <https://www.youtube.com/watch?v=u6queueGsa-Q>

- <https://www.youtube.com/watch?v=R6XAPkiQMtw>

Screen Magnifiers: Examples and Videos

- <https://www.youtube.com/watch?v=lvMjGYbBzy0>
- https://www.youtube.com/watch?v=iY5Ge_2BfNA
- <https://www.youtube.com/watch?v=CO6kZvMNUHQ>

Head Mounted Displays: Informative Videos

- <https://www.youtube.com/watch?v=ZgFGMZTvoX0>
- <https://www.youtube.com/watch?v=BVZSqtjgil>
- <https://www.youtube.com/watch?v=6NNmpbU7GMA>

Hearing impairments

Audio Devices: Video Supplies

- <https://www.youtube.com/watch?v=74njYT6a1Lw>
- <https://www.youtube.com/watch?v=ciEG0dRsEAo>

Physical Impairments

Adaptive Keyboards: Types and Usage

- <https://www.youtube.com/watch?v=Y98UIIPO44U>
- <https://www.youtube.com/watch?v=e6l7fdUk2ps>

Alternative Mice:

- <https://www.youtube.com/watch?v=nk8iFKcBsh0>
- https://www.youtube.com/watch?v=VeFqbl5Y_kw
- <https://www.youtube.com/watch?v=lunffeei1D8>
- <https://www.youtube.com/watch?v=l6KIWnRem6Y>

Cognitive Impairments

Touchscreen Monitors: Examples

- <https://www.youtube.com/watch?v=Q6zSrV9UgAI>
- <https://www.youtube.com/watch?v=8yqDOsgVVJE>
- https://www.youtube.com/watch?v=De2MwwES_iw

2.2 Mac OS

macOS, Apple's operating system for Mac desktops and laptops, is a proprietary OS designed to optimize performance on specific hardware. It manages resources like memory and processing power to execute tasks efficiently.

macOS provides a diverse range of features and applications for users, enhancing various aspects of their experience:

- **Media Features:** Users can engage with content through applications like Music, TV, Podcasts, Books, and Photos.
- **Creativity-Based Features:** Applications such as Photos, GarageBand, and iMovie empower users to view, edit, and create media.
- **Productivity Features:** Graphic tools are available in applications like Pages, Numbers, and Keynote for efficient work.
- **Communications Features:** Communication is facilitated through text, visual, and audio applications like Mail, Messages, and FaceTime.
- **Organization Features:** Applications such as Notes, Reminders, Calendar, Voice Memos, and Contacts help users find and manage their content.
- **iCloud:** Users can access and share content seamlessly across different devices.
- **Accessibility Features:** Assistive tools like VoiceOver, Accessibility Keyboard, and Text to Speech cater to users with disabilities.
- **Compatibility Features:** Easy transfer of Windows-based files, running Microsoft Office or Windows on a Mac provides flexibility.

These applications come pre-installed and are optimized for macOS, ensuring efficient resource allocation. Recent additions include focus modes for customized notifications, Live Text for copying text from photos, universal control for seamless device interaction, and a Recording Indicator for enhanced security, revealing which apps have microphone access.

Assistive technologies play a crucial role in enhancing accessibility on Apple PCs, making them more inclusive for users with diverse needs. These technologies offer valuable features and

capabilities that cater to individuals with visual impairments, low vision, motor disabilities, and other accessibility challenges.

However, a significant challenge with some Apple devices lies in their ports. For instance, Apple devices do not have USB ports; instead, they utilize the original port type in Mac PCs known as Thunderbolt. Consequently, users often need a special device called a DOKER to connect peripherals with USB and other commonly used ports to Apple PCs.

Examples of Dockers include:

i-tec USB 3.0 / USB-C / Thunderbolt 3 Dual Display Docking Station



Figure 30. Image of Cadual4kdock-2 Device

The i-tec USB 3.0 / USB-C / Thunderbolt 3 Dual Display Docking Station, known as cadual4kdock-2, is a versatile and high-performance docking solution. This secure universal docking station, part of the i-tec Docker Pro series, facilitates maximum performance by enabling the connection of up to two monitors simultaneously. Users can customize their workspace and link assistive accessories to laptops or tablets using USB-A 3.0 or USB-C. The docking station features six USB ports for seamless connection of USB devices and peripherals. With GLAN Ethernet support, it ensures network speeds of 10/100/1000 Mbps, delivering a robust and high-speed internet connection. Additionally, the dock is VESA mount-compatible, allowing for vertical mounting behind a monitor.

i-tec Thunderbolt 3 Travel Dock Dual 4K Display with Power Delivery 60W + i-tec Universal Charger 77 W



Figure 31. Image of Thunderbolt 3

This Thunderbolt 3/4 secure universal docking station from the i-tec Docker Pro series offers a great performance in a compact design. Capable of connecting up to two 4K external monitors or one at 8K/30Hz, it features DisplayPort and HDMI ports for versatile display options. Users can effortlessly connect their USB devices and peripherals. The inclusion of Gigabit Ethernet RJ-45 ensures reliable, robust, and high-speed internet connectivity supporting 10/100/1000 Mbps speeds. Additionally, a combined jack for audio and microphone enhances the station's functionality. It is noted that the package includes a 77W (65W USB-C PD) power supply, and the dock can also be utilized with the USB-C PSU provided with the laptop, available as a standalone item.

i-tec USB4 Metal Docking station Dual 4K HDMI DP with Power Delivery 80 W + i-tec Universal Charger 100 W



Figure 32. Image of i-tec USB4 Metal Docking station

This secure universal docking solution from the i-tec Docker Pro series is compatible with USB4, USB-C, and Thunderbolt laptops and tablets, with the host device required to support DisplayPort Alt mode. The docking station features 1x DisplayPort and 1x HDMI, supporting dual 4K/60Hz or a single 8K/30Hz display, contingent on host performance, connecting multiple USB devices and peripherals is convenient. Additional features include GLAN Ethernet for network speeds of 10/100/1000 Mbps, SD and microSD slots for memory cards, and a combo 3.5mm audio input/output jack for easy connection to headsets or speakers.

**i-tec Thunderbolt 3/USB-C Dual 4K Docking Station + USB-C to DisplayPort Cable (1,5 m)
+ Power Delivery 60W**



Figure 33. Image of i-tec Thunderbolt 3/USB-C

This secure universal docking station from the i-tec Docker Pro series delivers high performance and supports two external screens. Compatible with Thunderbolt, USB4, and USB-C laptops and tablets (host device must support DisplayPort Alt mode), it features 1x HDMI and 1x Thunderbolt 3 ports, supporting dual 4K/60Hz or a single 8K/30Hz display depending on host performance. Provides connecting multiple USB devices and peripherals is effortless. Providing up to 60W Power Delivery for compatible USB4, USB-C, and Thunderbolt laptops and tablets. The inclusion of GLAN Ethernet supports network speeds of 10/100/1000 Mbps, offering a robust and high-speed internet connection. Additional features include SD and microSD slots for memory card connection, and a combo 3.5mm audio input/output jack for easy headset or speaker connection.

(link to VIKO part 4.4. [Accessibility features on Mac.](#))

2.2.1 Accessibility devices for people with Visual Impairments

In some cases, Apple's macOS is pre-equipped to support these technologies without the need for additional drivers but in the majority of them the user has to implement an adaptor in order to connect the majority of the assistive devices. For instance, Braille Displays and Screen Magnifiers, or High-Contrast Keyboards are typically plug-and-play devices that need an adaptor to connect with mac computers that have no usb ports.

Some devices that can be connected to Apple OS:

Braille Displays - Focus 40 Blue Braille Display by VFO



Figure 34. Images of Braille display Devices

The Focus 40 Blue Braille Display by VFO is designed with features tailored to enhance accessibility for individuals with visual impairments. Sporting 40 braille cells, it provides a line of refreshable braille for users, complemented by navigation buttons to facilitate easy movement through text. The inclusion of Bluetooth connectivity makes this braille display versatile, allowing wireless connections to various devices, including computers, smartphones, and tablets. Its portability adds to its assets, making it a convenient tool for on-the-go users seeking accessibility across different platforms.

This braille display is an asset for users who rely on braille to access digital content. Its seamless integration with screen reader software, such as JAWS, NVDA, or VoiceOver, ensures a comprehensive and interactive experience. The device likely supports both Bluetooth and USB connections, offering users flexibility in how they connect to their devices. While specific software details may vary, it's common for braille displays to be compatible with widely used screen reader applications, and manufacturers may offer device-specific software to enhance functionality or provide firmware updates. For the most accurate and up-to-date

information, users are encouraged to check the official VFO website or contact VFO customer support directly.

High-Contrast Keyboards - LogicKeyboard Large Print White on Black Keyboard



Figure 35. Images of High-Contrast Keyboards

The LogicKeyboard Large Print White on Black Keyboard is a specialized input device designed to enhance accessibility for users with visual impairments or those who benefit from high-contrast keyboards. Featuring large, high-visibility key labels with white characters on a black background, this keyboard improves readability and reduces eye strain. The large print ensures that users can easily identify and locate keys, making it an ideal solution for individuals with low vision or those who prefer a more distinct visual layout. This keyboard follows a standard layout, maintaining compatibility with various operating systems, and it offers a USB connection for straightforward integration with a wide range of computers and devices.

In addition to its accessibility features, the LogicKeyboard Large Print keyboard provides a comfortable typing experience with low-profile keys that have a soft touch for smooth and quiet operation. The durable construction ensures longevity, and its user-friendly design makes it suitable for individuals of all ages and abilities. Whether used in educational settings, professional environments, or at home, the LogicKeyboard Large Print White on Black Keyboard stands out as an effective and inclusive tool for individuals seeking a visually enhanced and ergonomic typing solution.

For the most accurate and up-to-date information, users are encouraged to refer to the manufacturer's specifications and guidelines.

2.2.2 Accessibility devices for people with Hearing Impairments

Imagine a world where everyone can hear and be heard. Thanks to special hearing aids that can connect to Mac computers, people with hearing difficulties can join in conversations, attend meetings, and enjoy the sounds of daily life. These clever devices not only make things louder

but also help cut out unwanted noises. With them, everyone gets to be part of the conversation, making the digital world a more inclusive place for all.

Some devices that can be connected to Mac OS:

Bluetooth Hearing Aids



Figure 36. Images of Bluetooth Hearing Aids

Bluetooth hearing aids are designed to provide a seamless and convenient connection between the user's macOS laptop and their hearing aids. To use Bluetooth hearing aids with a macOS laptop, the user needs to ensure that their laptop has the necessary hardware and software support. This includes checking for Bluetooth compatibility, supporting Bluetooth Low Energy (BLE), and ensuring accessibility features are enabled on macOS. Additionally, the user should be aware of any specific drivers or software provided by their hearing aid manufacturer and whether their hearing aids can be adjusted via the macOS laptop. Keeping both the macOS operating system and hearing aid firmware up to date is essential, and the user should be mindful of their laptop's battery life when using Bluetooth for extended periods. In most cases, Bluetooth hearing aids should work efficiently with a macOS laptop, but following the manufacturer's guidance and staying updated with software and firmware can ensure a smoother experience.

MacOS generally supports standard Bluetooth profiles that most hearing aids use. However, to ensure seamless compatibility and functionality, the user should follow these steps:

Step 1: The user should start by pairing their Bluetooth hearing aids with their macOS laptop. To do this, go to the Bluetooth settings on the Mac, make sure Bluetooth is turned on, and follow the pairing instructions provided with the hearing aids. The macOS should detect and pair with the hearing aids without the need for additional drivers.

Step 2: The user should make sure their hearing aids have the latest firmware updates. Hearing aid manufacturers often release firmware updates to enhance compatibility and performance with various devices, including macOS. The user may need to connect their hearing aids to a smartphone or a dedicated app to update their firmware.

Step 3: macOS offers several accessibility features that can be used to optimize the user's experience with hearing aids. These include options for adjusting sound balance, enabling mono audio, and turning on closed captions.

Step 4: The user should check the official website of their hearing aid manufacturer or contact their customer support to see if they offer any specific software or guidance for macOS users. Some manufacturers provide custom applications that allow users to fine-tune their hearing aids using a Mac.

In general, macOS should work with standard Bluetooth hearing aids without requiring additional drivers. However, it's essential for the user to ensure that both their macOS operating system and hearing aids have the latest updates to maintain compatibility and optimize their hearing aid experience.

Assistive Listening Systems (ALS)



Figure 37. Images of a variety of ALS

Assistive Listening Systems can be used with macOS laptops or desktop computers to improve audio clarity. These systems include various components like personal amplifiers, induction loop systems, and FM systems.

- **Induction Loop Systems:** If the user has a hearing aid with a T-coil (telecoil) feature, they can use induction loop systems. These systems transmit audio signals wirelessly to the user's hearing aid when they're within the loop's range.



Figure 38. Image of Induction Loop Systems

- **FM Systems:** These systems use wireless signals to transmit audio to a receiver that can be connected to the user's hearing aids. They are often used in classrooms, theaters, and other public places.



Figure 39. Image of FM Systems

- **Personal Amplifiers:** Personal amplifiers are portable devices that amplify sound. They can be connected to the user's macOS laptop or other devices via a compatible cable.



Figure 40. Image of Personal Amplifiers

Assistive Listening Systems (ALS) typically do not require specific drivers for macOS compatibility. Most ALS are designed to work with standard audio output options available on macOS devices. However, some ALS accessories may require additional software, and the user should check the manufacturer's recommendations for specific instructions.

Steps to ensure compatibility:

- Step 1: The user should ensure that their hearing aids are compatible with ALS. If their hearing aids have a telecoil (T-coil) or Bluetooth capabilities, it can make the connection process more straightforward.
- Step 2: Depending on the user's hearing aids' compatibility and their specific needs, they should choose an ALS that suits their situation. For example, if the user often attends public events, induction loop systems or FM/infrared systems may be suitable. For personal use, personal amplifiers can be a good choice.
- Step 3: Connect the ALS to the user's macOS laptop or desktop using the appropriate cables or wireless connections. Ensure that the ALS is powered and functioning correctly.
- Step 4: If the user's ALS has adjustable settings, they should configure them according to their preferences. Some ALS allow the user to control the volume, tone, and other audio settings.

- Step 5: On the user's macOS device, go to the sound settings and select the ALS as the audio output source. This will route the audio from the macOS device to the ALS and, subsequently, to the user's hearing aids or receivers.
- Step 6: Test the system by playing audio on the user's macOS device and adjusting the volume and settings on both the macOS device and the ALS to achieve the best audio quality and clarity.

2.2.3 Accessibility devices for people with Physical Impairments

Apple's macOS, iPadOS, and iOS platforms, as mentioned earlier in the Mac OS chapter, can be connected to assistive devices through the use of an adapter with USB ports. Most devices connect to computers or laptops using this method. This inclusive approach empowers users with disabilities to personalize their computing experience, promoting independence and enhancing productivity. In this context, we explore a diverse range of accessible devices that align with Apple's operating systems, enabling users to leverage cutting-edge assistive technologies for a more inclusive and personalized computing environment. These devices can connect to all operating systems as long as the appropriate ports are available on the computer or adapters used.

TrackBall Mice – Logitech MX Ergo Wireless Trackball Mouse



Figure 41. Image of a Trackball Mouse model

Trackball mice are input devices that offer a unique alternative to traditional mice, featuring a stationary ball on the top that users manipulate with their fingers or palm to control the cursor on the screen. The design provides a comfortable and ergonomic option, reducing the need for extensive wrist movement. Trackball mice are particularly beneficial for users with mobility or dexterity issues, as they allow precise cursor control without the need to physically move the entire mouse. Many trackball mice come equipped with programmable buttons, scroll wheels, and customizable sensitivity settings, catering to the preferences and requirements of individual users.

When it comes to connectivity, trackball mice are available in both wired and wireless options, and many are compatible with Mac devices. They can be connected to Mac computers via USB or Bluetooth, ensuring a seamless integration process. Typically, these mice operate as plug-and-play devices, requiring no additional software installation for basic functionality. However, some models may come with software options that allow users to customize button assignments, sensitivity levels, and other settings based on their specific needs. The versatility and user-friendly design of trackball mice make them suitable for various tasks, from casual computer use to professional applications where precision and comfort are essential.

Users interested in specific features or compatibility details should check the product specifications provided by the manufacturer.

Switch Access Devices



Figure 42. Images of different Switch Access Devices

Switch access devices are used to provide an alternative means of input for individuals who may have difficulty using traditional input devices like keyboards or mice. Users activate the switch through movements they can perform, such as pressing a button with their hand, head, foot, or any other part of the body with controlled movement. These devices are particularly beneficial for people with conditions such as cerebral palsy or spinal cord injuries.

Features:

- Users can often customize the switch input to perform specific actions, such as clicking, scrolling, or navigating through menus.
- Switch access devices are designed to be compatible with various devices, including computers. They often support common operating systems like macOS.
- Many devices offer adjustable sensitivity settings to cater to individual user needs.
- Switch access devices can be used for a range of applications, from navigating a computer interface to controlling environmental elements or communication devices.

Examples that connect to Mac OS:

1. TASH Jouse3:

The TASH Jouse3 is a joystick-based switch device that allows users to control the mouse pointer and perform clicks using a simple sip or puff action.

It can connect to Mac OS, providing an accessible way for users to interact with Mac computers.

2. Tecla Shield:

Tecla Shield is a switch interface that enables users to control smartphones, tablets, and computers using external switches or the device's built-in switches.

It connects to Mac OS and provides a range of customization options for switch inputs.

3. AbleNet Hook+ Switch Interface:

The AbleNet Hook+ is a switch interface that allows users to connect multiple switches for various control options. It supports a range of switch types.

It is compatible with Mac OS, offering a versatile solution for users with different motor abilities.

AbleNet BIGtrack Trackball Mouse



Figure 43. Image of Trackball Mouse

The AbleNet BIGtrack Trackball Keyboard serves as an assistive technology solution, specifically crafted for individuals contending with motor or dexterity challenges, offering enhanced computer navigation. Tailored for those encountering difficulties with standard mice or keyboards, this device introduces key features to address specific needs. Its standout attributes include a large trackball, ideal for users with limited fine motor control, color-coded buttons for easy identification and activation, durable construction ensuring stability, and straightforward operation requiring users to roll the trackball for cursor control and utilize color-coded buttons for mouse clicks.

Moreover, the device commonly supports switch access, enabling users to connect external switches for additional functionalities such as left and right clicks. In terms of compatibility, the AbleNet BIGtrack is generally well-suited for various operating systems, such as Windows and macOS.

2.2.4 Accessibility devices for people with Cognitive Impairments

In the technological landscape, specialized tools emerge as invaluable aids for individuals facing cognitive challenges. These tools, exemplified by personalized apps and software compatible with Mac computers, serve as functional guides. They offer assistance in memory retention, organizational tasks, and overall productivity. Analogous to a supportive companion, these tools streamline the computer usage experience for everyone, fostering a more accommodating digital environment for individuals requiring additional support.

Customizable Keyboards



Figure 44. Different types of Customizable Keyboards

Customizable keyboards are input devices with keys that can be configured and programmed to perform specific functions or actions according to the user's preferences. These keyboards offer flexibility in layout, key assignments, and sometimes even the appearance of keys, catering to individual needs and improving accessibility.

Customizable keyboards are used to enhance the typing experience for individuals with specific requirements, including those with physical disabilities or cognitive impairments. They allow users to adapt the keyboard to their unique needs, making it more comfortable and efficient for their work or daily computer activities.

Features:

- Users can assign different functions or macros to individual keys, allowing for customized shortcuts or commands.
- Some customizable keyboards feature backlit keys, aiding visibility in various lighting conditions.
- Users may be able to adjust the sensitivity of keys to accommodate different typing preferences.
- Certain models allow the customization of keycap labels or symbols for improved visibility.
- Many customizable keyboards come with ergonomic designs to enhance user comfort during extended typing sessions.

Software for Mac OS

Customizable keyboards may require specific software for programming and configuring key assignments. Examples of software that may be used with customizable keyboards on Mac OS include:

- **Keyboard Maestro**

This automation software for Mac allows users to create custom macros, key mappings, and automation scripts for enhanced keyboard functionality.

- **Karabiner-Elements**

This open-source software enables advanced customization of keyboard layouts, key remapping, and other modifications on Mac OS.

Customizable Touchpads



Figure 45. Images of Built-in and non-built in touchpad

Customizable touchpads are input devices with touch-sensitive surfaces that can be configured and programmed to perform specific functions or gestures according to user preferences. These touchpads offer flexibility in user interaction, allowing individuals to tailor the touchpad's behaviour to their specific needs and enhance their overall computing experience.

Customizable touchpads are used as an alternative or complement to traditional mice or trackpads. They serve a variety of purposes, including navigation, gesture control, and accessibility improvements. Users can customize gestures and commands to streamline tasks, making the touchpad a versatile tool for both general computer use and specialized applications.

Features:

- Users can define and customize gestures for various actions such as scrolling, zooming, and launching applications.
- Some customizable touchpads come with programmable physical buttons that can be assigned specific functions or macros.

- Users may have the option to adjust the sensitivity of the touchpad to suit their preferences and control requirements.
- The ability to customize tapping actions, including single-tap, double-tap, and triple-tap, enhances user control and efficiency.
- Many customizable touchpads integrate seamlessly with accessibility software, allowing individuals with motor impairments to configure the touchpad according to their unique needs.

Connection to Mac OS

Connecting a customizable touchpad to Mac OS is typically straightforward. The process involves the following steps:

- **Plug and Play**

Many customizable touchpads connect to Mac computers using USB or Bluetooth, allowing for easy plug-and-play functionality, only if an adaptor is implemented on the Mac OS system.

- **Bluetooth Pairing**

For wireless touchpads, users can activate Bluetooth on their Mac, put the touchpad in pairing mode, and select it in the Bluetooth settings to establish a connection.

Some touchpads may come with specific drivers or software that need to be installed on the Mac for full customization features. Users should check the manufacturer's instructions for details.

Examples of customizable touchpads:

- **Logitech T650 Wireless Rechargeable Touchpad** → This touchpad features customizable gestures, such as swiping and tapping. It connects to Mac OS via a USB receiver (if an adaptor is implemented on the computer with the suitable USB port) or Bluetooth.
- **Apple Magic Trackpad** → Designed specifically for Mac, this touchpad supports a variety of gestures and provides a large, smooth surface for navigation. It connects to Mac computers via Bluetooth.

- Dell TP713 Wireless Touchpad → This touchpad offers customizable gestures and buttons. It connects to Mac OS wirelessly via Bluetooth.

2.2.5 Exercises

Quizzes for Visual Impairments

Quiz 1

Select the correct sentences for the LogicKeyboard Large Print Keyboard

- A. LogicKeyboard Large Print White on Black Keyboard has small, low-visibility key labels.
- B. This keyboard is not suitable for individuals with visual impairments.
- C. The LogicKeyboard Large Print keyboard offers a USB connection for integration with various devices.
- D. The keyboard's design is not user-friendly.

Answers: C

Quiz 2: True or False

The LogicKeyboard Large Print White on Black Keyboard is designed to help users with visual impairments.

Answer: True

Quizzes for Hearing Impairments

Quiz 1

Select the correct word

1. Bluetooth hearing aids provide a seamless connection between the user's macOS laptop and their hearing aids, enhancing _____.

- A. accountability

B. accessibility

C. electricity

2. The user should ensure that their laptop supports Bluetooth Low Energy (BLE) and has _____ features enabled on macOS.

A. accessibility

B. collaboration

C. security

3. To use Bluetooth hearing aids efficiently, it's crucial to keep both the macOS operating system and hearing aid _____ up to date.

A. firmware

B. box

C. mask

Answers: B, A, A

Quiz 2

Select the correct sentence if it is True or False.

1. ALS typically requires specific drivers for macOS compatibility.

2. Personal amplifiers are often used in public places like classrooms and theaters.

3. To connect ALS to a macOS laptop, the user should select the ALS as the audio output source in the display settings.

Answers: F, T,T

Quiz 3

Multiply Choice:

1.How can the user optimize their experience with Bluetooth hearing aids on a macOS laptop?

- A.** Adjusting the laptop's screen brightness
- B.** Keeping the laptop in sleep mode
- C.** Ensuring the hearing aids have the latest firmware updates

2.What should the user check for in their hearing aids to use induction loop systems?

- A.** Bluetooth capabilities
- B.** T-coil (telecoil) feature
- C.** USB connectivity

Answers: C, B

Quiz 4

True/False: Bluetooth hearing aids should work efficiently with a macOS laptop without the need for additional drivers.

True/False: macOS generally supports standard Bluetooth profiles that most hearing aids use

Answers: T, T

Quizzes for Physical Impairments

Quiz 1

Select the Correct Word

1.Trackball mice provide a unique alternative to traditional mice, featuring a stationary ball on the top that users manipulate with their fingers or palm to control the _____ on the screen.

- A.** cursor
- B.** keyboard
- C.** monitor

2.Trackball mice are particularly beneficial for users with _____ issues, as they allow precise cursor control without the need to physically move the entire mouse.

- A.** vision
- B.** mobility
- C.** hearing

Answers: A, B

Quiz 2

Select the sentence if it's True or False

True/False: Trackball mice are only available in wired options, and they are not compatible with Mac devices.

True/False: Trackball mice typically require additional software installation for basic functionality beyond plug-and-play.

Answers: F, F

Quiz 3

Choose the correct sentence:

1. Which of the following is a benefit of trackball mice?
 - A.** Increased need for extensive wrist movement
 - B.** Precise cursor control without moving the entire mouse
 - C.** Exclusively designed for professional applications

2. How can trackball mice be connected to Mac computers?
 - A.** Only via USB
 - B.** Only via Bluetooth
 - C.** Both via USB and Bluetooth

3. What customization options may trackball mice offer?
 - A.** Customizable sensitivity settings
 - B.** Fixed button assignments
 - C.** Limited user-friendly design

Answers: B, C, A

Quiz 4

Multiple Choice

1. What is the primary function of switch access devices?
 - A.** Enhancing screen brightness
 - B.** Providing an alternative means of input
 - C.** Acting as external speakers

2.Which part of the body can users use to activate switch access devices?

- A.** Eyes
- B.** Nose
- C.** Controlled movement part (e.g., hand, head, foot)

3.What is a feature of switch access devices?

- A.** Lack of compatibility with common operating systems
- B.** Inability to customize switch inputs
- C.** Adjustable sensitivity settings

Answers: B, C, C

Quizzes for Cognitive Impairments

Quiz 1

Chose which sentence is True or False

True/False: Customizable keyboards allow users to assign different functions or macros to individual keys.

True/False: Customizable keyboards may feature backlit keys to aid visibility in various lighting conditions.

Answers: T, T

Quiz 2

Multiple Choice

1.What can users define and customize for various actions on customizable touchpads?

- A.** Screen brightness
- B.** Gestures

C. Keyboard shortcuts

2. What is one feature of customizable touchpads?

A. Fixed tapping actions

B. Inability to adjust touchpad sensitivity

C. Programmable physical buttons

Answers: B, C

Quiz 3

Select the Correct Sentence

Which software allows users to create custom macros, key mappings, and automation scripts for enhanced keyboard functionality?

A. Karabiner-Elements

B. Keyboard Maestro

C. Microsoft Word

What is a feature of customizable keyboards?

A. Limited key assignments

B. Ergonomic designs for discomfort

C. Customization of keycap labels for improved visibility

Answers: B, C

Quiz 4

Select the Correct Word

1.What is a versatile tool for both general computer use and specialized applications?

- A. Keyboard
- B. Trackpad
- C. Mouse

2.What is a seamless way to connect customizable touchpads to Mac computers?

- A. Plug and Play
- B. Manual Configuration
- C. Wired Connection

Answers: B, A

2.2.6 Resources

Visual Impairments

Here are some videos showcasing assistive devices.

High Contrast Keyboards – Examples

- <https://www.youtube.com/watch?v=u-KmO9Dg29I>
- <https://www.youtube.com/watch?v=4BHKf09VQgA>

Screen Magnifiers – Examples and screen protector

- <https://www.youtube.com/watch?v=VJimuG6hR7s>
- <https://www.youtube.com/watch?v=lcGqoUWjXtw>

Physical Impairments

Let's explore videos showcasing the aforementioned devices that are available for use.

TrackBall Mice – Logitech MX Ergo Wireless Trackball Mouse

- <https://www.youtube.com/watch?v=Db6ux01T83Q>
- <https://www.youtube.com/watch?v=-v4kGQsLZWU>

AbleNet BIGtrack Trackball Mouse

- <https://www.youtube.com/watch?v=rgtdeqaFaEI>

Cognitive Impairments

Let's explore some features of the Touchpads for Desktops

Touchpads for Desktop – Examples

- <https://www.youtube.com/watch?v=DU-T9u5zmrs>
- <https://www.youtube.com/watch?v=798Rz6pHh5w>

Apple has itself official web site and YouTube Channel about Apple devices accessibility:

- <https://www.apple.com/shop/accessories/all/accessibility>
- <https://www.youtube.com/@Apple/search>

2.3 Linux OS

Similar to Windows, iOS, and macOS, Linux functions as an operating system, playing a crucial role in managing hardware resources for desktops and laptops. Notably, Android, a widely-used platform, operates on the Linux OS. The Linux OS consists of key components:

- **Bootloader:** Manages the computer's boot process, often presented as a splash screen for users.
- **Kernel:** The core element named 'Linux,' governing CPU (Central Processing Unit), memory, and peripheral devices at the lowest OS level.
- **Init System:** Bootstraps the user space, controlling daemons.
- **Daemons:** Background services like printing and sound, initiating during boot or after logging into the desktop.
- **Graphical Server:** Sub-system displaying graphics on the monitor, known as the X server or simply X.

- Desktop Environment: The user-interaction component, offering various choices like GNOME, Cinnamon, KDE, etc., each equipped with built-in applications.
- Applications: Linux provides a vast array of high-quality software titles, similar to Windows and macOS. Modern Linux distributions feature centralized tools (e.g., Ubuntu Software Center) for easy app discovery and installation.

2.3.1 Accessibility for people with Visual Impairments

In the context of the Linux operating system, a robust ecosystem of assistive hardware devices has emerged to address the unique needs of users with visual challenges. These devices seamlessly integrate with Linux, providing tactile, auditory, or braille-based solutions that augment the user experience. From specialized braille displays and screen readers to innovative navigation tools, these assistive hardware devices on Linux contribute to a more inclusive computing environment, breaking down barriers and enabling individuals with visual impairments to harness the full potential of technology.

BrailleNote Touch Plus



Figure 46. BrailleNote Touch Plus

The BrailleNote Touch Plus is a versatile braille notetaker designed for individuals with visual impairments. It features a braille display, Perkins-style braille keyboard, and a touchscreen interface. The device runs on the Android operating system, making it compatible with many accessible apps. For connectivity to a Linux computer, users can employ standard USB or Bluetooth connections. Additionally, the BrailleNote Touch Plus supports various file formats, allowing users to read and edit documents directly on the device. Its built-in applications, along with support for third-party apps, make it a comprehensive tool for productivity, education, and communication.

For basic connectivity and file access, the device should work as a plug-and-play device. However, for optimal integration and compatibility with specific Linux applications, users may explore braille display drivers and screen reader software like Orca.

HIMS Polaris Mini



Figure 47. Hims Polaris Mini

The HIMS Polaris Mini is a compact and portable notetaker with a braille display designed for individuals with visual impairments. With its built-in applications and support for third-party apps, it offers a comprehensive solution for productivity and communication. The device connects to a Linux computer through USB or Bluetooth, allowing users to access and edit documents, manage emails, and navigate their Linux environment using braille input and output.

Similar to the BrailleNote, basic functionality should be plug-and-play. Users may benefit from Linux-compatible screen readers for enhanced integration and customization.

Logitech MX Ergo Wireless Trackball Mouse



Figure 48. Wireless Trackball mouse

The Logitech MX Ergo is a wireless trackball mouse designed to provide a comfortable and ergonomic pointing device for users with visual impairments. It features a trackball that users can manipulate with their fingers to control the cursor on the screen. The device connects to a

Linux computer via Bluetooth or USB, offering a plug-and-play experience. Its customizable buttons and precision control make it a reliable tool for navigating the Linux desktop environment.

For standard cursor control and basic functionalities, the device should work without additional software. Logitech Options, which provides customization features, may not be available for Linux, but it's not essential for basic usage.

HumanWare Brailliant BI 40X



Figure 49. HumanWare Brailliant

The HumanWare Brailliant BI 40X is a braille display featuring 40 braille cells, providing users with a tactile interface to access digital content. It connects to a Linux computer via USB or Bluetooth, offering flexibility in connectivity. The ergonomic design and responsive braille cells make it a reliable tool for reading documents, browsing the web, and interacting with various applications on a Linux system.

For basic functionality, it should work as a plug-and-play device. Users may explore braille display drivers and screen reader software for advanced features and compatibility with Linux applications.

2.3.2 Accessibility for people with Hearing Impairments

Linux, an open-source operating system renowned for its versatility, has made significant strides in developing and supporting assistive technologies. Whether through the creation of specialized assistive devices designed to seamlessly integrate with Linux or the implementation of accessibility features within the operating system itself, Linux strives to empower users with

hearing impairments by fostering an inclusive and adaptive computing environment. In this realm, Linux continues to contribute to the evolution of assistive technologies, aiming to bridge gaps and facilitate a more accessible digital experience for all users.

Below are some of the devices that can be connected to Linux systems:

Bluetooth Hearing Aids → ReSound ONE



Figure 50. ReSound-Hearing Aids

ReSound ONE, a state-of-the-art hearing aid, seamlessly integrates with Linux devices through Bluetooth connectivity. For activation, ensure Bluetooth is enabled on both the hearing aid and the Linux device.

Connect by navigating to the Bluetooth settings on your Linux device and pairing it with ReSound ONE. Visit the ReSound website to download any required drivers or firmware updates, optimizing performance for a personalized hearing experience.

Vibrating Alarm Clocks → ClearSounds SHAKER Digital Vibrating Alarm Clock



Figure 51. ClearSounds-Alarm Clock

The ClearSounds SHAKER Digital Vibrating Alarm Clock connects to Linux systems via USB or Bluetooth. To set it up, plug it into your Linux workstation using the provided USB or enable

Bluetooth pairing. Ensure the necessary drivers are installed for seamless integration.
Customize alarm settings through the ClearSounds app on your Linux device.

Regularly check for software updates on the manufacturer's website to guarantee the latest features and compatibility.

Visual Alerting Systems → Silent Alert SA3000



Figure 52. Silent Alert System

Silent Alert SA3000 seamlessly integrates with Linux-based smart home hubs. Follow the provided instructions to connect the SA3000 to your Linux smart home hub.

Check for compatibility and ensure the system's firmware is up-to-date. Visit the Silent Alert website to download any required Linux-specific drivers or updates. Customize alert preferences using the SA3000 app on your Linux device for enhanced accessibility at home or work.

2.3.3 Accessibility for people with Physical Impairments

Logitech MX Ergo Wireless Trackball

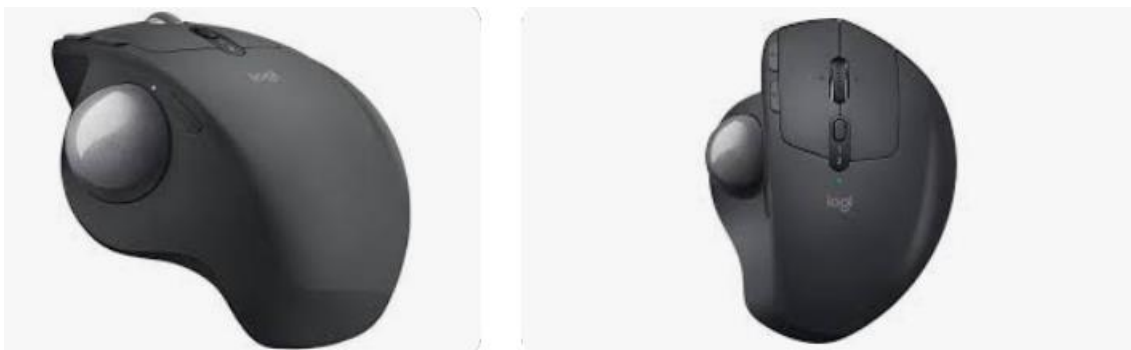


Figure 53. Wireless TrackBall

The Logitech MX Ergo Wireless Trackball is a ergonomic input device designed for computer users seeking precision and comfort. Here are the key features and functionalities of the Logitech MX Ergo:

- The MX Ergo features a trackball instead of a traditional mouse. The trackball allows users to control the cursor by moving the ball with their thumb, reducing the need to move the entire device on a surface.
- One notable feature is the ability to adjust the angle of the trackball. Users can tilt it up to 20 degrees for a more comfortable hand position.
- The device includes a precision scroll wheel for easy navigation through documents and web pages.
- The MX Ergo can connect to multiple devices through Logitech's Easy-Switch technology, allowing users to switch between devices with the press of a button. It also supports Easy-Connect, making the initial pairing process straightforward.
- The trackball is equipped with a rechargeable battery, providing extended use between charges.
- Users can customize the functionality of the buttons to suit their preferences and workflow.
- Logitech incorporates advanced tracking technology to ensure precise and responsive cursor movement.

As for compatibility with Linux, Logitech provides Unifying Receiver software that is compatible with various operating systems, including Linux. However, the level of functionality and support can vary depending on the specific distribution and kernel version. It's advisable to check the official Logitech website or consult community forums for Linux users to get the latest information on compatibility and potential workarounds if needed. Generally, the Logitech MX Ergo should work with basic functionality on most Linux systems.

Origin Instruments HeadMouse Nano



Figure 54. Headmouse Nano

The Origin Instruments HeadMouse Nano is a device designed to provide individuals with limited mobility with the ability to control a computer cursor using head movements. It does not require a joystick for operation; instead, it relies on the movement of the user's head.

The HeadMouse Nano typically consists of a small camera that tracks the movement of a reflective dot placed on the user's forehead or glasses. As the user moves their head, the camera captures these movements and translates them into cursor movements on the computer screen. This allows individuals with mobility challenges to control the cursor and interact with the computer using head gestures.

The device is often used as an alternative input method, providing greater accessibility for individuals with conditions such as spinal cord injuries, muscular dystrophy, or other mobility impairments. The HeadMouse Nano is designed to be used independently, without the need for additional joysticks or input devices. It's a hands-free solution that enhances computer accessibility for users with limited motor control. While compatibility may depend on specific kernel support, USB devices like the HeadMouse Nano are likely recognized as standard HID devices on Linux.

QuadJoy Sip/Puff Switch



Figure 55. Sip/Puff Switch Device

QuadJoy Sip/Puff Switch is a specialized assistive technology device designed for individuals with limited mobility, particularly those who may not be able to use traditional input methods like a keyboard or mouse.

This device operates based on sip and puff actions, which involve the user inhaling (sip) or exhaling (puff) into a tube. The assistive technology translates these actions into specific input commands that can be used to control a computer or other electronic devices.

The QuadJoy typically consists of a mouthpiece with a tube, and users can perform various commands by sipping or puffing air into the tube. Users can configure the QuadJoy to perform different functions based on their preferences and needs. Common functions include cursor control, left and right clicks, and additional commands. The QuadJoy Sip/Puff Switch is designed to work with a range of devices, including computers. However, specific compatibility may depend on the operating system and software used. While the QuadJoy can be a standalone input device, additional software may be required to customize its functionality or enhance its compatibility with specific operating systems. The need for additional devices or software may vary.

Regarding Linux compatibility, it's essential to check with the manufacturer or distributor of the QuadJoy for the most up-to-date information. Many assistive technology devices, including those designed for alternative input methods, may have varying levels of support for different operating systems.

Wacom Intuos Pro Graphics Tablet



Figure 56. Graphics Tablet

The Wacom Intuos Pro Graphics Tablet is a professional-grade graphic input device designed for digital artists, illustrators, photographers, and other creative professionals. It allows users to create digital art and design with precision and control. Here are the key features and functions of the Wacom Intuos Pro:

- The tablet comes with a stylus, often known as a pen, that provides pressure sensitivity and tilt recognition. This allows users to create strokes with varying thickness and opacity, simulating a natural drawing or writing experience.
- The pen is pressure-sensitive, meaning that the harder you press, the thicker and darker the lines or strokes become. This feature is particularly useful for artists who want to add nuance and detail to their work.
- The tablet can detect the tilt of the pen, allowing for more natural shading and artistic effects. Artists can tilt the pen like a traditional drawing tool to achieve different line characteristics.
- Some models of the Wacom Intuos Pro come with touch controls, allowing users to navigate, zoom, and rotate their canvas using gestures like those on touch-enabled devices.
- The tablet is equipped with customizable shortcut buttons called ExpressKeys and a Radial Menu, providing quick access to frequently used commands and shortcuts.
- Many models offer wireless connectivity options, reducing cable clutter and providing more freedom of movement.

As for compatibility with Linux, Wacom generally provides drivers that support Linux for its tablets. However, the level of support may vary depending on the specific model and the

distribution of Linux you are using. It's advisable to check the official Wacom website or contact Wacom support for information on Linux compatibility and available drivers for the Intuos Pro model you are interested in.

2.3.4 Accessibility for people with Cognitive Impairments

While the market offers an array of assistive technologies tailored for physical disabilities, there is a notable scarcity of specific hardware solutions designed explicitly for cognitive challenges. Cognitive impairments can manifest in diverse ways, affecting memory, attention, problem-solving, and other cognitive functions. Despite the limited availability of dedicated devices for Linux OS, ongoing advancements in technology hold the potential to address the unique needs of individuals with cognitive impairments. Current assistive solutions often involve software applications, wearable technologies, and smart home devices that aim to support cognitive functions indirectly. As the field of assistive technology continues to evolve, there is a growing awareness of the necessity to develop hardware solutions explicitly catered to the cognitive diversity of individuals, fostering inclusivity and improving overall quality of life.

Enabling Devices Talkable IV Communication Aid



Figure 57. Enabling Talkable Device

The Enabling Devices Talkable IV Communication Aid is a versatile assistive technology device designed to support individuals with communication challenges, including those with speech and language disabilities. It serves as a communication aid by providing users with the ability to express themselves using pre-recorded messages or custom recordings. The Talkable IV features a simple interface with large, accessible buttons that users can press to play recorded messages, facilitating communication in various settings.

Key features and functions include:

Pre-Recorded Messages

The device comes with pre-recorded messages that cover common communication needs. Users can select the appropriate button to play the desired message.

Customizable Recordings

Users have the option to record their own messages, allowing for personalized communication based on individual preferences and needs.

Accessible Design

The Talkable IV is designed with accessibility in mind, featuring large buttons that are easy to press. This design is particularly beneficial for individuals with motor or dexterity challenges.

Portability

The compact and lightweight design of the Talkable IV makes it a portable solution, allowing users to carry it with them for communication in various environments.

Versatility

The device can be used in a variety of settings, including at home, in educational settings, or in healthcare environments, providing a means of expression and communication.

For the Talkable IV Communication Aid to function, it typically does not require connection to other devices or software interfaces. The device operates independently, and users can interact with it directly to initiate communication. While it does not usually involve connecting to a Linux operating system or other external devices, users may need to refer to the specific product documentation or manufacturer's instructions for any details related to compatibility or additional features.

2.3.5 Exercises

Quizzes for people with Visual Impairments

Quiz 1

Choose if the sentence is True or False.

1. The BrailleNote Touch Plus runs on the iOS operating system.
2. The HIMS Polaris Mini connects to a Linux computer only through Bluetooth.
3. The Logitech MX Ergo requires additional software for basic usage on a Linux computer.

4.The HumanWare Brailiant BI 40X features 20 braille cells.

Answers: F, F, F, F

Quiz 2

Find the answer.

1.Which device has a tactile interface with 40 braille cells?

- A. HIMS Polaris Mini
- B. Logitech MX Ergo
- C. Ruby XL HD
- D. HumanWare Brailiant BI 40X

Answer: D

Quiz 3

Choose the correct word.

1.The BrailleNote Touch Plus is a versatile _____ designed for individuals with visual impairments.

- A. Smartphone
- B. Notetaker
- C. Mouse
- D. Keyboard

2.The Logitech MX Ergo is a wireless _____ designed to provide a comfortable and ergonomic pointing device.

- A. Keyboard
- B. Monitor
- C. Trackball mouse

D. Joystick

Answers: B, C

Quiz 4

Find the correct answer.

Which sentence correctly describes the connectivity of the HIMS Polaris Mini to a Linux computer?

- A.** "The HIMS Polaris Mini connects to a Linux computer through USB or Bluetooth, offering a plug-and-play experience."
- B.** "For optimal integration, users must explore additional software for the HIMS Polaris Mini on Linux."
- C.** "The HIMS Polaris Mini primarily works as a standalone device without connecting to external systems."

Answer: A.

Quizzes for people with Hearing Impairments

Quiz 1

Chose if the sentence is True or False.

- 1.ReSound ONE hearing aids support Bluetooth connectivity for integration with Linux devices.
- 2.The ClearSounds SHAKER Digital Vibrating Alarm Clock connects to Linux systems exclusively through USB.
- 3.The Silent Alert SA3000 visual alerting system is designed for compatibility with Linux-based smart home hubs.

Answers: T, F, T

Quiz 2

Find the correct answer.

1.How can individuals customize ReSound ONE hearing aids?

- A. Through USB connections
- B. Using the ReSound Smart 3D app
- C. Via Bluetooth settings
- D. Through closed captioning controls

2.What is a notable feature of the ClearSounds SHAKER Digital Vibrating Alarm Clock?

- A. Direct audio streaming
- B. High-resolution display
- C. Bed shaker for alerts
- D. Amplified sound

Answers: B, C

Quiz 3

Chose the suitable word.

1.The Silent Alert SA3000 visual alerting system enhances _____ in the home or workplace for individuals with hearing impairments.

- A. Integration
- B. Accessibility
- C. Customization
- D. Time management

Answer: B

Quizzes for people with Physical Impairments

Quiz 1

Decide if the sentence is True or False

- 1.The Logitech MX Ergo Wireless Trackball features a traditional mouse instead of a trackball.
- 2.The Origin Instruments HeadMouse Nano relies on the movement of a joystick for operation.
- 3.The QuadJoy Sip/Puff Switch operates based on sip and puff actions to control a computer.
- 4.The Wacom Intuos Pro Graphics Tablet does not support pressure sensitivity or tilt recognition with its stylus.

Answers: F, F, T, F

Quiz 2

Find the correct answer.

1. What is a notable feature of the Logitech MX Ergo Wireless Trackball?
 - A. Pressure-sensitive stylus
 - B. Head tracking technology
 - C. Adjustable angle of the trackball
 - D. Sip and puff actions
2. How does the HeadMouse Nano typically capture head movements?
 - A. Through a traditional mouse
 - B. Via a reflective dot on the user's forehead or glasses
 - C. By tracking hand gestures
 - D. Using a joystick

Answers: C, B

Quiz 3

Chose the correct word.

1.The QuadJoy Sip/Puff Switch is a specialized assistive technology device for individuals with limited _____.

- A. Hearing
- B. Vision
- C. Mobility
- D. Memory

2.The Wacom Intuos Pro Graphics Tablet allows users to create digital art with precision and _____.

- A. Uncontrolled strokes
- B. Tilt recognition
- C. Limited connectivity
- D. Wireless restrictions

Answers: C, B

Quiz 4

Find the correct answer.

1.Which sentence accurately describes the connectivity of the Logitech MX Ergo Wireless Trackball?

- A. "The Logitech MX Ergo connects to multiple devices through Logitech's Easy-Switch technology, allowing users to switch between devices with the press of a button."
- B. "The MX Ergo relies on a traditional mouse for cursor control."
- C. "Logitech MX Ergo does not support customization of button functionality."

2.What is an accurate statement about the Wacom Intuos Pro Graphics Tablet?

- A. "The tablet lacks pressure sensitivity and tilt recognition."

B. "ExpressKeys and Radial Menu are not available on the tablet."

C. "Wacom generally provides drivers that support Linux for its tablets."

Answers: A, C

2.3.6 Resources

Visual Impairments

For more information you can check out some video resources about the above mentioned devices.

HumanWare Brailliant BI 40X

- <https://www.youtube.com/watch?v=W-1NPZa5UEQ>
- <https://www.youtube.com/watch?v=I9kqj3LIFi0>

HIMS Polaris Mini

- <https://www.youtube.com/watch?v=Ws5upgETetc>
- Webinar in Polaris Education:
https://www.youtube.com/watch?v=sy_KLxe44Xc&list=PL8LbvKiYY9-s2d3zcnqcoDex5p6G9DxSp

BrailleNote Touch Plus

- <https://www.youtube.com/watch?v=t3HtCtHE0Jk>
- Webinar in BrailleNote Touch:
https://www.youtube.com/watch?v=Su010butoF4&list=PLDWfRB9hDxLOuhwE_S9QvUjeOjSPEMesE

Hearing Impairments

Below are resources for audio assistive technologies:

- https://www.youtube.com/watch?v=P_oyFlblvMY
- Webinar for Resound hearing aids:
<https://www.youtube.com/watch?v=S8bwUP1uvOo&list=PLeu5EFk0WAOIA8Zs3J0XaPq51xpPdWvRX&index=1>

Physical Impairments

Some videos related to assistive technology:

- <https://www.youtube.com/watch?v=rtz8D3S6Tpk>

Cognitive Impairments

Let's explore a few assistive technologies:

- <https://www.youtube.com/watch?v=JwRkuVtzWTQ>

3. Operating System Accessibility Management for Computers

3.1 MS Windows OS

3.1.1 Built in features & Settings

3.1.1.1 Visual Accessibility

Microsoft Windows includes a suite of accessibility features designed to assist individuals with low vision. These built-in tools encompass screen readers for spoken interface feedback, screen magnifiers for enlarging on-screen content, and speech recognition for voice-activated control, enhancing the overall accessibility and usability of the system for users with visual impairments. Additionally, Windows offers various customization options, such as adjusting text size, cursor settings, color filters, contrast themes, and visual effects, allowing users to tailor their computing experience to their specific needs, making technology more accessible to a broader user base.

Narrator

The narrator allows the user to operate its computer without a mouse to perform common, everyday tasks. It reads and communicates with onscreen things, such as text and buttons, with simple words is a screen reader.

Using Narrator lets the user read and write emails, browse the web, and work with documents.

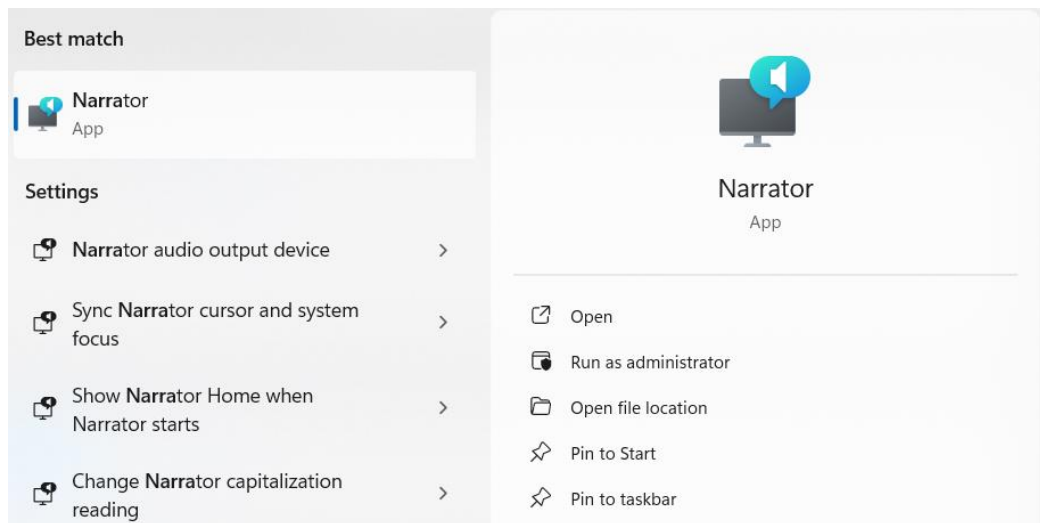
When Narrator is activated, reads the headlines or the first sentences/paragraphs of the page you are screening.

Narrator is set by default in English. If the United Kingdom English which is installed together with your native language isn't understood, then to change or download another language the user must go to:

Windows → Settings → Time & Language → Language & Region

and then download English United States or the language which is preferable.

This software, like others, also contains a set of instructions-commands with keyboard shortcuts for the convenience of the people using it.



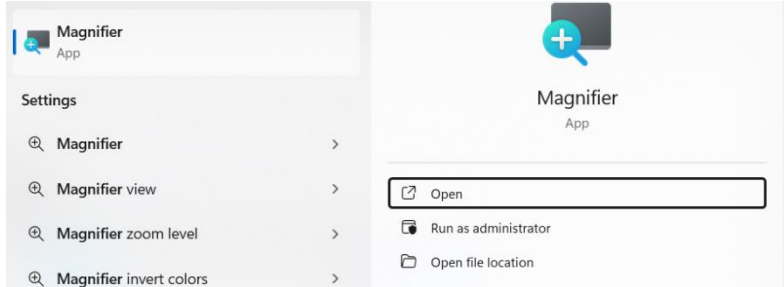
General Commands

Press these keys	To do this (Action)
Windows logo key + Ctrl + Enter	Start or stop Narrator
Narrator + Esc	Exit Narrator
Narrator + 1	Toggle input learning
Narrator + Right arrow	Move to the next item
Narrator + Left arrow	Move to previous item

Magnifier

The Magnifier enlarges part or all the user's screen in order to see words and pictures better. It has a frame with buttons to increase and decrease the screen and is useful because the screen moves when the mouse is moved.

Magnifier is a screen magnifier application that can be used when running Microsoft Windows. When used, it creates a line at the top of the screen that greatly magnifies where the mouse is located.



General Commands

Press this key (buttons in the keyboard)	To do this (action in the computer)
Windows logo key + Plus sign (+)	Turn on Magnifier
Windows logo key + Esc	Turn off Magnifier
Windows logo key + Plus sign (+) or Minus sign (-)	When Magnifier is on, zoom in or out
Windows logo key + Ctrl + M	Open Magnifier settings
Ctrl + Alt + I	Invert colors
Ctrl + Alt + F	Switch to full screen view
Ctrl + Alt + L	Switch to docked view
Ctrl + Alt + D	Cycle through views
Ctrl + Alt + Spacebar	Quickly see the entire desktop when using full screen view

Windows Speech Recognition

Speech recognition is a built-in feature of the Microsoft Windows operating system that allows users to control their computers and interact with various applications using voice commands.

Once speech recognition is activated, the user can use voice commands to perform various tasks, such as opening applications, navigating the desktop, browsing the web, and dictating text in documents or emails.

Before the user sets up the Speech Recognition in Windows 11, he must set up first:

i. A microphone

1st step: Select Windows button (Start) → Settings → Speech

2nd step: Under Microphone, select the Get Started button.

3rd step: The Speak Wizard opens, and the set up starts automatically. If identify any issue, you can select the issues and help Speak Wizard to solve them.

ii. The PC settings in order to understand their voice

1st step: Press Windows logo key+Ctrl+S. The Set-up Speech Recognition wizard window opens with an introduction on the Welcome to Speech Recognition page.

2nd step: Select Next. Follow the instructions on your screen to set up speech recognition. The wizard will guide you through the setup steps.

3rd step: After the setup is complete, you can choose to take a tutorial to learn more about speech recognition. To take the tutorial, select Start Tutorial in the wizard window. To skip the tutorial, select Skip Tutorial. You can now start using speech recognition.

General Commands

To do this (Action)	Say this (Words)
Open Start	Start
Open Search	Press Windows S
Select an item by its name	File, Start, View
Select an item or icon	Click recycle bin, click computer, click file name

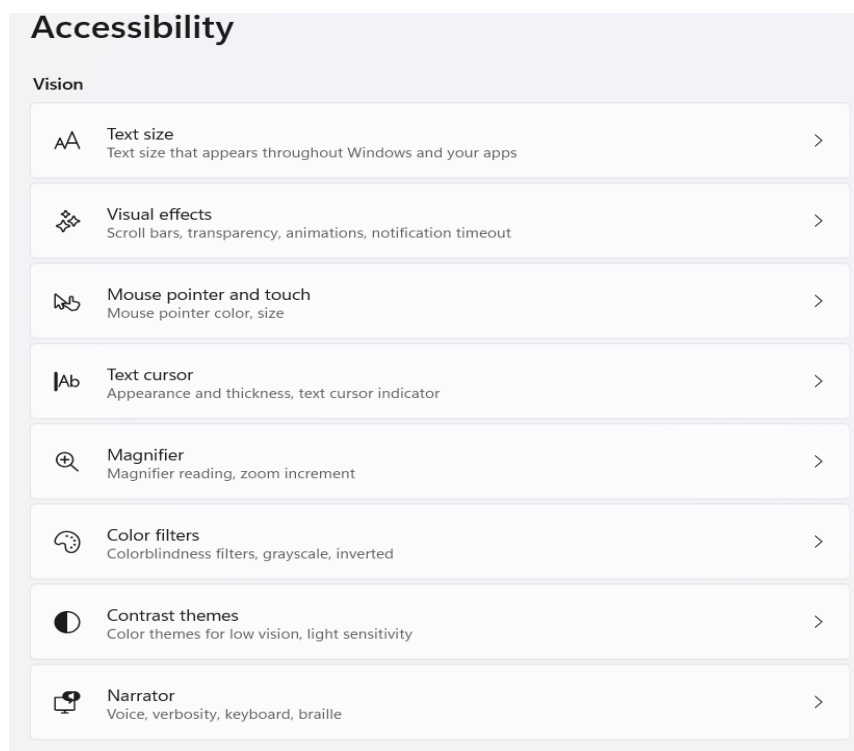
For ease of use, the user can make the following settings on their computer:

- **High contrast mode:** text and icons can be more distinct with the high contrast mode provided by Windows.
- **Screen readers:** Tools such as Narrator or third-party options such as JAWS can read screen content, including icons and settings, aloud.
- **Magnification:** content and icons can be enlarged due to the Magnifier or third-party options.

Accessibility Settings

Windows software has several features that a person with a disability can choose to make it easier for them to work on the computer.

The user can in the first way write/search the **menu of Accessibility**, otherwise in shortcut keyboard mode can press: **Windows logo key + U**.



- The options and settings provided in the Accessibility menu for low vision are:

Text size: This setting allows the user to adjust the size of the text that appears throughout the Windows interface. The user can make the text larger or smaller to suit hir/her readability needs.

Visual effects: Visual effects include animations, transitions, and other graphical elements that can be turned off or customized to reduce visual distractions and improve performance.

Mouse pointer and touch: Windows offers settings to customize the appearance and behavior of the mouse pointer. The user can change its size, color, and enable features like pointer trails or snap to default button.

Text cursor: This setting lets the user change the thickness and blinking rate of the text cursor. Adjusting the cursor settings can make it easier to locate and track when typing.

Color filters: Color filters allow users to change the color palette of the entire screen to improve visibility and reduce eye strain. The users can set color filters to grayscale, inverted colors, or custom color schemes.

Contrast themes: Windows includes high-contrast themes that provide a visually distinct interface with high contrast between foreground and background elements. Theme themes can make text and UI elements more legible.

3.1.1.2 Hearing Accessibility

Microsoft Windows offers a suite of built-in accessibility features designed to enhance the user experience for individuals with visual and hearing impairments. These features aim to make the operating system more inclusive by providing tools for managing captions and subtitles, sound notifications, and audio settings. Whether it's customizing the display of captions or adjusting audio output for users with hearing loss, these features ensure that Windows is accessible to a broader range of users.

Windows software has several features that a person with a disability can choose to make it easier for them to work on the computer.

The user can in the first way write/search the **menu of Accessibility**, otherwise in shortcut keyboard mode can press: **Windows logo key + U**.



- The options and settings provided in the Accessibility menu for low hearing are:

Audio:

- **Volume Control:** Windows allows users to adjust the volume of their audio output. The users can control the volume of individual applications as well as system-wide volume settings.
- **Mono Audio:** This feature combines the left and right audio channels into a single channel, which can be helpful for users with hearing loss in one ear.

Captions: Windows provides system wide caption settings in the "Accessibility menu" of the settings app. Users can adjust caption appearance, including text size, font, color, and background to make captions more readable.

Closed Caption and Subtitles

1. Turn on live captions:

To enable live captions, do one of the following:

- Enable the Live Captions toggle in the Accessibility quick settings drop-down. (To open the quick settings, select the battery, network, or volume icon in the taskbar).
- Press the Windows logo key + Ctrl + L.
- Select Start > All apps > Accessibility > Accessibility > Live captions.
- Go to Settings > Accessibility > Accessibility > Captions and turn on the Live Captions toggle.

When first enabled, Live Captions will prompt you to download live caption language files to be used by the device's speech recognition. If your language is not available, you can use another language during installation.

2. Personalize how captions are displayed

To choose where captions are displayed on your desktop:

- Select the Settings button in the live captions window.
- Select Position.
- Choose either Top, Bottom, or Floating on screen.
- When you choose Top or Bottom, the captions window will appear as docked to the top or bottom screen edges in reserved space on your desktop, and other apps will not be blocked by the captions window. When docked to the top, you might find that live captions work well while sharing video in a virtual meeting or conversation, whereas in other cases, such as viewing videos, docking to bottom might work best.
- When you choose Floating on screen, the live captions will appear in an overlay window which you can reposition as needed to avoid obscuring other apps in use.

To show more lines of text in the captions window, increase the window size by using the mouse, touch, or keyboard.

3. Make captions easier to read

- Select the Settings button in the live captions window.
- Select Preferences.
- Select Caption style. The Accessibility settings for Captions opens.
- Under Caption style, do one of the following:
 - Select a built-in style from the dropdown menu. Use the Default built-in style to have captions displayed with colors appropriate to your device's dark or light mode setting in Settings > Personalization > Colors > Choose your mode.
 - Select the Edit button to create a custom style that works best for you.

Sounds Notifications

Windows audio alerts provide audio feedback and notifications to inform users about events, actions, or changes to the operating system or applications.

To change the Notification Sounds in Windows 10 the user can follow the steps below:

1. Right click the Start button.
2. Go to Control Panel.

3. Change the View into Small icons.
4. Click Sound.
5. Then select Sounds.
6. Under the Program Events, look for Notification then click it.
7. From the drop-down menu, choose the Notification sound then click Apply.

Mono Audio

Mono audio in Windows is a mode that combines sound from the left and right audio channels and plays it through a single audio channel (usually the center speaker or the left and right speakers equally). This mode is designed primarily for accessibility purposes and is useful for people with hearing problems in one ear. By combining both audio channels into one, users with hearing loss in one ear can hear audio content more clearly and without losing information that may be present in either the left or right audio channel.

See how to enable monaural audio in Windows 10 and 11:

1. Right-click the speaker icon in the Windows taskbar (system tray) or open the "Sound" settings from Control Panel.
2. Select "Open Sound Settings" or "Sounds".
3. In the sound settings, scroll down to the "Advanced sound options" section.
4. Under the "Mono audio" section, turn on the switch to enable mono audio.

Enabling mono audio will ensure that all audio outputs from your computer are played in mono mode, combining the left and right audio channels into one.

3.1.1.3 Physical Accessibility

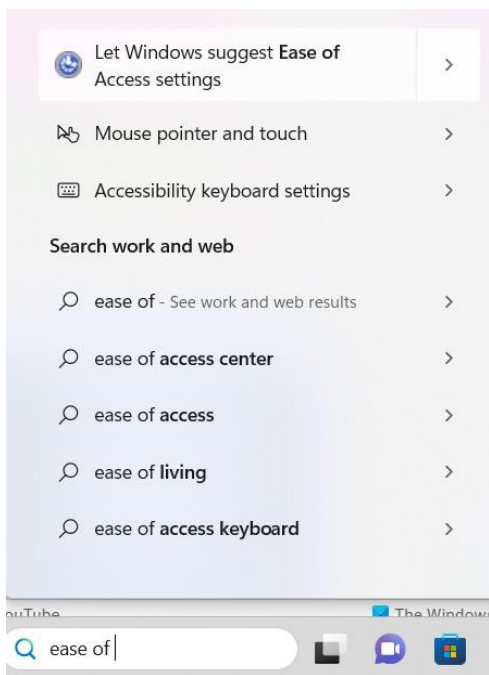
Windows offers a comprehensive suite of built-in accessibility features aimed at making the operating system more inclusive and user-friendly for individuals with diverse needs. In this accessibility toolkit, users will find various functionalities that enhance interaction with their devices. The features range from screen magnification, speech recognition, on-screen keyboards, and voice commands to assistive input devices, customizable keyboard shortcuts, and text-to-speech software. By integrating these capabilities, Windows ensures that everyone,

regardless of their abilities, can access, navigate, and utilize their computers effectively. These built-in features foster an inclusive and adaptable digital environment, enabling users to tailor their Windows experience to their unique requirements.

Windows Ease of Access Center

Windows Ease of Access Center is a set of accessibility features and settings that are built into the Windows operating system.

No specific global keyboard shortcuts exist for opening or closing the Ease of Access Center, but the user can access its settings by pressing "Windows + U".



When you click enter, a window makes its appearance:

Get recommendations to make your computer easier to use (eyesight)

« Ease of Access » Ease of Access Center » Get recommendations to make your computer easier to use (eyesight)

Search Control Panel

Get recommendations to make your computer easier to use

Answer the following questions to get recommendations for settings that can make your computer easier to see, hear, and use.

For each question, select all statements that apply to you. When you're done, you can decide which settings to turn on.

Your answers are used to determine recommended settings only. If another program or Web site wants to use this information to better suit your needs, you will be explicitly asked for permission by that program. [Privacy Statement](#)

Eyesight (1 of 5)

Select all statements that apply to you:

- ☐ Images and text on TV are difficult to see (even when I'm wearing glasses).
- ☐ Lighting conditions make it difficult to see images on my monitor.
- ☐ I am blind.
- ☐ I have another type of vision impairment (even if glasses correct it).

Next Cancel

When you click Cancel this software assists and guide the user to select one or more of the following suggestions.

Ease of Access Center

Control Panel » Ease of Access » Ease of Access Center

Search Control Panel

Control Panel Home

Change sign-in settings

Make your computer easier to use

Quick access to common tools

You can use the tools in this section to help you get started.

Windows can read and scan this list automatically. Press the SPACEBAR to select the highlighted tool.

☒ Always read this section aloud ☒ Always scan this section

 Start Magnifier	 Start Narrator
 Start On-Screen Keyboard	 Set up High Contrast

 Not sure where to start? [Get recommendations to make your computer easier to use](#)

Explore all settings

When you select these settings, they will automatically start each time you sign in.

-  [Use the computer without a display](#)
Optimize for blindness
-  [Make the computer easier to see](#)
Optimize visual display
-  [Use the computer without a mouse or keyboard](#)
Set up alternative input devices

 [Change sign-in settings](#)

Explore all settings

When you select these settings, they will automatically start each time you sign in.



[Use the computer without a display](#)

Optimize for blindness



[Make the computer easier to see](#)

Optimize visual display



[Use the computer without a mouse or keyboard](#)

Set up alternative input devices



[Make the mouse easier to use](#)

Adjust settings for the mouse or other pointing devices



[Make the keyboard easier to use](#)

Adjust settings for the keyboard



[Use text or visual alternatives for sounds](#)

Set up alternatives for sounds



[Make it easier to focus on tasks](#)

Adjust settings for reading and typing



[Make touch and tablets easier to use](#)

Adjust settings for touch and tablets

On-Screen Keyboard

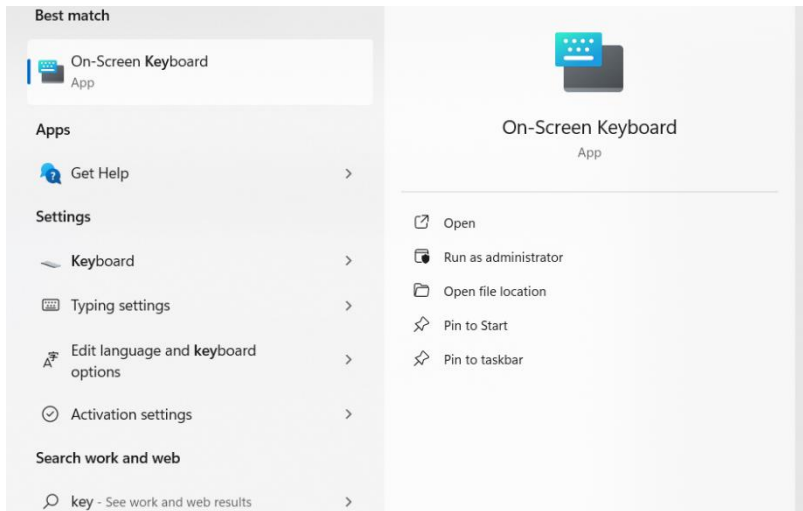
A virtual keyboard that appears on the computer screen.

It allows users to type text and control their computer by clicking on virtual keys using a mouse, touchscreen, or other input devices.

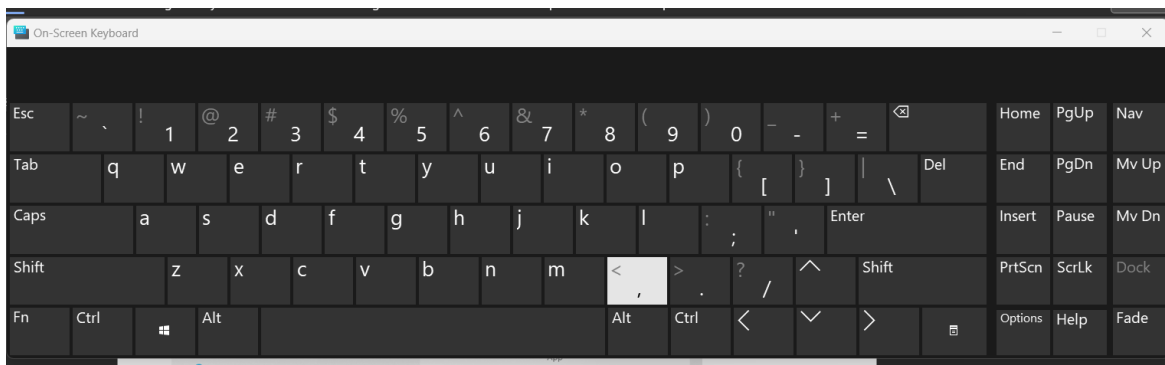
Features for Windows 11:

- Customizable layouts: The users can choose between different keyboard layouts and customize key sizes.
- Word prediction: Some on-screen keyboards provide word forecasting to speed up typing.
- Some keyboards offer keyboard predictions to help you predict keyboard shortcuts: It supports mouse users who may have difficulty with physical keyboards.
- Keyboard shortcuts:

To turn on the on-screen keyboard in Windows, press Win + Ctrl + O. There is no standard shortcut to close it.



- If the user clicks to open this Windows Software, it appears a keyboard on its screen.



The user can adjust the position of the keyboard on the screen and then clicks the document, file, link, or site he/she wants to type something.

Windows Speech Recognition

Speech recognition is a built-in feature of the Microsoft Windows operating system that allows users to control their computers and interact with various applications using voice commands.

Once speech recognition is activated, the user can use voice commands to perform various tasks, such as opening applications, navigating the desktop, browsing the web, and dictating text in documents or emails.

Before the user sets up the Speech Recognition in Windows 11, he must set up first:

i. A microphone

1st step: Select Windows button (Start) □ Settings □ Speech

2nd step: Under Microphone, select the Get Started button.

3rd step: The Speak Wizard opens, and the set up starts automatically. If identify any issue, you can select the issues and help Speak Wizard to solve them.

ii. The PC settings in order to understand their voice

1st step: Press Windows logo key+Ctrl+S. The Set-up Speech Recognition wizard window opens with an introduction on the Welcome to Speech Recognition page.

2nd step: Select Next. Follow the instructions on your screen to set up speech recognition. The wizard will guide you through the setup steps.

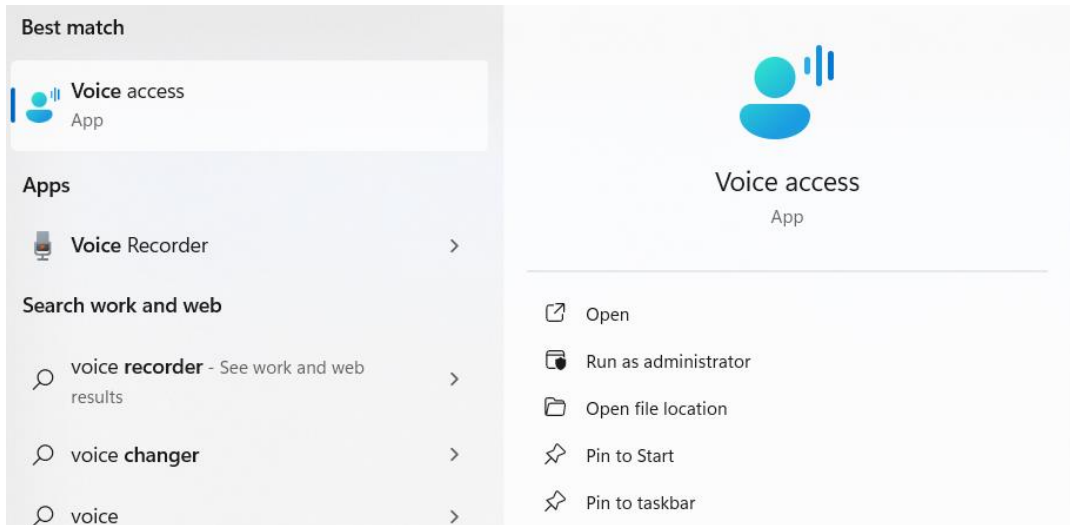
3rd step: After the setup is complete, you can choose to take a tutorial to learn more about speech recognition. To take the tutorial, select Start Tutorial in the wizard window. To skip the tutorial, select Skip Tutorial. You can now start using speech recognition.

General Commands

To do this (Action)	Say this (Words)
Open Start	Start
Open Search	Press Windows S
Select an item by its name	File, Start, View
Select an item or icon	Click recycle bin, click computer, click file name

More guidance: Videos and links regarding Speech Recognition are included in the Resources

Voice Access



Voice control software empowers users to navigate and control their devices through voice commands. Can provide an alternative input method for those who find it difficult to use traditional input devices.

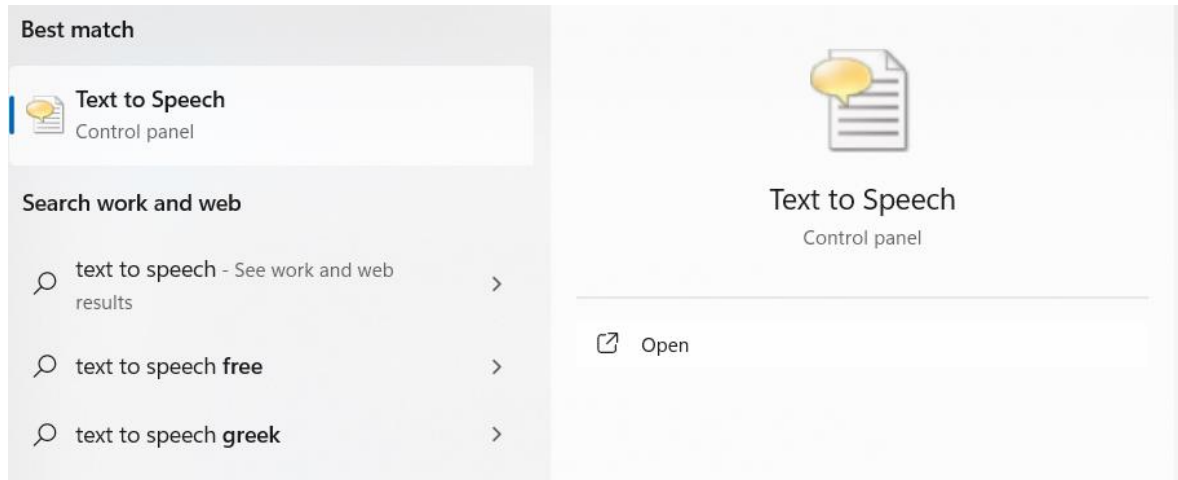
In Windows 11 the user can follow this path-procedure to activate Voice Access:

1. Windows Search
2. Typing Voice Access
3. Open Voice Access
4. Activate the microphone which is at the left corner of the screen: When user says: “Show grid here” a numbered matrix appears that helps the user click in the screen. If announce the number 3 the box will move up and right, and if says 7 the box gets smaller. With this way it is easier for the user to click in a specific area.
5. The user can give voice commands to the PC. For instance, “Open Firefox”

The software also has Voice Access Commands that the user can use to be more specific.

There are many Voices Control and Voice Recognition software available from different companies with different prices. The user can choose according to the different features available in the software.

Text-to-Speech Software



Text-to-speech (TTS) software converts written text into spoken words. This assists individuals with visual impairments or reading difficulties in accessing written content.

There are many Software that the user can download depending on their features.

Some free software is web-based, which means that it runs on web servers and is accessed through a web browser over the internet:

- ReadLoud
- Free TTS
- Text 2 MP3
- TTSTReader

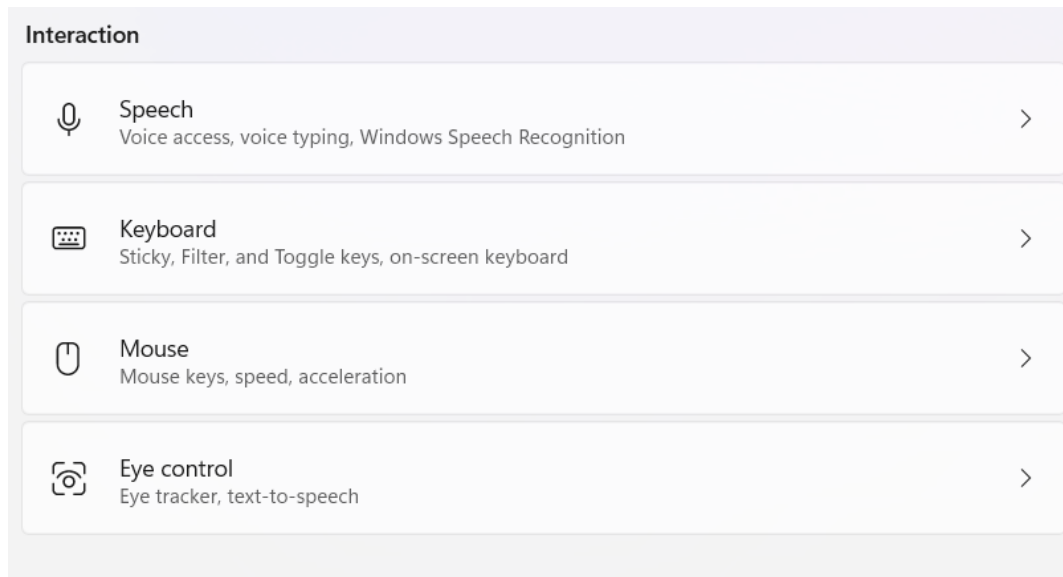
For ease of use, the user can make the following settings on their computer:

- **Assistive Input Devices:** Many devices such as head-controlled mice, eye-tracking devices, etc, can be connected with Windows and provide help and ease to the users.
- **Customized Keyboard Shortcuts:** Screen keyboard or keyboard shortcuts can create a feeling of independence and technology to the users.
- **Voice Commands:** This software can be used to control desktop elements and access settings.

Accessibility Settings

Windows software has several features that a person with a disability can choose to make it easier for them to work on the computer.

The user can in the first way write/search the menu of **Accessibility**, otherwise in shortcut keyboard mode can press: **Windows logo key + U**.



- The options and settings provided in the Accessibility menu for physical impairments are:

Speech:

Speech recognition: Windows includes a built-in speech recognition feature that allows users to control their computer and dictate text using their voice. Users can configure and train the speech recognition system to better recognize their voice.

Mouse:

- Mouse customization: Users can adjust mouse settings such as pointer speed, sensitivity, and button configuration to suit their needs.
- Mouse keys: Windows provides mouse keys, which allows users to control the mouse cursor using the keyboard's numeric keypad.

Keyboard:

- Sticky keys: When enabled, it allows the user to press modifier keys like Shift, Ctrl, or Alt one at a time, and Windows will treat them as if they were held down until the user press another key.

- **Filter keys:** When filter keys is activated, it filters out rapid or repeated key presses. Is designed to ignore brief or repeated keystrokes, which can help users who have mobility issues and may accidentally press keys multiple times.
- **Toggle keys:** Accessibility feature that provides audible feedback when the user presses the caps lock, num lock, or scroll keys. It plays a sound to notify you when these keys are toggled on or off.
- **On screen keyboard:** The on-screen keyboard is a virtual keyboard displayed on the computer screen. It allows users to input text and control the computer using a mouse, touch, or other pointing devices.
- **Underline access keys:** An option that displays keyboard shortcuts with an underscored letter in menus and dialog boxes. This feature helps users navigate and interact with software more easily using keyboard shortcuts.
- **Typing settings:** Windows provides various typing settings that allows users to customize their keyboard experience. This includes options for keyboard repeat rate, delay, and cursor blink rate. Users can adjust these settings to make typing more comfortable and responsive.
- **Language and region:** This feature is important for users who need to type in multiple languages or use non-standard keyboard layouts.

Eye control: To use eye control effectively, users need to calibrate the eye tracking system. Calibration ensures accurate tracking of their eye movements and gaze point on the screen. Users follow on-screen instructions to calibrate the system.

3.1.1.4 Cognitive Accessibility

To ensure that its software is accessible and user-friendly for individuals with cognitive impairments, Microsoft Windows has incorporated a range of built-in features and settings that simplify the computing experience. These features are designed to make the computer environment more comprehensible and manageable for users who may have challenges related to cognitive processing. By offering options like simplified interfaces, Text-to-Speech (TTS) capabilities, and easy access to critical accessibility features such as sticky keys, toggle keys, and filter keys, Windows empowers users to customize their settings for a more comfortable and productive computing experience.

[Link to previous subchapter Visual Accessibility](#)

3.1.1.5 Exercises

Visual Impairments

Quiz 1

Choose if the sentence is True or False

1. Narrator is a screen reader that helps users operate the computer without a mouse. (True/False)
2. When Narrator is activated, it reads only the body text of a page. (True/False)
3. Changing the language in Narrator requires going to "Windows > Settings > Time & Language > Language & Region." (True/False)

Answers: T, F, T

Quiz 2

Match the accessibility settings with their descriptions:

1. Text size
2. Visual effects
3. Mouse pointer and touch

4. Color filters

5. Contrast themes

Descriptions:

- a. Customize mouse pointer appearance and behavior.
- b. Adjust the size of the text throughout the Windows interface.
- c. Turn off or customize animations and transitions.
- d. Change the color palette of the entire screen.
- e. High-contrast themes with distinct foreground and background.

Answers: 1-b, 2-c, 3-a, 4-d, 5-e

Quiz 3

Choose the correct answer

What do Color Filters in Accessibility settings allow users to do?

- a) Change the size of the text
- b) Customize the appearance of the mouse pointer
- c) Adjust the color palette of the entire screen
- d) Increase the thickness of the text cursor

Answer: c) Adjust the color palette of the entire screen

Quiz 4

Fill in the Blank with the given words.

1. Narrator is a _____ that allows the user to operate their computer without a mouse. It reads and communicates with onscreen items using simple words, acting as a _____.

2. Using Narrator, users can perform common tasks such as reading and writing emails, browsing the web, and working with _____.

3. When Narrator is activated, it reads the headlines, or the first sentences/paragraphs of the page being screened. Narrator is set by default in _____, and to change or download another language, users must go to:

Windows → Settings → Time & Language → Language & Region

and then download English United States or the preferred language.

4. Narrator, like other software, also contains a set of _____ with keyboard shortcuts for the convenience of users.

Given words: e. screen reader, d. screen reader, c. documents, b. English, a. instructions-commands

Answers: 1-e-d, 2-c, 3-b, 4-a

Hearing Impairments

Quiz 1

Select if the sentence is True or False:

1. Windows software offers features for individuals with disabilities to make computer use more accessible. (T/F)

Answer: T

2. The Accessibility menu in Windows can be found by searching or writing in the menu. (T/F)

Answer: T

Physical Impairments

Exercise 1:

1. The Windows Ease of Access Center is a set of accessibility features in the Windows operating system. (T/F)

Answer: True

2. To open the Ease of Access Center, press "Windows + U." (T/F)

Answer: True

3. The On-Screen Keyboard is a physical keyboard. (T/F)

Answer: False

4. The on-screen keyboard can be activated by pressing Win + Ctrl + O. (T/F)

Answer: True

5: Voice Access allows users to control their devices through touch commands. (T/F)

Answer: False

Exercise 2:

Fill in the Blank with the given words.

1.The On-Screen Keyboard is a _____ keyboard that appears on the computer screen.

Answer: a. virtual

2.To activate Voice Access in Windows 11, the user needs to type "Voice Access" in _____.

Answer: c. Windows Search

3.Text-to-Speech (TTS) software converts written text into _____.

Answer: b. spoken words

4.Sticky keys allow the user to press modifier keys like Shift, Ctrl, or Alt _____.

Answer: a. one at a time

Given words: a. one at a time, b. spoken words, c. Windows Search, d. virtual

Exercise 3:

Multiple Choice

What is the purpose of the On-Screen Keyboard?

- A. To control the mouse
- B. To browse the web
- C. To type text and control the computer

Answer: C

How can the user activate Voice Access in Windows 11?

- A. Press Windows + U
- B. Type "Voice Access" in Windows Search
- C. Press Win + Ctrl + O

Answer: B

What does Text-to-Speech (TTS) software do?

- A. Converts written text into spoken words
- B. Creates text documents
- C. Organizes files on the computer

Answer: A

Cognitive Impairments

Exercise 1

Choose if the sentence is True or False

1. Narrator is a screen reader that helps users operate the computer without a mouse.
(True/False)
2. When Narrator is activated, it reads only the body text of a page. (True/False)

3. Changing the language in Narrator requires going to "Windows > Settings > Time & Language > Language & Region." (True/False)

Answers: T, F, T

Exercise 2

Match the accessibility settings with their descriptions:

1. Text size

2. Visual effects

3. Mouse pointer and touch

4. Color filters

5. Contrast themes

Descriptions:

- a. Customize mouse pointer appearance and behavior.
- b. Adjust the size of the text throughout the Windows interface.
- c. Turn off or customize animations and transitions.
- d. Change the color palette of the entire screen.
- e. High-contrast themes with distinct foreground and background.

Answers: 1-b, 2-c, 3-a, 4-d, 5-e

Exercise 3

Choose the correct answer

What do Color Filters in Accessibility settings allow users to do?

- a) Change the size of the text
- b) Customize the appearance of the mouse pointer
- c) Adjust the color palette of the entire screen

d) Increase the thickness of the text cursor

Answer: c) Adjust the color palette of the entire screen

Exercise 4

Fill in the Blank with the given words.

1. Narrator is a _____ that allows the user to operate their computer without a mouse. It reads and communicates with onscreen items using simple words, acting as a _____.

2. Using Narrator, users can perform common tasks such as reading and writing emails, browsing the web, and working with _____.

3. When Narrator is activated, it reads the headlines, or the first sentences/paragraphs of the page being screened. Narrator is set by default in _____, and to change or download another language, users must go to:

Windows → Settings → Time & Language → Language & Region

and then download English United States or the preferred language.

4. Narrator, like other software, also contains a set of _____ with keyboard shortcuts for the convenience of users.

Given words: e. screen reader, d. screen reader, c. documents, b. English, a. instructions-commands

Answers: 1-e-d, 2-c, 3-b, 4-a

3.1.1.6 Resources

Visual Impairments

Narrator:

- <https://support.microsoft.com/en-us/windows/appendix-b-narrator-keyboard-commands-and-touch-gestures-8bdab3f4-b3e9-4554-7f28-8b15bd37410a>

Magnifier:

- <https://support.microsoft.com/en-us/windows/use-magnifier-to-make-things-on-the-screen-easier-to-see-414948ba-8b1c-d3bd-8615-0e5e32204198>

Speech Recognition:

- https://support.microsoft.com/en-us/windows/windows-speech-recognition-commands-9d25ef36-994d-f367-a81a-a326160128c7#WindowsVersion=Windows_11
- https://support.microsoft.com/en-us/windows/use-voice-recognition-in-windows-83ff75bd-63eb-0b6c-18d4-6fae94050571#WindowsVersion=Windows_11

Jaws:

- https://help.pearsoncmg.com/xl/student/student_help/Content/use_command_line_language_jaws.htm
- <https://www.freedomscientific.com/training/jaws/hotkeys/>

NVDA screen reader:

- <https://www.nvaccess.org/>
- <https://www.youtube.com/watch?v=h09RaEsRn6Q>

ZoomText:

- <https://www.freedomscientific.com/training/zoomtext/zoomtext-hotkeys/>

Dolphin SuperNova

- <https://www.visionaustralia.org/technology-products/resources/using-technology/dolphin-supernova>
- https://www.youtube.com/watch?v=iBA-dlzoI_Y
- <https://www.youtube.com/watch?v=oxBCapWFqmw>
- <https://www.youtube.com/watch?v=JDSwbVMOxWE>

Official MS Windows channel:

- <https://www.youtube.com/@MicrosoftWindows>

Hearing and Cognitive Impairments

Closed Caption/Subtitles:

- https://support.microsoft.com/en-us/windows/use-live-captions-to-better-understand-audio-b52da59c-14b8-4031-aeeb-f6a47e6055df#bkmk_turnoncaptions
- <https://www.youtube.com/watch?v=0BIOApH8z3k>
- <https://www.youtube.com/watch?v=HBu5UJBNKTo>

Sounds Notifications:

- <https://www.technewstoday.com/change-notification-sound-windows/>

Official MS Windows channel:

- <https://www.youtube.com/@MicrosoftWindows>

3.1.2 File Management

3.1.2.1 Visual Accessibility

What is file management?

File management is the process of organizing, storing, naming, and deleting files. It is of crucial importance due to the user's easiness and access of finding the documents or the files he/she needs.

Understanding how to work with files and folders the user can manage the information of his/her computer. As the user saves more and more documents in the computer maybe it would be beneficial to create new folders to organize them better.

File Management with Narrator

Using Narrator, which is a screen reader in Microsoft Windows, the user can perform various file management tasks with specific keyboard shortcuts.

Read Item or Text

Narrate current item → Caps Lock + M

Read from the current location → Caps Lock + M, followed by Down Arrow or Up Arrow

Navigation

Next item → Down Arrow

Previous item → Up Arrow

Next character → Right Arrow

Previous character → Left Arrow

File and Folder Operations

Open an item → Enter

Open context menu for an item → Caps Lock + / (Forward Slash)

Copy an item → Caps Lock + C

Cut an item → Caps Lock + X

Paste an item → Caps Lock + V

Delete an item → Delete

Rename an item → F2

Move to Recycle Bin → Caps Lock + D

Selecting Items

Select an item → Spacebar

Select multiple items → Hold Caps Lock and press Spacebar for each item

Deselect an item → Spacebar

File Management with Magnifier

While Magnifier primarily focuses on enlarging the screen content, the user can still perform file management tasks alongside it. Here are some tips for file management with Magnifier:

Open File Explorer → Use the keyboard shortcut **Windows + E** to open File Explorer. Magnifier will automatically zoom in on the File Explorer window.

Navigation → Navigate through folders and files using the arrow keys or by clicking on items within the Magnified view.

Selecting Files → Select files and folders by clicking on them in the magnified view. The user can use a mouse or touchpad.

Copy, Cut, and Paste → To copy or cut files, right-click on them, choose "Copy" or "Cut," and then navigate to the destination folder to paste them by right-clicking and selecting "Paste."

Deleting Files → To delete files, right-click on them and select "Delete." Confirm the deletion when prompted.

Renaming Files → Right-click on a file and select "Rename." The user can then type the new name and press Enter to save it.

Creating New Folders → Right-click in the file list, go to "New," and select "Folder" to create a new folder in the current directory.

Searching for Files → Use the search bar in File Explorer to find specific files or folders by typing the name or keyword the user is looking for.

Organizing Files → The user can move files by selecting them, right-clicking, and choosing "Cut," then navigating to the destination folder and choosing "Paste."

Changing View Options → In File Explorer, use the "View" tab to change the way files and folders are displayed, such as using details, tiles, or lists.

3.1.2.2 Physical Accessibility

File Management with Speech Recognition

Speech recognition in Windows allows the user to manage files and perform various file management tasks using voice commands.

Open File Explorer → Use a voice command like "Open File Explorer" to launch the file management tool.

Navigate Folders → The user can use voice commands to navigate through folders, such as "Go to Documents" or "Open Downloads."

Select Files and Folders → The user can use voice commands to select files and folders by saying their names, like "Select [file name]."

Copy, Cut, and Paste → For copying or cutting files, the user can use voice commands like "Copy [file name]" or "Cut [file name]." To paste them, say "Paste."

Delete Files → To delete files, the user can use a voice command like "Delete [file name]."

Rename Files → The user can rename files by saying "Rename [file name]" and then dictating the new name.

Create New Folders → The user can create new folders by saying "Create new folder."

Search for Files → Use voice commands like "Search for [file name]" to find specific files.

Open Files → The user can open files by saying "Open [file name]."

Organize Files → Use commands like "Move [file name] to [destination]" or "Copy [file name] to [destination]" to organize files.

Change View Options → The user can change the view in File Explorer by saying "Switch to details view" or "Change to large icons."

Speech recognition allows the user to control their computer and interact with files using natural language voice commands.

3.1.2.3 Cognitive Accessibility

File Management with Text to Speech Software

File management in Microsoft Windows can be made more efficient with various keyboard shortcuts.

Ctrl + C → Copy the selected file(s) or folder(s).

Ctrl + X → Cut the selected file(s) or folder(s).

Ctrl + V → Paste the copied or cut file(s) or folder(s) into the current location.

Ctrl + Z → Undo the last action.

Delete → Move the selected file(s) or folder(s) to the Recycle Bin.

Shift + Delete → Permanently delete the selected file(s) or folder(s) without moving them to the Recycle Bin.

Ctrl + D → Send the selected item to the desktop.

F2 → Rename the selected file or folder.

Ctrl + N → Open a new File Explorer window.

Alt + Enter → Open the Properties dialog for the selected file or folder.

Alt + Up Arrow → Go up one level in the folder hierarchy.

Backspace → Go back to the previous folder.

Alt + Left Arrow → Go back in navigation history.

Alt + Right Arrow → Go forward in navigation history.

Ctrl + W → Close the current File Explorer window.

Ctrl + Shift + N → Create a new folder in the current location.

F5 → Refresh the current window.

Alt + Enter → Open the Properties dialog for the selected file or folder.

Ctrl + F → Activate the search bar in File Explorer.

Shift + F10 → Open the context menu for the selected item.

Ctrl + P → Print the selected file or folder.

Alt + Enter → Open the Properties dialog for the selected file or folder.

Ctrl + Shift + Esc → Open Task Manager.

Ctrl + A → Select all items in the current window.

Ctrl + Shift + A → Invert selection, deselects all selected items and selects unselected ones.

3.1.2.5 Exercises

Visual Accessibility

Quiz 1

Choose if the sentence is True or False

1. Using Narrator, the keyboard shortcut "Caps Lock + M" is used to narrate the current item. (True/False)
2. To delete an item using Narrator, the keyboard shortcut is "Caps Lock + D." (True/False)
3. Holding Caps Lock and pressing Spacebar is used to deselect an item. (True/False)

Answers: T, F, T

Quiz 2

Select the correct answer

1. What keyboard shortcut is used to open File Explorer with Magnifier?

- a) Ctrl + E
- b) Windows + E
- c) Alt + E

2. How can the user navigate through folders and files with Magnifier?

- a) Arrow keys
- b) Ctrl + Arrow keys
- c) Shift + Arrow keys

3. To create a new folder in File Explorer with Magnifier, the user should:

- a) Press Ctrl + N
- b) Right-click, go to "New," and select "Folder"
- c) Press Alt + F

Answers: b, a, b

Quiz 3

Match the following file management actions with the correct accessibility tool:

1. "Caps Lock + X"
2. "Windows + E"
3. "Right-click, go to 'New,' and select 'Folder'"

Options:

- a. Narrator
- b. Magnifier
- c. Both

Answers: 1-a, 2-b, 3-b

Quiz 4

Fill in the blanks in the following sentences related to file management tools:

1. To narrate the current item with Narrator, use the shortcut "_____."
2. With Magnifier, open File Explorer using the keyboard shortcut "_____."
3. The shortcut "Caps Lock + /" in Narrator is used to open the _____ menu for an item.

Options:

- a. Context
- b. Windows + E
- c. Caps Lock + M

Answers: 1-c, 2-b, 3-a

Physical Accessibility

Quiz 1

Choose if the sentence is True or False

1. Using speech recognition, the user can navigate folders in Windows by saying specific commands. (True/False)
2. To create a new folder with speech recognition, the user says, "Open new folder." (True/False)
3. Speech recognition enables the user to change the view in File Explorer using natural language commands. (True/False)

Answers: T, F, T

Quiz 2

Choose the correct option

1. How can the user open File Explorer with speech recognition?
 - a) Say "Open New File"
 - b) Use the keyboard shortcut Ctrl + E
 - c) Say "Open File Explorer"
3. How can the user organize files using speech recognition?
 - a) Say "Move file to folder"
 - b) Use the mouse to drag and drop files
 - c) Say "Create new folder"

Answers: c, a

Quiz 3

Match the following speech recognition commands with the correct file management action:

1. "Delete [file name]"
2. "Create new folder"
3. "Switch to details view"

Options:

- a. Remove files
- b. Establish a new folder
- c. Modify the view in File Explorer

Answers: 1-a, 2-b, 3-c

Quiz 4

Fill in the blanks in the following sentences related to file management with speech recognition:

- 1. To open File Explorer, the user can use the voice command "_____."
- 2. The user can copy a file by saying "_____ [file name]."
- 3. Speech recognition allows the user to rename files by saying "Rename _____."

Match with:

- a. Copy
- b. Open File Explorer
- c. [file name]

Answers: 1-b, 2-a, 3-c

Cognitive Accessibility

Quiz 1

Choose if the sentence is True or False

- 1. Ctrl + C is used to permanently delete selected files or folders. (True/False)
- 2. F2 is a keyboard shortcut to rename a selected file or folder. (True/False)
- 3. Alt + Up Arrow is used to navigate up one level in the folder hierarchy. (True/False)

Answers: F, T, T

Quiz 2

Select the correct answer

1. What does Ctrl + V do in file management with Speech Recognition?

- a) Paste
- b) Cut
- c) Copy

2. Which shortcut is used to create a new folder in Speech Recognition?

- a) Ctrl + D
- b) Ctrl + N
- c) Ctrl + Shift + N

3. How can you open the Properties dialog for a selected file or folder in Speech Recognition?

- a) Alt + Enter
- b) Ctrl + W
- c) Shift + F10

Answers: a, c, a

Quiz 3

Match the following file management shortcuts with their corresponding actions:

- 1. Ctrl + A
- 2. Alt + Up Arrow
- 3. F5

Options:

- a. Select all items
- b. Go up one level

c. Refresh the current window

Answers: 1-a, 2-b, 3-c

Quiz 4

Fill in the blanks in the following sentences related to file management keyboard shortcuts:

1.Ctrl + ___ is used to paste the copied or cut file(s) or folder(s).

2.F2 is a shortcut to ___ the selected file or folder.

3.Alt + Right Arrow is used to ___ in navigation history.

Match with:

a.V

b.Rename

c.Go forward

Answers: 1-a, 2-b, 3-c

3.1.2.6 Resources

Hearing and Cognitive Impairments

Videos and related articles for file management:

<https://www.youtube.com/watch?v=QqLbk-PmX2Q>

[Computer Keyboard Shortcutss \(computerhope.com\)](https://www.computerhope.com)

<https://edu.gcfglobal.org/en/windowsbasics/working-with-files/1/#>

Lecture in File Management: <https://www.youtube.com/watch?v=wIj9szVzp2k>

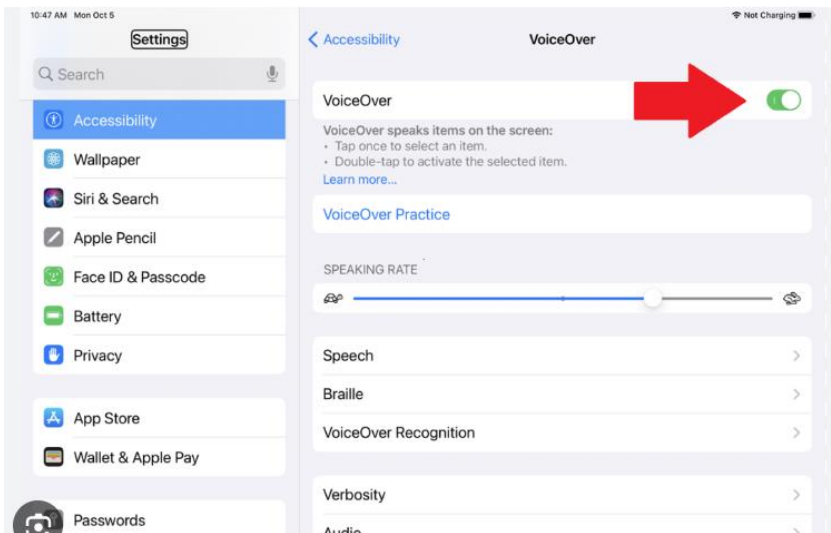
3.2 Mac OS

3.2.1 Built in features & Settings

3.2.1.1 Visual Accessibility

Mac OS prioritizes accessibility with a range of built-in features designed to enhance the computing experience for users with visual impairments. Recognizing the diverse needs of its user base, Mac OS integrates a suite of tools that cater to various visual challenges. From screen magnification to voiceovers, these features are seamlessly embedded in the operating system to ensure a user-friendly interface for individuals with impaired vision. Whether it's adjusting text size, employing screen readers, or fine-tuning display settings, Mac OS provides a comprehensive set of tools to empower users with visual impairments, fostering inclusivity and a more personalized computing experience.

VoiceOver



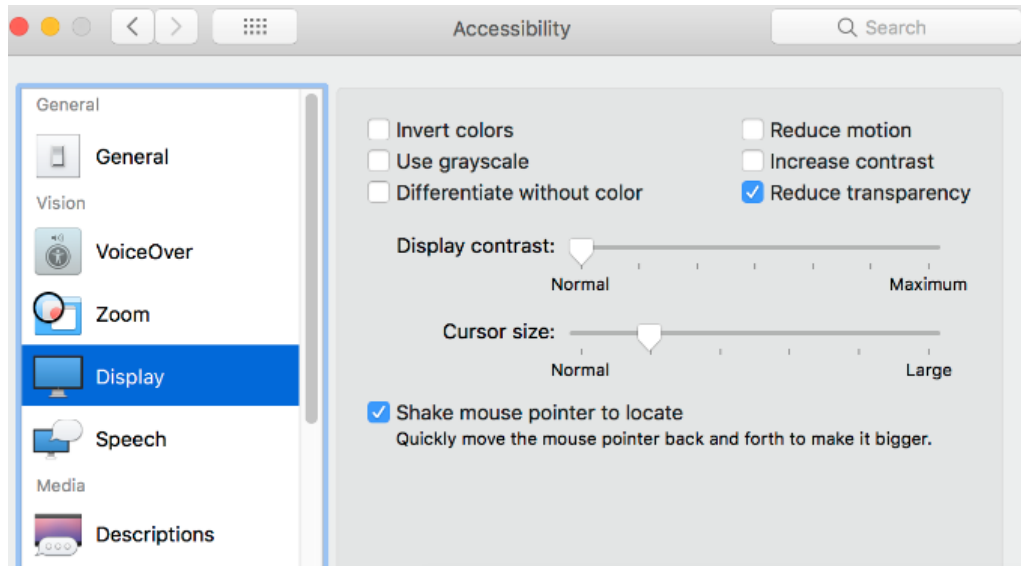
VoiceOver is a screen reader feature integrated into Apple's macOS operating system for Mac computers. It is designed to assist the user with visual impairments by providing spoken descriptions of on-screen elements and enabling the user to navigate and interact with their Mac using keyboard commands.

Key aspects of VoiceOver:

Features	Description
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Activation	The user can turn on VoiceOver during the initial setup of their Mac or enable it later through the Accessibility settings. The user can also use a keyboard shortcut (Command + F5) to toggle VoiceOver on and off.
Deactivation	To turn off VoiceOver, the user can use the same keyboard shortcut (Command + F5) or disable it through the Accessibility settings.
Navigation	VoiceOver provides the user with spoken feedback about what's happening on the screen. As the user moves the cursor or selects different elements, VoiceOver announces the relevant information. The user can navigate through various on-screen elements, such as buttons, links, and text, using VoiceOver commands.
Braille Support	VoiceOver also offers support for Braille displays, allowing the user to read information using Braille output devices.
Customization	The user can customize VoiceOver settings to adjust the speaking rate, voice, pitch, and other preferences to suit their needs.
Reading and Interaction	VoiceOver reads aloud the content of documents, emails, web pages, and more. It provides the user with spoken feedback during text input and interacts with various applications.
Web Browsing	VoiceOver enhances web browsing by reading the content of web pages, describing links and buttons, and providing an accessible experience for the user navigating the internet.

Display Accommodations



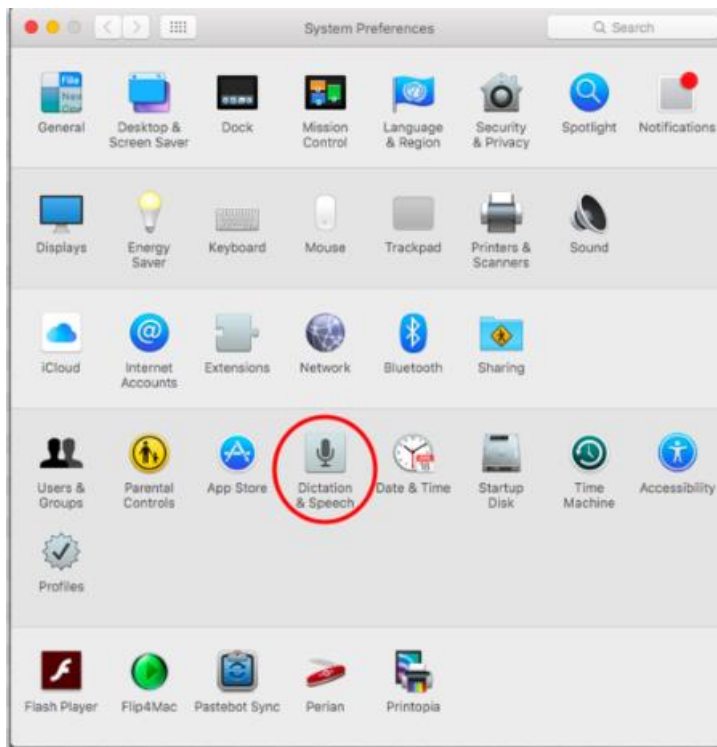
Display Accommodations is an accessibility feature on Apple Mac computers that allows users to adjust the display settings to make the on-screen content more visually accessible. This feature is particularly beneficial for users with visual impairments or those who prefer specific visual adjustments.

Key Aspects:

Features	Description
Accessibility Settings	Display Accommodations is part of the broader Accessibility settings on macOS. Users can access these settings through the System Preferences.
Color Filters	One significant aspect of Display Accommodations is the Color Filters option. Users can apply various color filters to the screen to enhance visibility for individuals with specific types of color blindness or sensitivity to certain colors.
Grayscale Mode	Display Accommodations offers a Grayscale mode, converting the display to black-and-white. This mode can be helpful for users who find it easier to distinguish content in grayscale.
Invert Colors	Users can invert colors on the display, which may assist individuals with specific visual conditions. This feature is particularly useful for enhancing contrast.

Differentiation of Interface Elements	Display Accommodations includes settings to help users differentiate between interface elements. For example, it can increase the contrast between text and background, making it easier to read.
Increase Contrast	Users can increase the overall contrast of the display. This can improve visibility by making text and interface elements stand out more clearly against the background.
Cursor Size	Display Accommodations allows users to adjust the size of the cursor. This is beneficial for individuals who may have difficulty locating or tracking the default-sized cursor.
Accessibility Keyboard	Display Accommodations integrates with the Accessibility Keyboard, providing an on-screen keyboard that users can manipulate using a pointing device or by dwell selection.
Shortcuts and Hotkeys	Users can set up shortcuts and hotkeys to quickly toggle between different Display Accommodations settings, providing convenience and efficiency.

Dictation

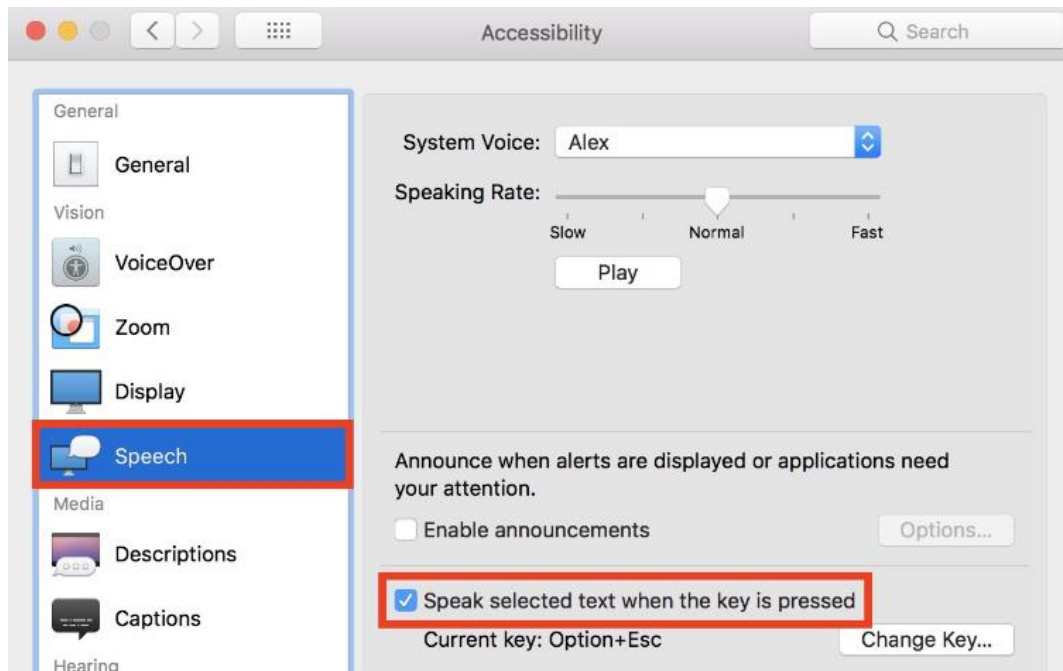


Dictation is a built-in feature on Apple Mac computers that enables users to input text by speaking rather than typing. This accessibility feature is designed to assist users who may have difficulty typing or prefer the convenience of speech input.

Key Aspects:

Features	Description
Activation	Users can activate Dictation on their Mac by going to System Preferences > Keyboard > Dictation. Once activated, users can use a customizable keyboard shortcut to start and stop Dictation.
Internet Connection	Dictation relies on an internet connection for processing speech-to-text. When a user speaks into the microphone, the audio is sent to Apple servers for transcription, and the resulting text is sent back to the user's device.
Languages and Dialects	Dictation supports a variety of languages and dialects. Users can choose their preferred language for speech input in the Dictation settings.
System Integration	Dictation is integrated into the macOS system, allowing users to use speech input in various applications, including text editors, word processors, email clients, and web browsers.
Editing and Corrections	Users can make corrections and edits using voice commands. For instance, users can say "delete that" to remove the last segment of dictated text or "select previous word" to highlight a specific portion for editing.
Privacy and Security	Similar to other Apple features, Dictation prioritizes user privacy. The audio recordings of dictated speech are anonymized and processed in a way that doesn't link them to the user's Apple ID. Users can also choose to disable the option for Apple to store their audio recordings.
Continuous Learning	Dictation improves over time as it learns from the user's speech patterns and corrections. This continuous learning helps enhance the accuracy of transcriptions.

Speak Selected Text



"Speak Selected Text" is a built-in accessibility feature on Apple Mac computers that allows users to have the computer read aloud selected text. This feature is particularly helpful for individuals with visual impairments, those who prefer auditory learning, or anyone who wants text content to read aloud to them.

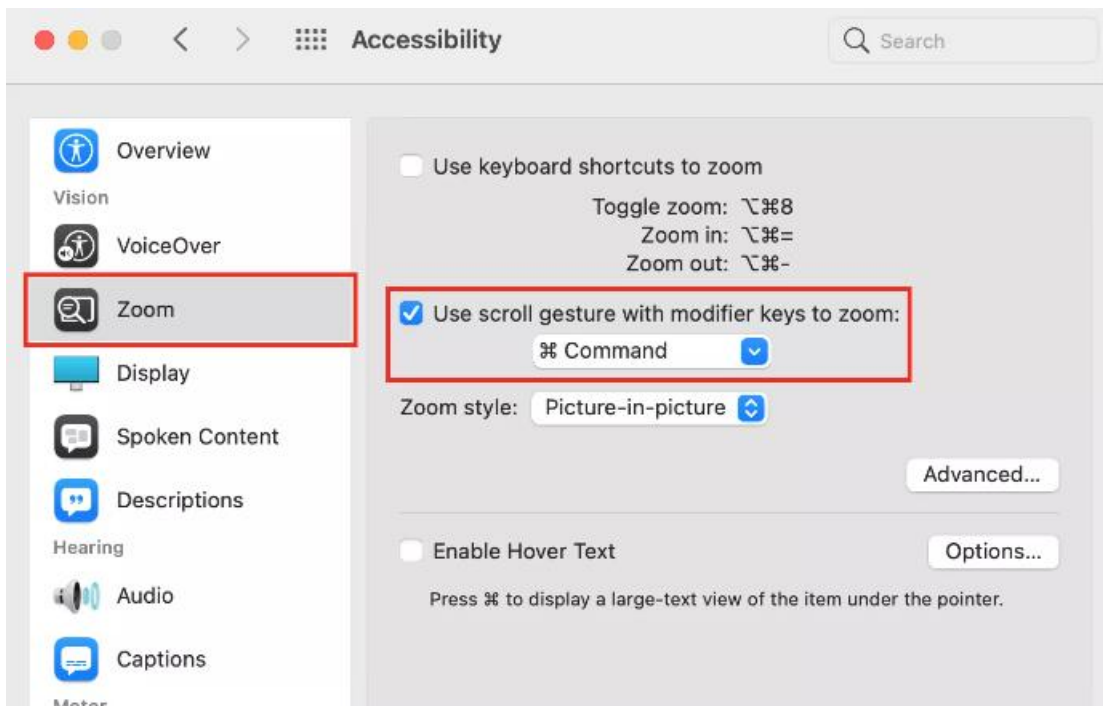
Users can highlight a portion of text in any application, such as a document, webpage, or email. After selecting the text, they can press the assigned shortcut keys, and the Mac will read the highlighted text aloud using the system's built-in text-to-speech capabilities.

Key Aspects:

Features	Description
Activation	Users can activate "Speak Selected Text" in the Accessibility settings of their Mac. To enable this feature, users can go to System Preferences > Accessibility > Spoken Content and check the box for "Speak selected text when the key is pressed."
Shortcut Key	Once activated, users can assign a specific keyboard shortcut to trigger the "Speak Selected Text" feature. By default, the Option + Esc keys are commonly used, but users can customize this shortcut based on their preferences.

Voice Options	The "Speak Selected Text" feature allows users to choose from various system voices and adjust the speaking rate to suit their preferences. Users can access these options in the Speech settings within the Accessibility preferences.
System Integration	Users can use this feature in text editors, browsers, email clients, and other applications that support text selection.
Reading Controls	While text is being read aloud, users have control over playback. They can pause, resume, or stop the reading at any time using keyboard shortcuts or on-screen controls.
Customization	Users can customize the behavior of "Speak Selected Text" to suit their preferences. This includes choosing the voice, adjusting the speaking rate, and fine-tuning other speech-related settings.
Multilingual Support	The text-to-speech voices used by "Speak Selected Text" support multiple languages, allowing users to listen to content in different languages based on their preferences.

Zoom



Apple provides a built-in screen magnifier feature on macOS, specifically designed to assist users with visual impairments. This accessibility feature is known as "Zoom."

Enable Keyboard Shortcuts for Zoom

1. Open "System Preferences" from the Apple menu.
2. Click on "Accessibility" in the sidebar.
3. Choose "Zoom" on the right. (Scroll down if necessary.)
4. Activate "Use keyboard shortcuts to zoom."

Zoom In/Out with Shortcuts

To zoom in □ Press Option-Command-Equal Sign (=).

To zoom out □ Press Option-Command-Minus Sign (-).

Quickly switch between zoom levels □ Press Option-Command-8.

Zoom with Scroll

Zoom in and out using a keyboard key and scrolling with the mouse or trackpad.

1. Follow the same steps to access Zoom in "Accessibility."
2. Enable "Use scroll gesture with modifier keys to zoom."
3. Click on "Modifier Keys" and select a key (Control, Option, or Command).

Zoom with Touchpad

Zoom by touching the trackpad.

1. Access Zoom in "Accessibility" as before.
2. Enable "Use touch gesture with modifier key to zoom."
3. Choose a gesture: Double-tap with three fingers for quick zoom, or double-tap with three fingers and drag for gradual zoom.

Adjusting Zoom Display

Customization of the magnified area and its appearance.

1. Open "System Preferences" > "Accessibility" > "Zoom."
2. Click "Zoom Style" and choose "Full Screen," "Split Screen," or "Picture in Picture."
3. Adjust the size and position for "Split Screen" or "Picture in Picture" if selected.

These simple steps empower users to effortlessly zoom in and out on their Macs using various methods tailored to their preferences, whether through keyboard shortcuts, scrolling, or touch gestures.

Siri



Siri is a built-in feature on Mac computers running macOS. Siri is Apple's virtual assistant, and it allows users to interact with their Mac using voice commands. You can activate Siri on your Mac by clicking the Siri icon in the menu bar, using a keyboard shortcut, or saying "Hey Siri" if your Mac supports hands-free activation.

Once activated, you can use Siri to perform various tasks, such as checking the weather, sending messages, setting reminders, opening applications, and more. Siri is designed to understand natural language, making it convenient for users to communicate with their Mac using spoken words.

Leverage Siri's capabilities on your Mac for day-to-day functions, such as arranging meetings, accessing applications, or swiftly finding answers to your questions.

Siri's Activation

1. Navigate to the Apple menu on your Mac, click on "System Preferences," and select "Siri and Spotlight" from the side column (scrolling may be necessary). Ensure that "Ask Siri" is activated on the right; if not, turn it on by clicking "Turn On."
2. If you attempt to enable Siri without this setting selected, a prompt will guide you to activate Siri. Keep in mind that an internet connection is required to use Siri.

3. If prompted to enhance Siri and Whisper, choose one of the following options:

- Opting to Share Audio Recordings: Select "Share audio recordings" to permit Apple to store the audio snippets from your interactions with Siri and Whisper on your Mac. Apple may review a portion of the stored audio for quality assurance.
- Declining to Share Audio Recordings: Click "Not now."

If you later reconsider and wish to either share or cease sharing audio recordings, access the Apple menu, go to "System Preferences," and then choose "Privacy and Security" from the side column (scrolling may be required).

4. Choose one of the following actions:

- Configure a keyboard shortcut: Open the "Keyboard shortcut" pop-up menu and choose a pre-set shortcut to activate Siri, or craft your custom shortcut.

Quick Tip: If the Microphone key is present in the function key row, pressing and holding it will trigger Siri, providing an alternative to the keyboard shortcut.

- Choose Siri's speech mode: Access "Select" beside "Siri voice" for a preview, and then pick the desired voice from the options in "Variety of voices" and "Siri voice" (note that some languages may offer only one choice).
- Silence Siri: Navigate to "Siri Answers," and disable "Voice Feedback" to have Siri's response displayed in the Siri window without vocalization.
- Display Siri's spoken words on-screen: Opt for "Siri Replies," and activate the "Always show Siri captions" setting to view Siri's responses in text form.
- Display your spoken words on-screen: Click on "Siri Answers," and enable the "Always show speech text" option to have your spoken input presented as text on the screen.

- Utilize "Hey Siri" or "Siri": If supported for your device and language, activate "Listen for" or designate the specific phrase you wish to utter to initiate Siri. When this feature is enabled, and you also activate the "Allow Siri from locked screen" option, you can interact with Siri even when your Mac is locked or in sleep mode.

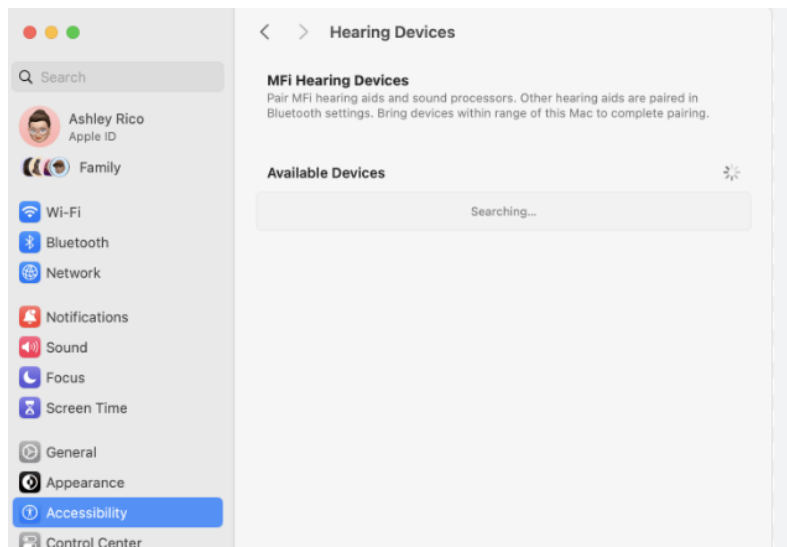
Siri's Deactivation

1. Navigate to the Apple menu on your Mac, select "System Preferences," and then click "Siri and Spotlight" in the side column (scrolling may be necessary).
2. On the right, switch off the "Ask Siri" option.

3.2.1.2 Hearing Accessibility

On macOS, Apple provides several built-in accessibility features and applications that can be beneficial for individuals with hearing impairments. These features aim to enhance the overall user experience and make the Mac platform more accessible.

Hearing Devices Setup



Hearing Devices Setup on Apple Mac computers involves configuring and connecting compatible hearing devices, such as hearing aids or cochlear implants, to enhance the audio experience for individuals with hearing impairments.

Key Aspects:

Features	Description
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Accessibility Settings	Users can access Hearing Devices Setup through the "System Preferences" on their Mac. Navigate to "System Preferences > Accessibility > Hearing" to configure hearing devices.
Bluetooth Connectivity	Hearing devices that support Bluetooth connectivity can be paired with the Mac for a seamless wireless audio experience. The user can ensure that the hearing device is in pairing mode, then select it from the list of available devices in the Bluetooth settings.
Hearing Devices in Accessibility Menu	Once configured, users can access essential hearing device settings directly from the Accessibility menu in the menu bar. This provides quick access to adjust settings on the fly.

Closed Captions



MacOS on Apple computers supports closed captions, providing an inclusive experience for users who are deaf or hard of hearing. Closed captions enhance accessibility by displaying text on the screen to represent spoken dialogue and other audio content.

Key Aspects:

Features	Description
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Accessibility Settings	Closed captions settings can be accessed through the "System Preferences" on a Mac. Navigate to "System Preferences > Accessibility > Captions" to configure caption preferences.
Customization Options	Users can customize closed caption appearance, including text size, font style, and background color, to suit their preferences and enhance readability.
Accessibility Shortcut	Mac users can set up accessibility shortcuts to quickly enable or disable closed captions. This provides a convenient way to access caption settings on the fly.

Visual Alerts



MacOS on Apple computers does not have a specific feature known as "Visual Alerts." However, macOS includes a range of accessibility features that aim to provide visual alerts and notifications for users with various needs. Users can enable visual alerts in "System Preferences > Accessibility > Audio."

Key Aspects:

Features	Description
Notification Center	The Notification Center on macOS aggregates alerts, notifications, and widgets, providing a centralized location for users to view and manage notifications from various applications. Users can access the Notification

	Center by clicking on the menu bar icon or swiping to the right with two fingers on the trackpad.
Banner Notifications	MacOS supports banner notifications that briefly appear in the upper-right corner of the screen, providing information about incoming messages, emails, or other app-specific alerts. Users can customize notification preferences for each application in the System Preferences.
Do Not Disturb	The Do Not Disturb feature allows users to silence notifications temporarily. When enabled, notifications won't appear on the screen, providing a focused and uninterrupted experience. Users can manually activate Do Not Disturb or schedule it for specific times.
Flash Screen for Alerts	Users can configure macOS to flash the screen when an alert or notification occurs. This visual cue can attract attention and is useful for users who may not rely on audible alerts.
Notification Options	Users can choose to receive notifications in different forms, such as a banner on the screen, a notification in the Notification Center, or a flash on the screen. These options cater to individual preferences and the urgency of the detected sound.

Sound Recognition



Apple's macOS includes a feature known as "Sound Recognition." Sound Recognition is an accessibility feature designed to alert users to certain sounds in their environment. This feature is particularly beneficial for individuals with hearing impairments or those who may have difficulty hearing specific sounds.

Key Aspects:

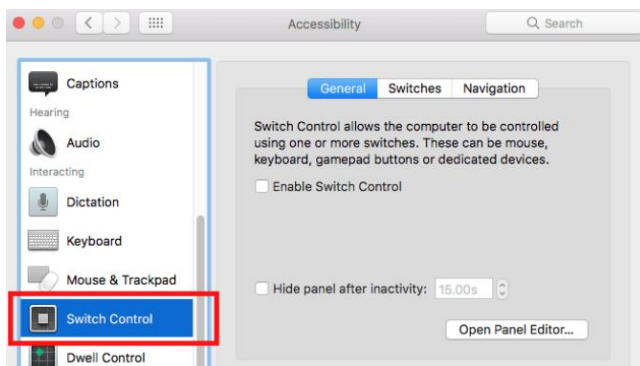
Features	Description
Activation and Settings	Users can find the Sound Recognition feature in the Accessibility settings. Once activated, it can detect and notify users about various sounds.
Supported Sounds	Sound Recognition is capable of identifying a range of sounds, including but not limited to doorbells, fire alarms, sirens, appliances, and specific animal sounds. Users can customize the types of sounds they want the system to recognize.
Visual Alerts	When Sound Recognition detects a recognized sound, it provides a visual notification on the screen. This visual alert ensures that users

	are informed of important sounds even if they might not hear them audibly.
Integration with Other Accessibility Features	Sound Recognition can complement other accessibility features on macOS, such as VoiceOver. The combination of features enhances the overall accessibility experience for users with different needs.

3.2.1.3 Physical Accessibility

MacOS is equipped with a robust set of features designed to enhance accessibility for individuals with physical disabilities, ensuring a user-friendly and inclusive computing experience. These features are thoughtfully crafted to address diverse needs, allowing users to customize their interactions based on unique preferences and challenges. From customizable pointer controls and hands-free navigation options to innovative input devices and specialized keyboard functionalities, MacOS stands as a pioneer in creating an accessible digital environment.

Switch Control



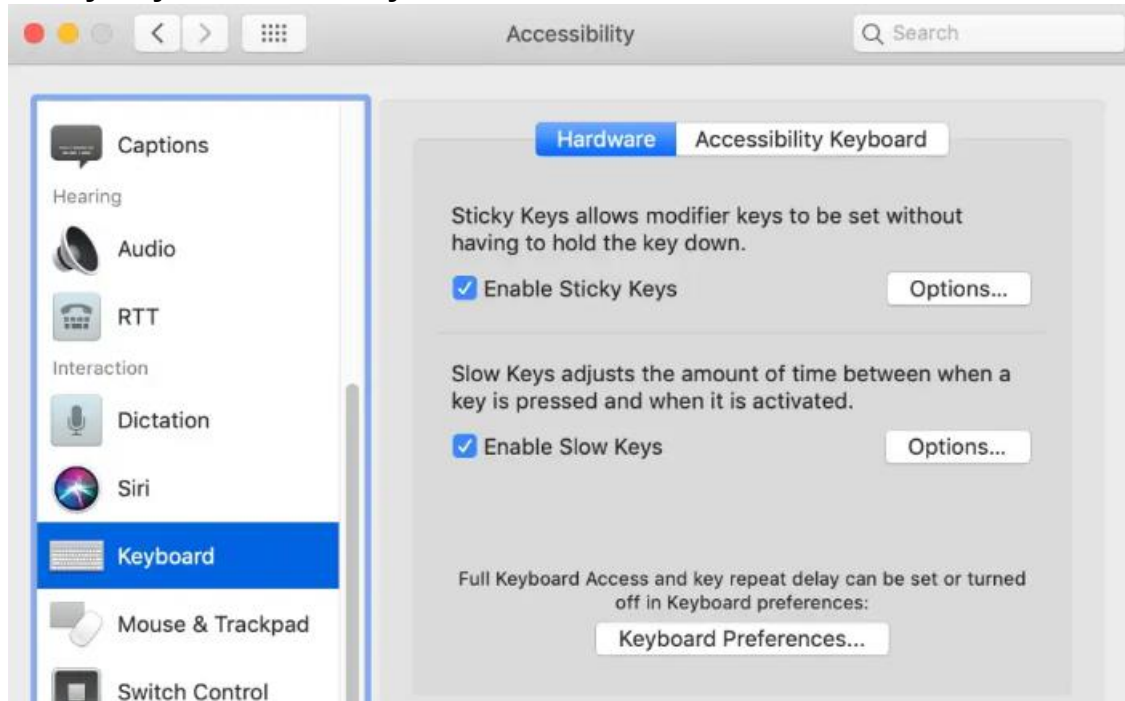
Switch Control is a powerful accessibility feature on Apple macOS that enables the users to interact with their Mac computers using external adaptive devices, such as switches, buttons, or a keyboard. This feature is designed to provide an alternative input method, allowing users to navigate the interface, select items, and perform various actions.

Key Aspects:

Features	Description
----------	-------------

Activation and Setup	Users can activate Switch Control in the Accessibility settings of their Mac. Once enabled, users can configure the feature to work with their specific adaptive devices.
Navigation and Interaction	The scanning cursor moves across the screen, highlighting different elements. Users activate their adaptive switch to select the highlighted item, initiate an action, or navigate through menus.
Custom Actions and Gestures	Users can assign custom actions or gestures to specific switches, providing a tailored and efficient way to interact with the computer. This customization enhances the user's ability to control their Mac effectively.
Full Keyboard Control	Switch Control allows users to emulate full keyboard control using their adaptive switches. This includes entering text, navigating through applications, and executing keyboard shortcuts.
Point Mode	Point Mode enables users to move a cursor freely around the screen, offering precise control for tasks such as drawing or graphic design.
Head Pointer	Switch Control supports the Head Pointer feature, allowing users to control the cursor using head movements. This is particularly beneficial for individuals who may not be able to use traditional input methods.
Menu Control	Users can access contextual menus and control various functions within applications using Switch Control. This feature enhances the overall usability of the Mac interface.

Sticky Keys and Slow Keys



Sticky Keys and Slow Keys are two accessibility features on Apple macOS designed to assist users who may have difficulty with traditional keyboard input due to motor control challenges. These features aim to make keyboard interactions more manageable for individuals with physical disabilities.

Key Aspects for Sticky Keys:

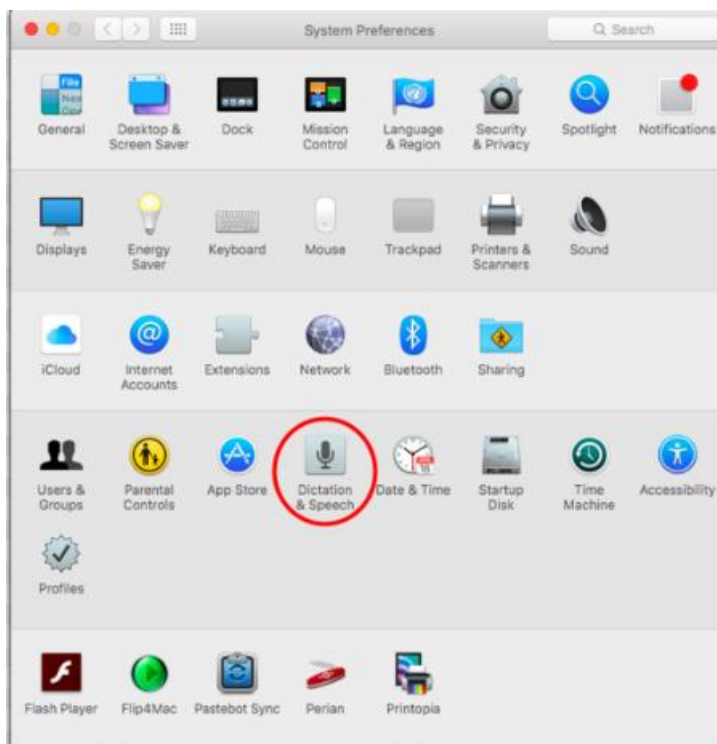
Functionality	Usage	Activation
Sticky Keys help users who have difficulty holding down multiple keys simultaneously. Instead of requiring simultaneous key presses for keyboard shortcuts, Sticky Keys allow users to press one key at a time, and the system will retain the keypress until the next key is pressed.	For example, if a user needs to press "Command" and "C" for copy, they can press and release the "Command" key, followed by the "C" key, simplifying the process.	Users can activate Sticky Keys through the Accessibility settings. Once enabled, users can customize settings, such as the modifier key behavior and the audible feedback for key presses. The user needs to press the Shift key five times to toggle Sticky Keys and the same to turn it off

Key Aspects for Slow Keys:

Functionality	Usage	Activation
This feature helps users who may have unintentional key presses due to motor control challenges.	When a key is pressed, there is a delay before the system registers the keypress. This helps prevent unintended key presses and gives users more control over their keyboard input.	Users can activate Slow Keys through the Accessibility settings. The settings allow users to customize the delay period before a key is registered as pressed. The user can press press Option-Command-F5 for Activation (or if the user has Mac or Magic Keyboard has Touch ID, quickly press Touch ID three times).

Users can choose to use Sticky Keys and Slow Keys in combination, tailoring their keyboard experience to meet their specific needs. This combined use can provide a more accessible and user-friendly environment for individuals with varying motor control requirements.

Dictation

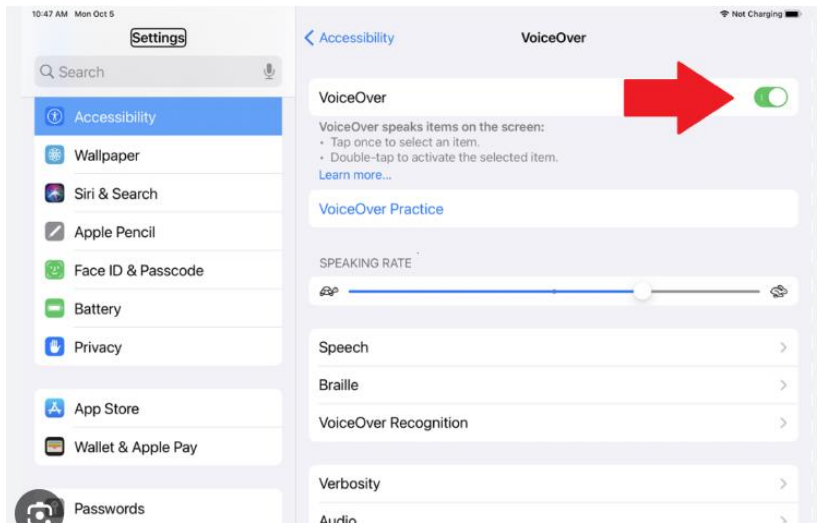


Dictation is a built-in feature on Apple Mac computers that enables users to input text by speaking rather than typing. This accessibility feature is designed to assist users who may have difficulty typing or prefer the convenience of speech input.

Key Aspects:

Features	Description
Activation	Users can activate Dictation on their Mac by going to System Preferences > Keyboard > Dictation. Once activated, users can use a customizable keyboard shortcut to start and stop Dictation.
Internet Connection	Dictation relies on an internet connection for processing speech-to-text. When a user speaks into the microphone, the audio is sent to Apple servers for transcription, and the resulting text is sent back to the user's device.
Languages and Dialects	Dictation supports a variety of languages and dialects. Users can choose their preferred language for speech input in the Dictation settings.
System Integration	Dictation is integrated into the macOS system, allowing users to use speech input in various applications, including text editors, word processors, email clients, and web browsers.
Editing and Corrections	Users can make corrections and edits using voice commands. For instance, users can say "delete that" to remove the last segment of dictated text or "select previous word" to highlight a specific portion for editing.
Privacy and Security	Similar to other Apple features, Dictation prioritizes user privacy. The audio recordings of dictated speech are anonymized and processed in a way that doesn't link them to the user's Apple ID. Users can also choose to disable the option for Apple to store their audio recordings
Continuous Learning	Dictation improves over time as it learns from the user's speech patterns and corrections. This continuous learning helps enhance the accuracy of transcriptions.

VoiceOver



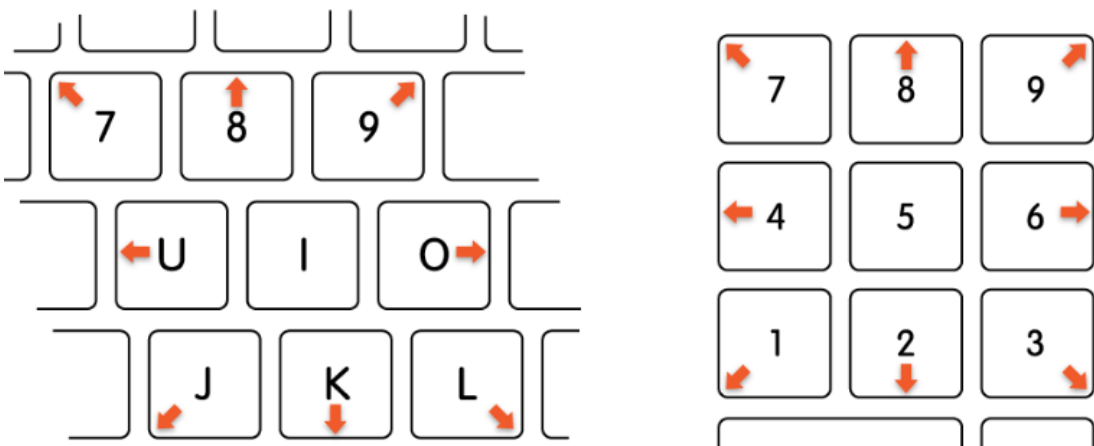
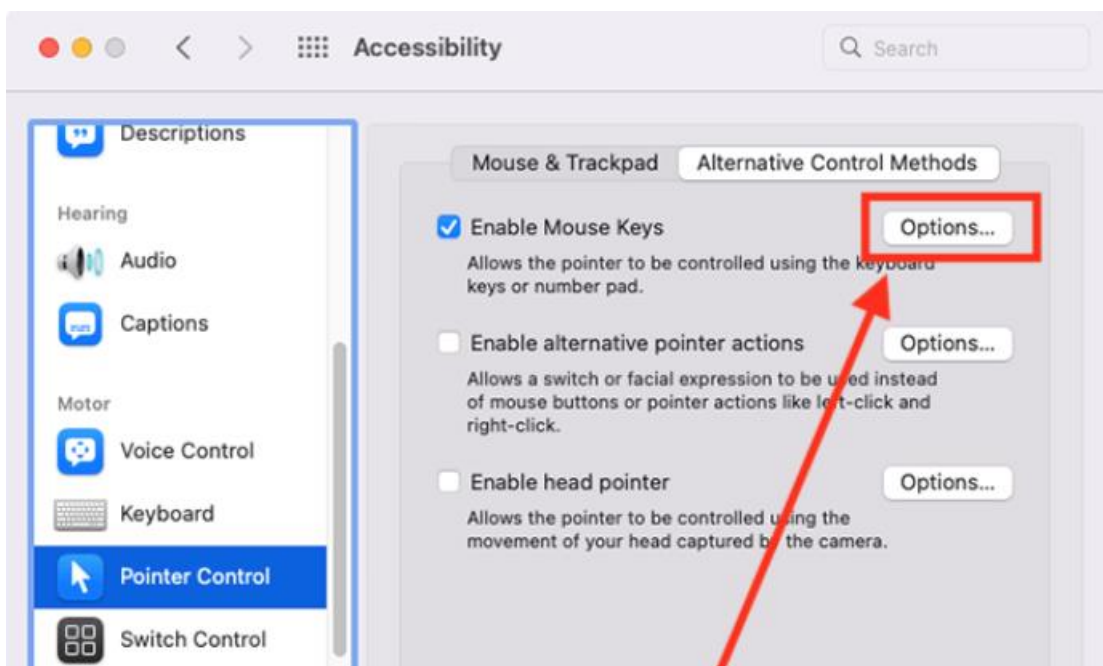
VoiceOver is a screen reader feature integrated into Apple's macOS operating system for Mac computers. It is designed to assist the user with visual or physical impairments by providing spoken descriptions of on-screen elements and enabling the user to navigate and interact with their Mac using keyboard commands.

Key aspects of VoiceOver:

Features	Description
Activation	The user can turn on VoiceOver during the initial setup of their Mac or enable it later through the Accessibility settings. The user can also use a keyboard shortcut (Command + F5) to toggle VoiceOver on and off.
Deactivation	To turn off VoiceOver, the user can use the same keyboard shortcut (Command + F5) or disable it through the Accessibility settings.
Navigation	VoiceOver provides the user with spoken feedback about what's happening on the screen. As the user moves the cursor or selects different elements, VoiceOver announces the relevant information. The user can navigate through various on-screen elements, such as buttons, links, and text, using VoiceOver commands.
Braille Support	VoiceOver also offers support for Braille displays, allowing the user to read information using Braille output devices.
Customization	The user can customize VoiceOver settings to adjust the speaking rate, voice, pitch, and other preferences to suit their needs.

Reading and Interaction	VoiceOver reads aloud the content of documents, emails, web pages, and more. It provides the user with spoken feedback during text input and interacts with various applications.
Web Browsing	VoiceOver enhances web browsing by reading the content of web pages, describing links and buttons, and providing an accessible experience for the user navigating the internet.

Pointer Control



The Pointer Control accessibility feature in Apple macOS offers users a diverse set of options to tailor and improve the functionality of the on-screen cursor. This feature is particularly valuable for users who may have specific preferences or require customized settings for their pointing

devices, such as mice or trackpads. By navigating to the Trackpad and Mouse Preferences in the System Preferences menu, users can adjust settings like tracking speed and double-click speed, ensuring a personalized and comfortable pointing experience.

Key Aspects:

Features	Description
Mouse Options	Within the Accessibility preferences, users can fine-tune mouse settings, including tracking speed. This allows users to control the cursor's movement across the screen based on their preferences and comfort.
Scrolling and Zooming	Pointer Control includes settings for scrolling speed and zooming options. Users can personalize how quickly content scrolls or zooms in and out, providing a tailored experience for individual needs.
Cursor Size and Color	Customization options extend to the cursor itself, allowing users to adjust its size and color. This feature is particularly beneficial for users who may have visual challenges or difficulty locating a standard-sized cursor.
Shake to Locate	A unique and helpful feature, "Shake to Locate," enables users to shake the mouse or trackpad to temporarily enlarge the cursor. This aids users in quickly locating the cursor on the screen, enhancing visibility and ease of use.
Custom Clicking Options	Users can personalize clicking options to suit their preferences. For example, they can enable Tap to Click or adjust the dwell time for a click to be registered. This flexibility accommodates users with varying clicking capabilities.
Secondary Click	The feature allows users to configure the secondary click (right-click) behavior. Users can choose between different options, such as using two fingers, the bottom-right corner of the trackpad, or an external mouse.

Integration with Accessibility Keyboard	Pointer Control settings seamlessly integrate with the Accessibility Keyboard, offering alternative methods for pointing and clicking. This on-screen keyboard enhances accessibility for users with diverse needs.
Compatibility with Other Accessibility Features	Pointer Control can be used in conjunction with other accessibility features, such as Switch Control, VoiceOver, or Head Pointer. This ensures a comprehensive and adaptable solution for users with various accessibility requirements.

Accessibility Keyboard



The Accessibility Keyboard on Apple macOS is a powerful accessibility feature designed to assist users with motor challenges or those who prefer an on-screen keyboard. This feature provides a visual, customizable, and interactive keyboard on the screen, enabling users to input text, navigate, and perform various functions without relying on a physical keyboard.

Access the On-Screen Keyboard through Accessibility Settings

The process for the user to open the on-screen keyboard on a Mac differs slightly depending on the macOS version. The user can open the on-screen keyboard via the Accessibility settings following the steps below:

1. Select Apple Menu > System Preferences.

2. Navigate to Accessibility.
3. Choose Keyboard.
4. Select Accessibility Keyboard.

The user can enable Accessibility Keyboard by checking the corresponding box.

To close the on-screen keyboard, the user can click the X (close icon) at the top left corner. Alternatively, the user can go to Apple Menu → System Preferences → Accessibility → Keyboard → Accessibility Keyboard and uncheck Enable Accessibility Keyboard.

The user can resize the on-screen keyboard by dragging a corner. Can use Panel Options to customize its appearance or turn Dwell on/off.

NOTE

If the user chooses to hide or fade the on-screen keyboard after inactivity, moving the pointer over it will make it fully visible. If it's hidden, moving the pointer will make the keyboard reappear.

Opening the On-Screen Keyboard from the Login Screen

The user can enable specific accessibility options in the login window to facilitate logging in, especially if the keyboard is faulty:

1. Select Apple Menu > System Preferences.
2. Go to Users & Groups.
3. Unlock the screen by selecting the lock icon, and the user can enter administrator credentials or use Apple Watch or Touch ID if supported.
4. Choose Login Options.
5. Select Accessibility Options under Users & Groups.

The user can enable desired accessibility options such as Accessibility Keyboard, Zoom, Sticky Keys, Mouse Keys, Slow Keys, or VoiceOver for the login window.

6. Click Apply to implement the changes.

NOTE

The user can use Option + Command + F5 to toggle accessibility options in the login window or press the Touch ID three times for the Accessibility Shortcuts panel.

Opening the On-Screen Keyboard Using Keyboard Shortcuts

For quick access to the on-screen keyboard, the user can use keyboard shortcuts:

1. Press Option + Command + F5.
2. Select Accessibility Keyboard.
3. Click Done.
4. Opening the On-Screen Keyboard Using the Input Menu

The Input menu, located on the top right of the menu bar, provides access to the Keyboard Viewer and other features:

5. Click on the Input Menu icon.
6. Choose Show Keyboard Viewer.

If the Input Menu icon is not visible, the user can enable it in System Preferences ☐ Keyboard ☐ Input Sources.

Siri



Siri is a built-in feature on Mac computers running macOS. Siri is Apple's virtual assistant, and it allows users to interact with their Mac using voice commands. You can activate Siri on your

Mac by clicking the Siri icon in the menu bar, using a keyboard shortcut, or saying "Hey Siri" if your Mac supports hands-free activation.

Once activated, you can use Siri to perform various tasks, such as checking the weather, sending messages, setting reminders, opening applications, and more. Siri is designed to understand natural language, making it convenient for users to communicate with their Mac using spoken words.

Leverage Siri's capabilities on your Mac for day-to-day functions, such as arranging meetings, accessing applications, or swiftly finding answers to your questions.

Siri's Activation

1. Navigate to the Apple menu on your Mac, click on "System Preferences," and select "Siri and Spotlight" from the side column (scrolling may be necessary). Ensure that "Ask Siri" is activated on the right; if not, turn it on by clicking "Turn On."
2. If you attempt to enable Siri without this setting selected, a prompt will guide you to activate Siri. Keep in mind that an internet connection is required to use Siri.
3. If prompted to enhance Siri and Whisper, choose one of the following options:
 - Opting to Share Audio Recordings: Select "Share audio recordings" to permit Apple to store the audio snippets from your interactions with Siri and Whisper on your Mac. Apple may review a portion of the stored audio for quality assurance.
 - Declining to Share Audio Recordings: Click "Not now."

If you later reconsider and wish to either share or cease sharing audio recordings, access the Apple menu, go to "System Preferences," and then choose "Privacy and Security" from the side column (scrolling may be required).

4. Choose one of the following actions:
 - Configure a keyboard shortcut: Open the "Keyboard shortcut" pop-up menu and choose a pre-set shortcut to activate Siri, or craft your custom shortcut.

Quick Tip: If the Microphone key is present in the function key row, pressing and holding it will trigger Siri, providing an alternative to the keyboard shortcut.

- Choose Siri's speech mode: Access "Select" beside "Siri voice" for a preview, and then pick the desired voice from the options in "Variety of voices" and "Siri voice" (note that some languages may offer only one choice).
- Silence Siri: Navigate to "Siri Answers," and disable "Voice Feedback" to have Siri's response displayed in the Siri window without vocalization.
- Display Siri's spoken words on-screen: Opt for "Siri Replies," and activate the "Always show Siri captions" setting to view Siri's responses in text form.
- Display your spoken words on-screen: Click on "Siri Answers," and enable the "Always show speech text" option to have your spoken input presented as text on the screen.
- Utilize "Hey Siri" or "Siri": If supported for your device and language, activate "Listen for" or designate the specific phrase you wish to utter to initiate Siri. When this feature is enabled, and you also activate the "Allow Siri from locked screen" option, you can interact with Siri even when your Mac is locked or in sleep mode.

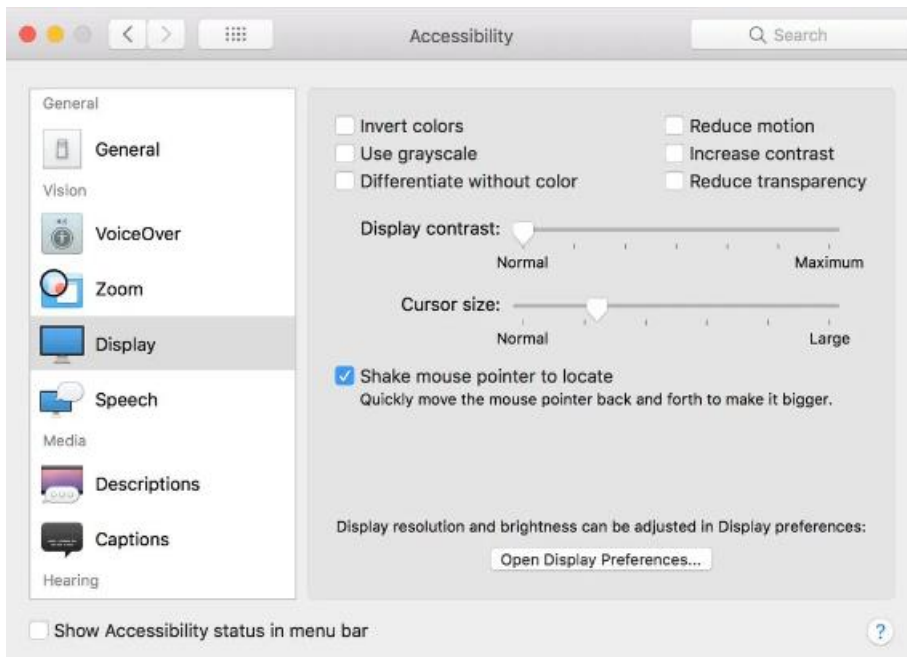
Siri's Deactivation

1. Navigate to the Apple menu on your Mac, select "System Preferences," and then click "Siri and Spotlight" in the side column (scrolling may be necessary).
2. On the right, switch off the "Ask Siri" option

3.2.1.4 Cognitive Accessibility

From simplified interfaces to customizable settings, macOS prioritizes inclusivity, allowing individuals with cognitive challenges to navigate and interact with their Mac devices with greater comfort and efficiency. Let's explore the thoughtful design and functionality that makes macOS a supportive platform for users with cognitive impairments.

Customizable Display



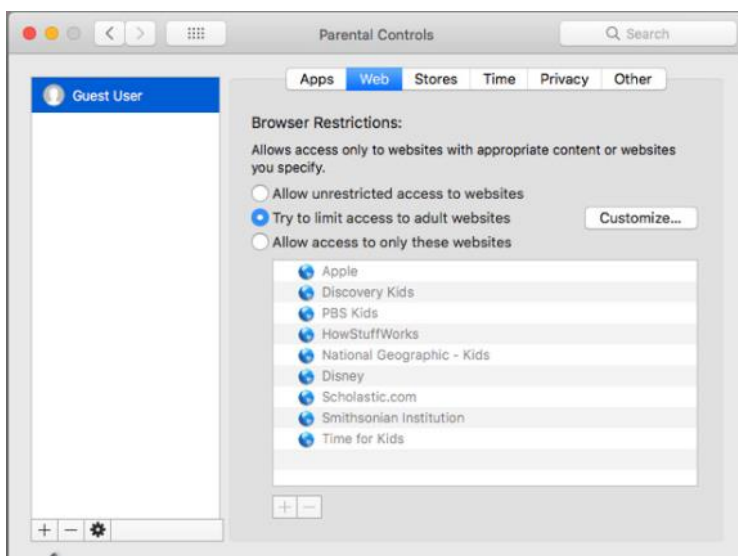
Users can personalize the display settings to reduce visual distractions. This includes adjusting font sizes, enhancing contrast, and choosing specific colors to improve readability.

Key Aspects:

Features	Description
Display Resolutions	Users can adjust the display resolution to tailor the level of detail and clarity. This is particularly useful for users who may prefer larger text and icons or those who require higher resolution for specific tasks.

Scaling Options	MacOS offers scaling options that allow users to adjust the size of text and other on-screen elements.
High Contrast Mode	MacOS provides a High Contrast mode that increases the contrast between text and background elements.
Cursor Size and Color	Users can customize the size and color of the cursor, making it more visible on the screen.
Night Shift	Night Shift adjusts the color temperature of the display based on the time of day, reducing blue light exposure during the evening. This can contribute to a more comfortable viewing experience, especially for users with sensitivity to blue light.
Color Filters	macOS includes color filters that allow users to adjust the display's color spectrum.
Invert Colors	The "Invert Colors" option reverses the colors on the display, creating a high-contrast and inverted appearance.
Accessibility Keyboard	The Accessibility Keyboard provides an on-screen keyboard with customizable layouts and display options. Users can adjust the size and appearance of the keyboard to suit their preferences.

Time Limits and Restrictions within Parental Control



Parental Controls include features for setting time limits and restrictions on a Mac for specific user accounts, especially useful for managing children's computer usage.

General steps to set time limits and restrictions on a Mac:

1. Log in to the Mac using the administrator account.
2. Open "System Preferences" from the Apple menu.
3. Locate and click on "Parental Controls" within System Preferences.
4. Choose the user account for which the user wants to set time limits and restrictions.
5. Check the box labeled "Enable Parental Controls" for the selected user account.
6. Navigate to the "Time Limits" or "Bedtime" section.
7. Specify the allowed usage duration for weekdays and weekends.
8. Go to the "Apps" or "Allowed Apps" section to restrict access to specific applications.
9. Choose the apps that the user can or cannot access during certain times.

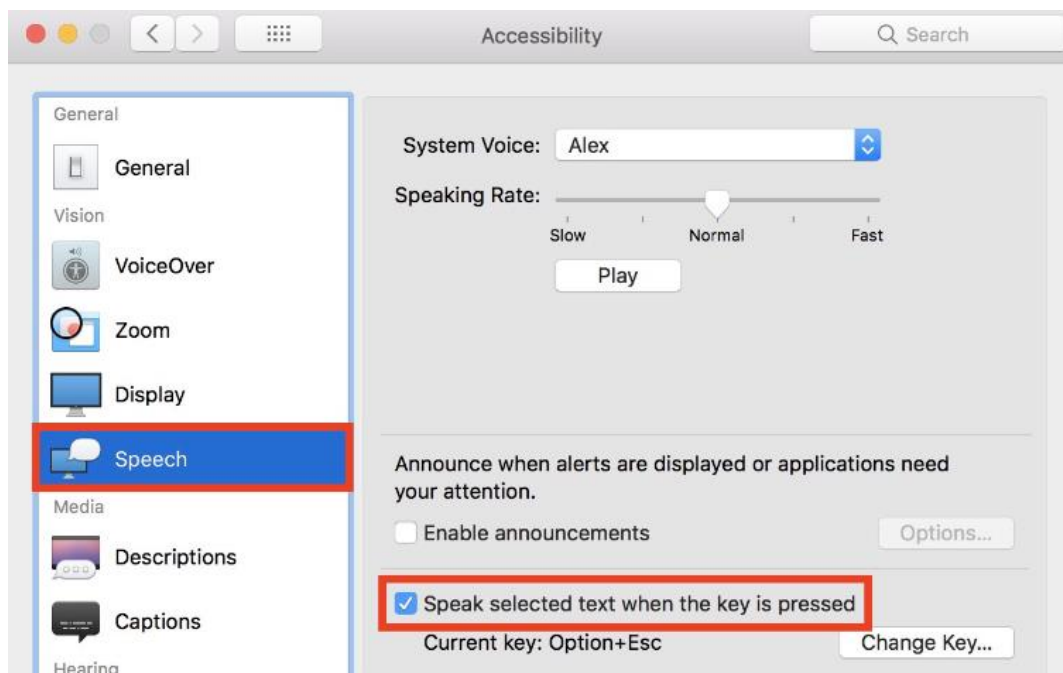
If needed, set restrictions on web browsing by configuring options within the "Web" or "Content" section.

Explore other sections within Parental Controls to customize additional restrictions, such as Game Center, Mail, and Messages.

10. Double-check the settings to ensure they align with the user's intended restrictions.
11. Confirm or save the changes.

Some changes may require entering the administrator password to apply the settings.

Speak Selected Text



"Speak Selected Text" is a built-in accessibility feature on Apple Mac computers that allows users to have the computer read aloud selected text. This feature is particularly helpful for individuals with visual impairments, those who prefer auditory learning, or anyone who wants text content to read aloud to them.

Users can highlight a portion of text in any application, such as a document, webpage, or email. After selecting the text, they can press the assigned shortcut keys, and the Mac will read the highlighted text aloud using the system's built-in text-to-speech capabilities.

Key Aspects:

Features	Description
Activation	Users can activate "Speak Selected Text" in the Accessibility settings of their Mac. To enable this feature, users can go to System Preferences > Accessibility > Spoken Content and check the box for "Speak selected text when the key is pressed."
Shortcut Key	Once activated, users can assign a specific keyboard shortcut to trigger the "Speak Selected Text" feature. By default, the Option + Esc keys are commonly used, but users can customize this shortcut based on their preferences.
Voice Options	The "Speak Selected Text" feature allows users to choose from various system voices and adjust the speaking rate to suit their preferences. Users can access these options in the Speech settings within the Accessibility preferences.
System Integration	Users can use this feature in text editors, browsers, email clients, and other applications that support text selection.
Reading Controls	While text is being read aloud, users have control over playback. They can pause, resume, or stop the reading at any time using keyboard shortcuts or on-screen controls.
Customization	Users can customize the behavior of "Speak Selected Text" to suit their preferences. This includes choosing the voice, adjusting the speaking rate, and fine-tuning other speech-related settings.

Multilingual Support	The text-to-speech voices used by "Speak Selected Text" support multiple languages, allowing users to listen to content in different languages based on their preferences.
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3.2.1.5 Exercises

Visual Impairments

Quiz 1

Choose if the sentence is True or False.

1. VoiceOver is designed to assist users with visual impairments by providing spoken descriptions of on-screen elements.
2. To deactivate VoiceOver, users can use the keyboard shortcut Command + F5.
3. VoiceOver provides support for touch gestures on Mac computers.

Answers: T, T, T

Quiz 2

Choose the correct sentence.

1. What is the primary purpose of Display Accommodations on Apple Mac computers?
 - a) Enhancing gaming graphics
 - b) Adjusting display settings for visual accessibility
 - c) Improving internet speed
 - d) Managing file storage
2. Which option is available in Display Accommodations to help users differentiate between interface elements?
 - a) Color Filters
 - b) Grayscale Mode
 - c) Increase Contrast

d) Cursor Size

3. How does Display Accommodations integrate with the Accessibility Keyboard?

- a) Provides color-coded keyboard
- b) Offers customizable keyboard shortcuts
- c) Displays a virtual on-screen keyboard
- d) Adjusts keyboard lighting

Answers: b, c, c

Quiz 3

Match the numbers with the letters:

- 1. Dictation relies on an internet connection for processing speech-to-text.
- 2. Users can make corrections and edits using voice commands.
- 3. Dictation improves over time as it learns from the user's speech patterns.

Match them with these sentence:

- a. Enhancing privacy in Dictation
- b. Continuous learning in Dictation
- c. Editing capabilities in Dictation

Answers: 1- a, 2-c, 3-b

Quiz 4:

1. What is the activation process for "Speak Selected Text" in Accessibility settings?

- a) Use keyboard shortcut Option + Esc
- b) Automatically activated upon Mac setup

- c) Accessible through Siri voice command
- d) Always enabled by default

2. How does "Speak Selected Text" handle multilingual support?

- a) Limited to one language
- b) Supports multiple languages
- c) Requires external language packs
- d) Relies on internet connection for language selection

3. What customization options are available for "Speak Selected Text"?

- a) Adjusting cursor size
- b) Changing system voices
- c) Enhancing internet speed
- d) Controlling screen brightness

Answers: a, b, b

Hearing Impairments

Quiz 1

Choose if the sentence is True or False

1. Hearing Devices Setup can be accessed through "System Preferences > Accessibility > Hearing" on a Mac.
2. Hearing devices with Bluetooth connectivity can be seamlessly paired with a Mac.
3. Once configured, users can access hearing device settings from the Accessibility menu in the menu bar.

Answers: T, T, T

Quiz 2

Choose the correct answers

1. How can users access closed caption settings on a Mac?

- a) Siri voice command
- b) System Preferences > Accessibility > Captions
- c) Control Panel > Sound
- d) Applications > Utilities

2. What customization options are available for closed captions?

- a) Background music control
- b) Text size, font style, and background color
- c) Screen brightness adjustment
- d) Internet speed optimization

3. What is the purpose of the accessibility shortcut for closed captions?

- a) Enable/disable screen recording
- b) Quickly access and manage closed caption settings
- c) Activate dark mode
- d) Adjust screen resolution

Answers: b,b,b

Quiz 3

Match the numbers with the letters

1. Notification Center aggregates alerts, notifications, and widgets.
2. MacOS supports banner notifications that appear in the upper-right corner.
3. Users can configure macOS to flash the screen when an alert occurs.

Match them with the sentence:

- a. Flash screen for alerts
- b. Banner notifications
- c. Notification Center

Answers: 1-c, 2-b, 3-a

Quiz 4

1. Where can users find the Sound Recognition feature in macOS?
 - a) Accessibility settings
 - b) System Preferences > Display
 - c) Applications > Utilities
 - d) Siri voice command
2. What types of sounds can Sound Recognition identify?
 - a) Only human voices
 - b) Animal sounds only
 - c) A range of sounds including doorbells and fire alarms
 - d) Music genres
3. How does Sound Recognition notify users when it detects a recognized sound?
 - a) Audible alert
 - b) Visual notification on the screen

- c) Send a notification to the user's phone
- d) Change system wallpaper

Answers: a, c, b

Physical Impairments

Quiz 1

Choose if the sentence is True or False

1. Switch Control allows users to emulate full keyboard control.
2. Point Mode enables users to control the cursor using head movements.
3. Menu Control in Switch Control enhances the overall usability of the Mac interface.

Answers: T, F, T

Quiz 2

Choose the correct answer

1. How does Sticky Keys assist users with keyboard shortcuts?
 - a) Requires simultaneous key presses
 - b) Allows pressing one key at a time
 - c) Disables keyboard shortcuts
 - d) Only works with the Shift key
2. What is the purpose of Slow Keys?
 - a) Speeds up key presses
 - b) Prevents unintended key presses
 - c) Disables key registration

d) Enhances keyboard shortcuts

3. How can users activate Sticky Keys?

- a) Press Shift key five times
- b) Press Option-Command-F5
- c) Use Touch ID three times
- d) Shout "Activate Sticky Keys"

Answers: b, b, a

Quiz 3

Match the numbers with the letters.

- 1. VoiceOver reads aloud the content of documents, emails, web pages, and more.
- 2. The user can customize VoiceOver settings to adjust the speaking rate.
- 3. To turn off VoiceOver, the user can use the keyboard shortcut Command + F5.

Match them with the sentences:

- a. Customization
- b. Deactivation
- c. Reading Aloud

Answers: 1-c, 2-a, 3-b

Quiz 4

Choose the correct answer.

- 1. What customization options are available for the cursor in Pointer Control?
 - a) Cursor taste

- b) Cursor speed only
- c) Cursor size and color
- d) Cursor temperature

2. How does "Shake to Locate" enhance user experience in Pointer Control?

- a) Shaking the cursor increases its size permanently.
- b) Shaking the device changes cursor color.
- c) Temporarily enlarges the cursor for quick location.
- d) Shaking initiates a right-click action.

3. How does Pointer Control integrate with other accessibility features?

- a) It doesn't integrate with other features.
- b) Only integrates with VoiceOver.
- c) Seamless integration with features like Switch Control and VoiceOver.
- d) Requires additional software for integration.

Answers: c, c, c

Cognitive Impairments

Quiz 1

Select if the sentence is True or False

- 1. Users can adjust the display resolution to tailor the level of detail and clarity.
- 2. Night Shift increases blue light exposure during the evening.
- 3. The Accessibility Keyboard provides an off-screen keyboard.

Answers: T, F, F

Quiz 2

Match the numbers with the letters

1. Users can set time limits for weekdays and weekends.
2. The "Speak Selected Text" feature is activated in the Accessibility settings.
3. Parental Controls allow restricting access to specific applications.

Match them with the sentences:

- a. Time Limits and Bedtime
- b. Speak Selected Text
- c. Apps and Allowed Apps

Answers: 1-a, 2-b, 3-c

Quiz 3

Select the correct answer

1. What does the "Speak Selected Text" feature offer control over while reading?
 - a) Screen brightness
 - b) Playback of selected text
 - c) Mouse sensitivity
 - d) Web browser tabs

2. How can users customize the behavior of "Speak Selected Text"?
 - a) Change display resolution
 - b) Adjust font sizes
 - c) Fine-tune speech-related settings
 - d) Change cursor color

3. In what type of applications can users utilize the "Speak Selected Text" feature?

- a) Only in games
- b) Text editors, browsers, and email clients
- c) Social media apps only
- d) Offline applications

Answers: b, c, b

3.2.1.6 Resources

Visual Accessibility

Useful video-resources regarding voice over:

- <https://www.youtube.com/watch?v=Lwol0iaBGGI>
- <https://www.youtube.com/watch?v=NilSb29tpS8>

Siri's Settings:

- https://www.youtube.com/watch?v=c_1b6PRhqBo
- <https://www.youtube.com/watch?v=NE0VbLzi-uM>

Dictation on Mac:

- <https://www.youtube.com/watch?v=4xFVVgFZL2U>

Official Apple channel:

- <https://www.youtube.com/@Apple>

Hearing Accessibility

Accessibility settings – click some informative videos:

- Closed live captions: <https://www.youtube.com/watch?v=nfJ22oQFhao>
- Adjusting Hearing Alarms: https://www.youtube.com/watch?v=Uzp2GVIM_LA

Official Apple channel:

- <https://www.youtube.com/@Apple>

Physical Accessibility

Examples of accessibility features and functions:

- Switch Control on Mac: <https://www.youtube.com/watch?v=rzpvPnbiM1s>
- Accessibility keyboard: <https://www.youtube.com/watch?v=-ixQPnS9FSc>
- Pointer Control Settings: <https://www.youtube.com/watch?v=XkB6UPRTel0>
- Sticky Keys on macOS: <https://www.youtube.com/watch?v=jWwml9CZY7g>

Official Apple channel:

- <https://www.youtube.com/@Apple>

Cognitive Accessibility

Resources regarding some of the above-mentioned built-in features:

- Switch Control: <https://www.youtube.com/watch?v=xzDui1uKPbs>
- Parental Control: <https://www.youtube.com/watch?v=ne7lvARyaP4>
- Keyboard shortcuts: <https://www.youtube.com/watch?v=GPy1fqgNkXc>

Official Apple channel:

- <https://www.youtube.com/@Apple>

3.2.2 File Management

3.2.2.1 Visual Impairments

File Management with Voice Over

In this chapter, you will discover the fundamental aspects of utilizing VoiceOver. This includes instructions on activating and deactivating VoiceOver, pausing its functionality, understanding details about on-screen items, engaging with them, and mastering cursor tracking.

- **Activate – Deactivate VoiceOver**

Action	Shortcut
Activate VoiceOver	Press Command-F5
Deactivate	Press Command-F5 (The same key shortcuts with the Activation process)

If you have configured the Universal Access preference to include a menu in the status bar, this menu will display whether VoiceOver is on or off.

Upon initiating VoiceOver for the first time, you have the option to embark on the Quick Start tutorial—an interactive guide covering the fundamentals of VoiceOver navigation and interaction. Once VoiceOver is activated, you can initiate the tutorial at any point by pressing VO-Command-F8.

- **Pausing speech**

When VoiceOver is speaking, you can temporarily pause the speech, and then resume where the speaking left off.

- **Using VoiceOver to navigate the desktop on your Mac**

- Move to the desktop: Press the VO-Shift-D key combination.
- Move between items in the work desk: Press the arrow keys.
- Press the arrow keys to move quickly to an item on the work desk: Enter the first letter of the item. For example, if you have a file named "Travel" in the work desk, type "T" to move to it.
- Open a selected item in the work desk: Press the Command-O key combination. Command-Command-Command.

- **To pause and resume speech**

Press the Control key. If you're using VoiceOver gestures, two-finger tap the trackpad. To resume speaking, repeat the key or gesture.

If you move the VoiceOver cursor after you pause the speech, VoiceOver begins speaking the item that's now in the VoiceOver cursor.

If you missed what VoiceOver spoke, you can press VO-Z to repeat the last word or phrase.

- **Hearing hints and information about an item**

VoiceOver provides many ways to learn more about the item in the VoiceOver cursor.

You can use the F1 through F6 keys with the VO keys (the Control and Option keys) to hear information about items on which the VoiceOver cursor, keyboard, or mouse pointer is focused.

To hear	Press
The application summary, describing the application that is currently active and the number of other applications that are running.	VO-F1
The window summary, describing the active window.	VO-F2
The item on which the VoiceOver cursor is focused. The description includes the current state of the item, such as whether a checkbox is selected, or the percent value of a slider. If you're using VoiceOver gestures, tap the trackpad three times to hear the item in the VoiceOver cursor. If there is no item, a sound effect indicates a blank area on the screen.	VO-F3
The size of the item in the VoiceOver cursor.	VO-Command-F3
The position of the item in the VoiceOver cursor.	VO-Command-F3-F3
The item on which the keyboard is focused. The description includes the current state of the item.	VO-F4
The location of the insertion point relative to the upper-left corner of the text item in which the insertion point is located. For example, you might hear "Insertion point is two inches right, five inches down from top-left corner of edit text."	VO-F4-F4
The item on which the mouse pointer is focused. The description includes the current state of the item.	VO-F5
The location of the mouse pointer as x and y coordinates on the screen, relative to the upper-left corner of the screen.	VO-F5-F5
The location of the mouse pointer in x and y coordinates relative to the current window.	VO-F5-F5-F5

The item that is currently selected (such as a folder or text in a document).

VO-F6

- **Hearing an item's location on the screen**

If you have stereo headphones or dual speakers, you can use positional audio to hear audio cues (or sound effects) about an item's location on the screen. This option is on by default.

To turn on positional audio:

When VoiceOver is on, open VoiceOver Utility by pressing VO-F8.

Click Sound in the category table and then select the "Enable positional audio" checkbox.

If you have set the Universal Access preference to play stereo audio as mono audio, you can't hear VoiceOver's positional audio.

- **Selecting and deselecting items**

You can select and deselect a single item or multiple items.

To select items:

- For a single item when cursor tracking is off, press VO-Command-F4.
- If you're using VoiceOver gestures, select a single item by double-tapping the trackpad.
- For multiple items, press VO-Shift-F3 to turn off cursor tracking. Then move the VoiceOver cursor to the first item and press VO-Command-Space bar. Move to the next item and press the keys again. Repeat until all the items you want are selected.

To hear the current selection, press VO-F6.

To deselect items:

- For a single item in the VoiceOver cursor, press VO-Command-Space bar.
- If you're using VoiceOver gestures, deselect a single item by double-tapping the trackpad.
- For all selected items, move to one of the items and press VO-Command-F4. To deselect the last and current item, press VO-Command-Space bar.

- **Dragging items using the keyboard**

You can use the mouse to drag and drop files with mouse tracking turned on or off.

To move items by using the mouse and keyboard:

1. Move the VoiceOver cursor to the item you want to move.

If mouse tracking is off, press VO-Command-F5 to route the VoiceOver cursor to the target location.

2. Verify that the mouse is on the item (press VO-F5).
3. Lock the mouse button (press VO-Command-Shift-Space bar).
4. Move the VoiceOver cursor to the target location.

If mouse tracking is off, press VO-Command-F5 to route the mouse to the target location.

5. Verify that the mouse is on the target location (press VO-F5).
6. Unlock the mouse button (press VO-Command-Shift-Space bar).

3.2.2.2 Physical Impairments

File Management with Siri

Managing files on a Mac using Siri can be particularly helpful for individuals with physical impairments, as it allows for hands-free control of various tasks. Siri, Apple's virtual assistant, can perform a range of file management actions through voice commands.

Some steps to manage files on Mac using Siri:

Basic Commands

Activate Siri □ Click on the Siri icon in the top menu bar or use the voice command, "Hey Siri" if it's enabled in your settings.

Open Finder □ You can ask Siri to "Open Finder" to access your files.

Find Specific Files

Say commands like "Find my recent documents" or "Show files from last week" to locate specific files.

File Operations

Create a New Folder □ Command Siri to "Create a new folder on the desktop" or in a specific directory.

Move or Copy Files □ Specify a file and destination with commands like "Move file X to folder Y" or "Copy document Z to desktop."

Rename Files □ Request Siri to "Rename file A to B" for easy file management.

File Information

Get File Information □ Ask Siri to provide information about a file, such as "What are the details of file C?"

Check Recent Files □ Use commands like "What are my recent documents?" to quickly review recent activities.

Some examples of Siri commands for desktop-related tasks:

Opening Applications → "Open [Application Name]" to launch specific applications on your desktop.

Organizing Files → "Move file [file name] to desktop" or "Copy document [document name] to desktop" to manage files on the desktop.

Changing Desktop Wallpaper → "Change desktop wallpaper" or "Set desktop background to [image name]" to modify your desktop appearance.

Adjusting Display Settings → "Open System Preferences" and then navigate to "Displays" or "Desktop & Screen Saver" to make adjustments.

Arranging Icons → "Arrange icons by [Name, Kind, Date, etc.]" to organize desktop icons based on your preferences.

Creating Documents → "Create a new document on the desktop" to start a new file directly on the desktop.

Getting Information → "What's on my desktop?" to get a summary of the items currently on your desktop.

Accessibility Settings

Adjust System Preferences → Siri can help adjust accessibility settings. For example, you can say "Open System Preferences" and then navigate to the Accessibility section.

File Management with general Keyboard Shortcuts

Desktop Shortcuts:

- Desktop Navigation

Command + F3 or Command + Mission Control: Exposes the desktop, minimizing open windows.

- Cycle Through Desktop Spaces

Control + Right Arrow or Control + Left Arrow: Switch between different desktop spaces if you use Mission Control.

- Create a New Folder on Desktop

Shift + Command + N: Creates a new folder on the desktop.

- Rename Selected Item

Return: Select an item on the desktop, then press Return to enter rename mode.

- Move to Trash

Command + Delete: Sends the selected item to the Trash.

- Empty Trash

Shift + Command + Delete: Empties the Trash.

- View Options for Desktop

Control + Click on the desktop, then select "Show View Options" to customize how items are displayed on the desktop.

- Toggle Icon View Options

Command + J: Opens the View Options for the current desktop window in icon view.

- Select All Items on Desktop

Command + A: Selects all items on the desktop.

- Navigate Through Items

Use arrow keys to navigate through items on the desktop.

- Sort Items on Desktop:

Control + Command + 1 (Sort by name), Control + Command + 2 (Sort by date modified), Control + Command + 3 (Sort by kind), etc.

- Clean Up By

Control + Command + R: Automatically arranges icons on the desktop.

Other related-file shortcuts:

- Open Finder

Command + N: Opens a new Finder window.

Command + O: Opens the selected item.

- Navigate Through Folders

Command + Up Arrow: Moves to the parent folder.

Command + Down Arrow: Opens the selected folder.

- Copy, Cut, and Paste

Command + C: Copies the selected item.

Command + X: Cuts the selected item.

Command + V: Pastes the copied or cut item.

- Undo and Redo

Command + Z: Undoes the previous action.

Command + Shift + Z or Command + Y: Redoes the undone action.

- Delete and Move to Trash

Command + Delete: Moves the selected item to the Trash.

- Empty Trash

Command + Shift + Delete: Empties the Trash.

- Select All Files

Command + A: Selects all items in the active window.

- Deselect All Files

Command + Shift + A: Deselects all items.

- Minimize and Maximize Windows

Command + M: Minimizes the active window.

Command + Option + M: Minimizes all windows.

Command + F: Enters or exits full-screen mode.

- Close Window

Command + W: Closes the active window.

- Show/Hide Sidebar:

Command + Option + S: Toggles the visibility of the sidebar.

- Show/Hide Toolbar

Command + Option + T: Toggles the visibility of the toolbar.

Other Shortcuts

- Get Info

Command + I: Opens the Get Info window for the selected item.

- Search

Command + F: Initiates a search in the active window.

3.2.2.3 Cognitive Impairments

[More information in the previous chapter here](#)

3.2.2.4 Exercises

Quizzes for Visual Impairments

Quiz 1

Please select if the following sentences are True or False.

1. Pressing Command-F5 activates VoiceOver on a Mac.
2. The same keyboard shortcut is used for both activating and deactivating VoiceOver.
3. The status bar menu indicates whether VoiceOver is on or off.

Answers: T, T, T

Quiz 2

Select the correct answer.

1. How can you temporarily pause VoiceOver speech?
 - a. Press Control key
 - b. Press Command-F4
 - c. Press VO-F1
2. What gesture is used to hear the item in the VoiceOver cursor for users employing VoiceOver gestures?
 - a. Single tap on the trackpad

- b. Double tap on the trackpad
 - c. Triple tap on the trackpad
3. How do you repeat the last word or phrase spoken by VoiceOver?
- a. Press VO-Z
 - b. Press Command-F5
 - c. Press VO-F3

Answers: a, c, a

Quiz 3

Fill in the blank spaces with the correct answer:

1. To hear the application summary, describing the currently active application, press _____.
2. If there is no item in the VoiceOver cursor, a sound effect indicates a _____ area on the screen.
3. If you have stereo headphones, you can use positional audio to hear audio cues about an item's location on the _____.

Answers: VO-F1, Blank, Screen

Quiz 4

Select which answer is the correct for each question.

1. What key or gesture is used to move the VoiceOver cursor to the item you want to move?
2. How can you turn on positional audio in VoiceOver?
3. What is the keyboard shortcut to select multiple items with cursor tracking turned off?

Answers:

- a. Press VO-Command-F5
- b. Open VoiceOver Utility by pressing VO-F8, click Sound, and select "Enable positional audio."
- c. Press VO-Shift-F3

Answers: 1-a. 2-b, 3-c

Quizzes for Physical Impairments

Quiz 1

1. Select All Items on Desktop (Command + A):

True/False

2. Toggle Icon View Options (Command + J) opens the View Options for the current desktop window in list view:

True/False

3. Empty Trash (Command + Shift + Delete) permanently deletes items without any confirmation:

True/False

4. Deselect All Files (Command + Shift + A) removes the selection from all items in the active window:

True/False

Answers: T, F, T, T

Quiz 2

Select the correct answer.

1. Minimize and Maximize Windows (Command + M) is used for:
 - a. Maximizing the active window.
 - b. Minimizing the active window.

c. Closing the active window.

2. Show/Hide Sidebar (Command + Option + S) is used for:

a. Toggling the visibility of the sidebar.

b. Opening a new Finder window.

c. Creating a new folder.

3. Navigate Through Folders (Command + Down Arrow) does:

a. Moves to the parent folder.

b. Opens the selected folder.

c. Deletes the selected item.

4. Search (Command + F) initiates a search in:

a. The active window.

b. The Trash.

c. The desktop.

Answers: b, a, b, a

Quiz 3

Fill in the Blanks with the given words.

1. Create a new folder on the desktop: Command Siri to "_____"

Answer: d. Create a new folder on the desktop.

2. Toggle Icon View Options: _____ + J opens the View Options for the current desktop window in icon view.

Answer: c. Command

3. Select All Items on Desktop: Command + _____ selects all items on the desktop.

Answer: b. A

4. Navigate Through Folders: Command + _____ Arrow moves to the parent folder.

Answer: a. Up

Options:

- a. Up
- b. A
- c. Command
- d. Create a new folder on the desktop

Quiz 4

Choose the correct sentence that accurately describes the action:

1. Toggle Icon View Options (Command + J):

- a. Opens a new Finder window.
- b. Toggles the visibility of the toolbar.
- c. Opens the View Options for the current desktop window in icon view.

2. Empty Trash (Shift + Command + Delete):

- a. Moves the selected item to the Trash.
- b. Permanently deletes items without any confirmation.
- c. Undoes the previous action.

3. Create a New Folder on Desktop (Shift + Command + N):

- a. Creates a new folder on the desktop.
- b. Opens the selected item.

c. Toggles the visibility of the sidebar.

4. Show/Hide Toolbar (Command + Option + T):

- a. Initiates a search in the active window.
- b. Toggles the visibility of the toolbar.
- c. Closes the active window.

Answers: c, b, a, b

Quizzes for Cognitive Impairments

[Press here to find the exercises](#)

3.2.2.5 Resources

Some helpful videos for guidance and learning about folder management functions on a Mac.

- Moving files with VoiceOver: <https://www.youtube.com/watch?v=2q84Tqcux0E>
- General File Management: <https://www.youtube.com/watch?v=hldUlvog6kI>
- A series of videos – Mac files and folders:
<https://www.youtube.com/watch?v=mYNchWitkyg&list=PL1bsBsPtN-9TY3YnJIY3haZ9v48i4i3Xy>

3.3 Linux OS

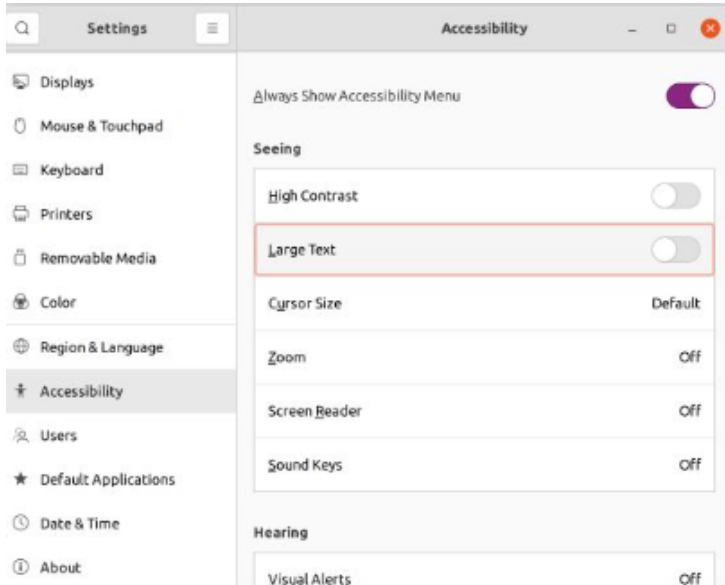
3.3.1 Built in features & Settings

3.3.1.1 Accessibility for Visual Impairments

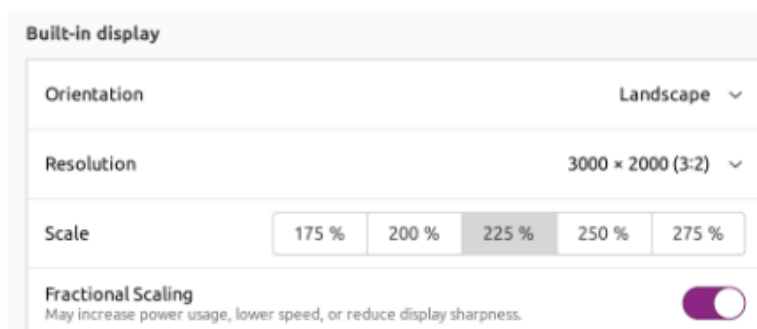
Accessibility Features

Enlarge the size of text, icons, and the pointer

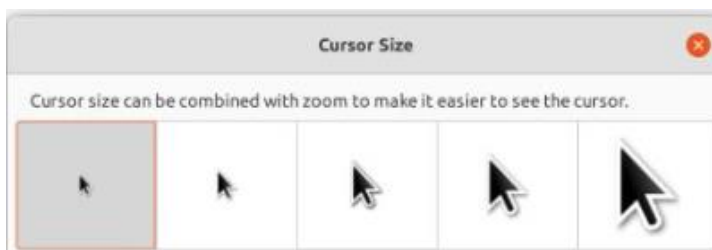
- Increase the font size of the text
 1. Settings > Accessibility > Seeing
 2. Large Text
 3. Adjust the toggle to on



- Enlarge all visual elements on the screen
 1. Settings > Displays > Built-in Display
 2. Scale
 3. Select from the options available

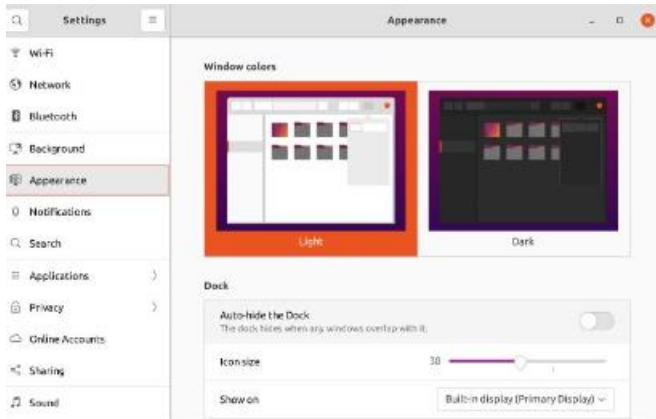


- Large Mouse Pointer
 1. Settings > Accessibility > Seeing
 2. Cursor Size
 3. Select a preferred size

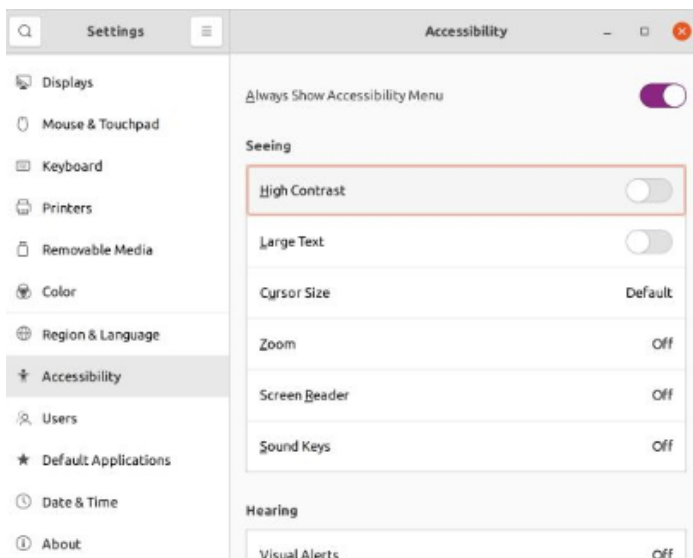


Adjust colour and contrast

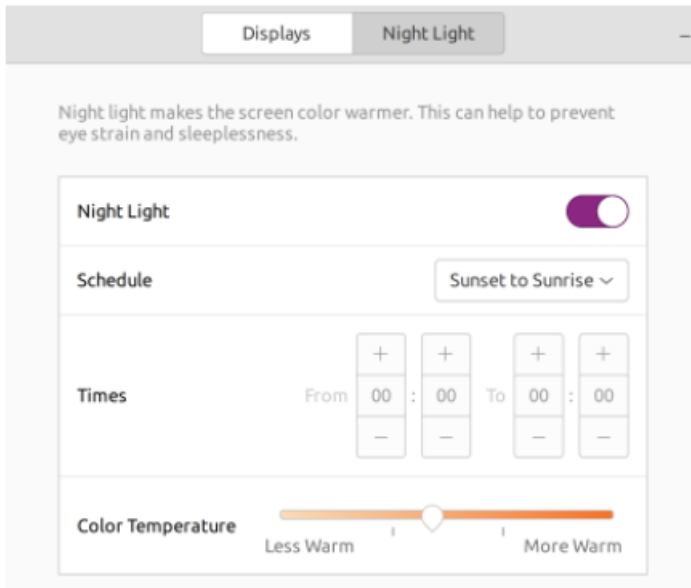
- Enable Dark Mode
 1. Settings > Appearance > Window colours
 2. Dark



- High Contrast
 1. Settings > Accessibility > Seeing
 2. Cursor Size
 3. Select a preferred size



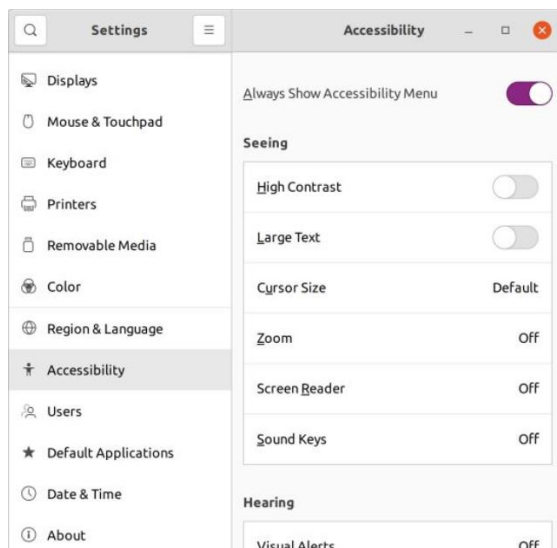
- For Night Light
 1. Settings > Accessibility > Seeing
 2. Cursor Size
 3. Select a preferred size



3.3.1.2 Accessibility for Hearing Impairments

Linux incorporates built-in features designed to enhance hearing accessibility, ensuring a seamless and accommodating computing experience for individuals who are deaf or hard of hearing. These features encompass various aspects, including auditory feedback, visual notifications, and customizable settings that empower users to tailor their Linux environment according to their unique auditory requirements. Whether it's the integration of visual cues in system alerts or options for adjusting sound preferences, Linux strives to create an environment where users with hearing impairments can fully participate in the digital realm with confidence and ease.

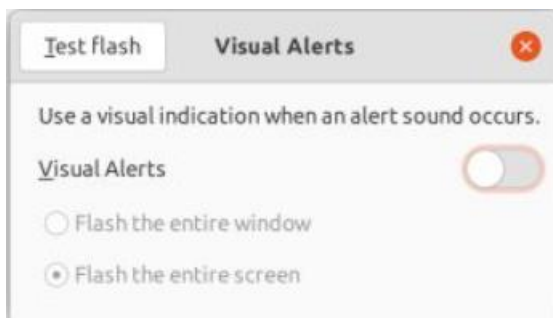
To Access Accessibility Settings



The following instructions pertain to Ubuntu 21.10 but should be applicable to most Linux versions based on the GNOME desktop.

1. Initiate the Applications Menu: Click the Show Applications Button or use the shortcut Windows + A (found on most keyboards)
2. Select the Settings gear icon
3. Navigate to Accessibility

For hearing features



1. Turn on Visual Alerts
2. Settings → Accessibility ▢ Hearing
3. Visual Alerts

NOTES

The visual alerts functionality allows the configuration of either flashing the active window or the entire screen in response to an alert sound. This proves beneficial for individuals who may not have the ability to hear the alert.

3.3.1.3 Accessibility for Physical Impairments

Linux operating systems provide a range of built-in accessibility features designed to enhance the computing experience for individuals with physical impairments. These features aim to make the Linux desktop environment more adaptable and user-friendly, catering to the diverse needs of users facing challenges related to motor skills and physical dexterity. From customizable keyboard shortcuts to mouse alternatives and input device adjustments, Linux's accessibility features empower users to navigate and interact with their systems in ways that suit their unique requirements.

Adaptive Keyboard and Mouse Settings (AccessX)

- Activation of Sticky Keys

1. Settings > Accessibility > Typing
2. Adjust the Sticky Keys toggle

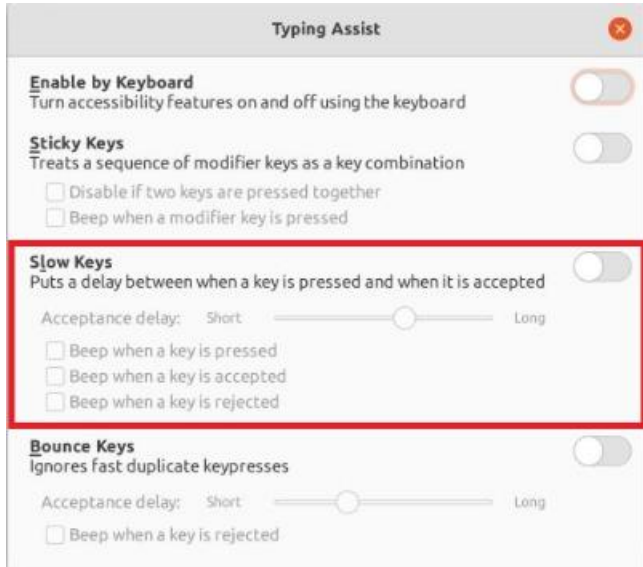


NOTE

Sticky Keys is crafted to facilitate single-handed activation of multi-key combinations, like CTRL + P (print) or Alt + Tab (switch windows). This functionality ensures that each system key (CTRL, ALT, Shift, or Windows) remains engaged until an alpha-numeric key is pressed, streamlining the process of executing complex keyboard commands for users with specific mobility needs.

- Slow Keys

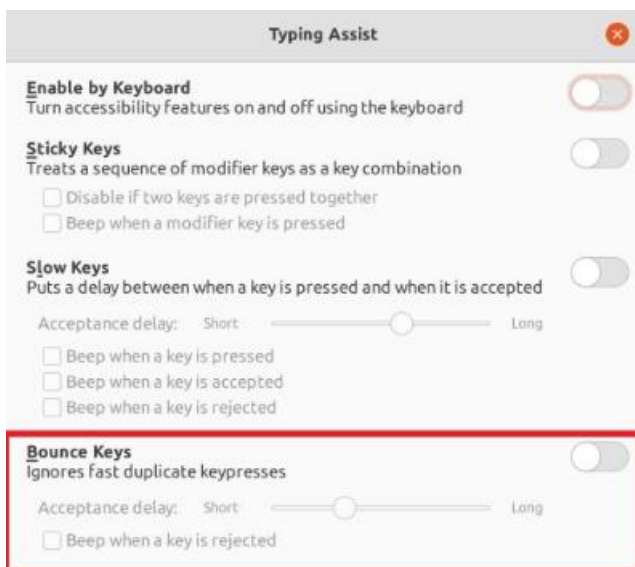
1. Settings > Accessibility > Typing
2. Adjust the Slow Keys toggle



NOTE

Slow Keys can be employed to disregard brief or repeated keystrokes by extending the time interval between key press and activation.

- Bounce Keys
1. Settings > Accessibility > Typing
 2. Adjust the Bounce Keys toggle

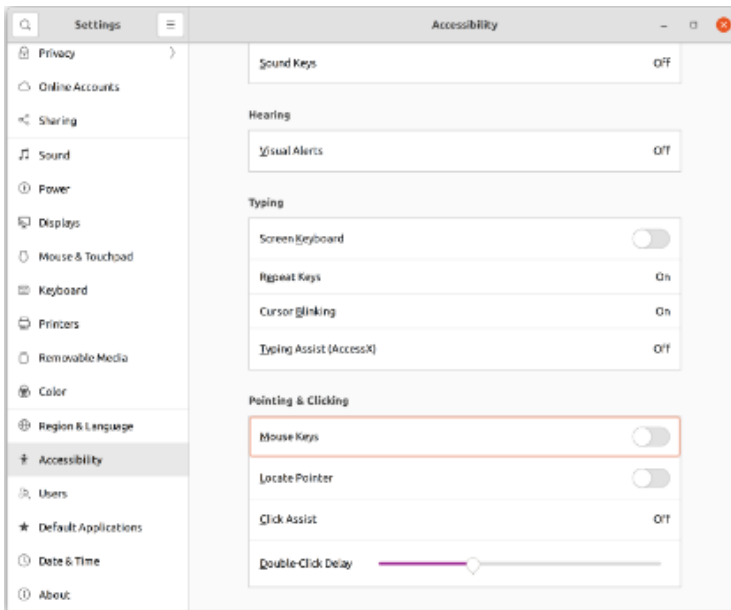


NOTE

Bounce Keys can be utilized to avoid unintended, repetitive keystrokes by extending the duration needed between accepting successive key presses.

- Mouse Keys

1. Settings > Accessibility > Pointing & Clicking
2. Adjust the Mouse Keys toggle

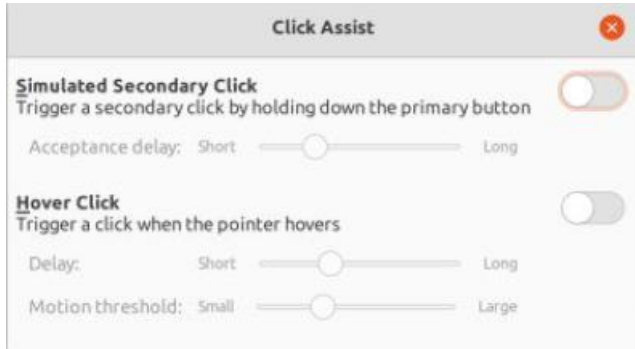


NOTE

Mouse Keys enables use of the keyboard to control the mouse pointer.

- Click Assist

1. Settings > Accessibility > Pointing & Clicking
2. Click Assist
3. Adjust the Hover Click toggle



NOTE

Click assist offers two features that simplify mouse usage for individuals facing challenges with the standard mouse buttons.

Simulated Secondary Click: This feature triggers a double-click action when the primary mouse button is held down for a predefined duration.

Hover Click: This functionality initiates a mouse click when the pointer remains stationary for a specified period.

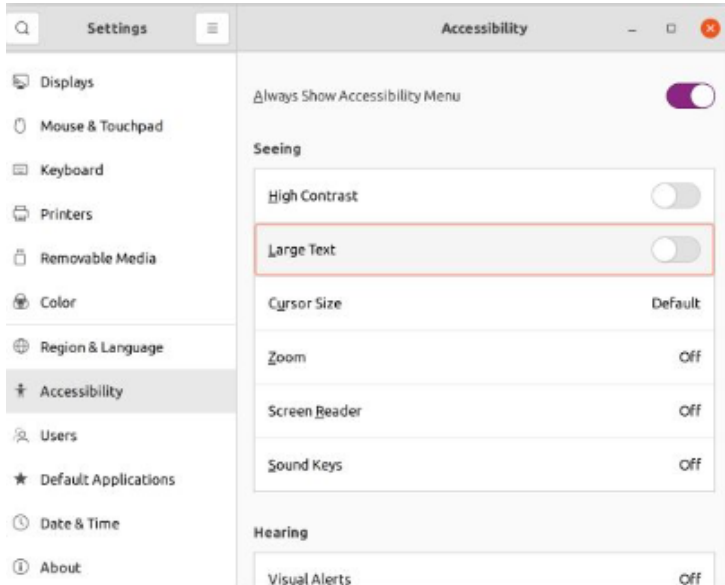
3.3.1.4 Accessibility for Cognitive Impairments

While Linux may not have specific built-in features labeled as "cognitive features," it embraces a philosophy of customization and flexibility. This allows users to adapt their computing experience to better suit cognitive preferences and requirements. The Linux ecosystem offers a range of tools and settings that users can leverage to enhance cognitive accessibility.

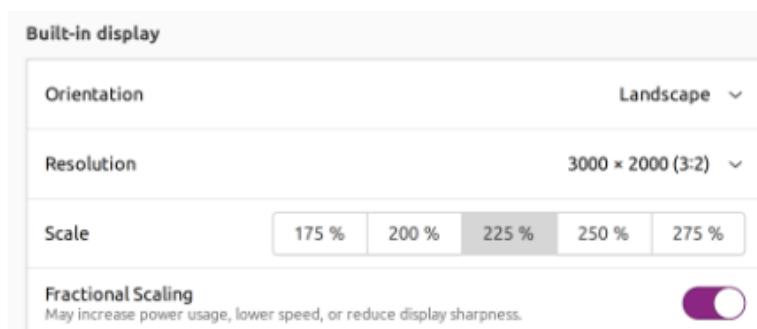
Accessibility Features

Enlarge the size of text, icons, and the pointer

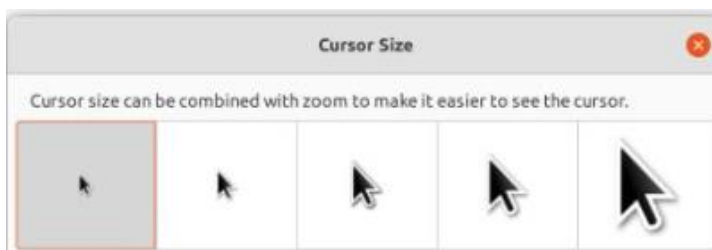
- Increase the font size of the text
 1. Settings > Accessibility > Seeing
 2. Large Text
 3. Adjust the toggle to on



- Enlarge all visual elements on the screen
 1. Settings > Displays > Built-in Display
 2. Scale
 3. Select from the options available

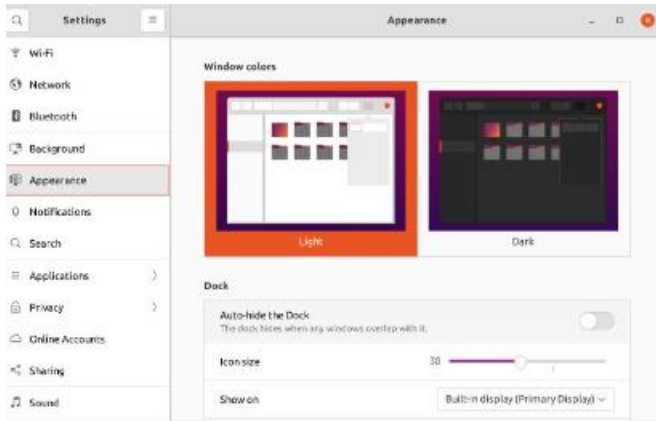


- Large Mouse Pointer
 1. Settings > Accessibility > Seeing
 2. Cursor Size
 3. Select a preferred size

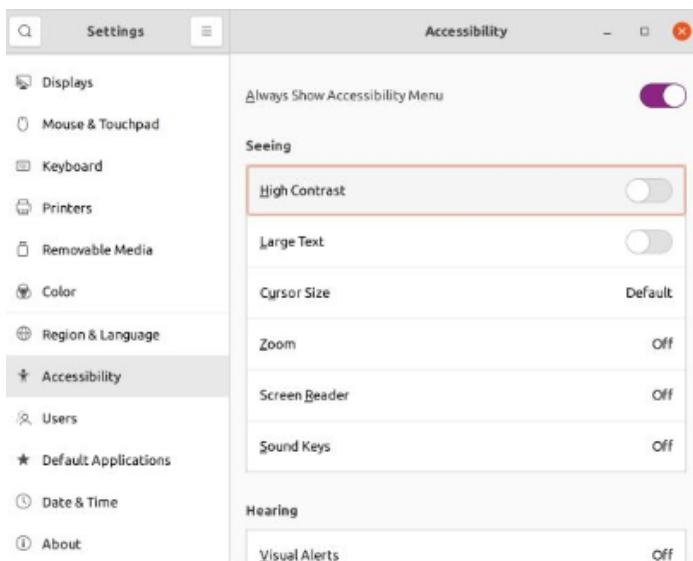


Adjust colour and contrast

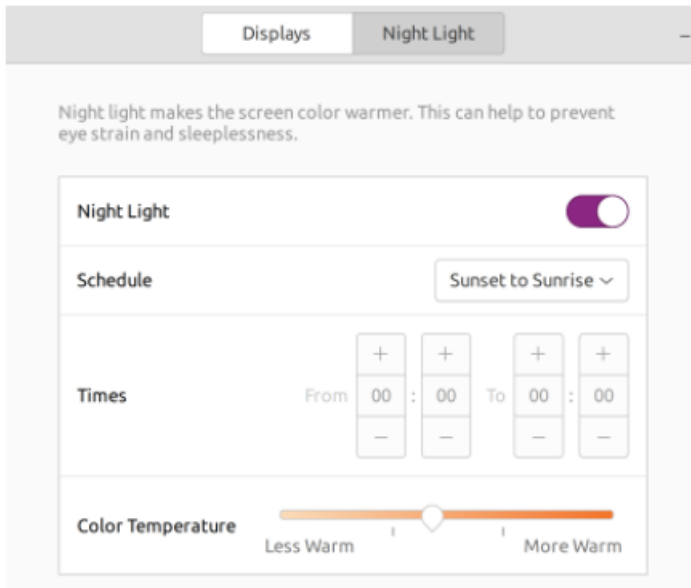
- Enable Dark Mode
 1. Settings > Appearance > Window colours
 2. Dark



- High Contrast
 1. Settings > Accessibility > Seeing
 2. Cursor Size
 3. Select a preferred size



- For Night Light
 1. Settings > Accessibility > Seeing
 2. Cursor Size
 3. Select a preferred size



3.3.1.5 Exercises

Visual Accessibility

Quiz 1

Choose if the sentence is True or False.

1. Increasing the font size of text can be done through Settings > Accessibility > Seeing > Large Text.

Answer: True

2.To enlarge all visual elements on the screen, you go to Settings > Displays > Built-in Display and adjust the Scale.

Answer: True

3.The option to enable Dark Mode is found in Settings > Appearance > Window colours.

Answer: True

4.High Contrast settings can be adjusted through Settings > Accessibility > Seeing > Cursor Size.

Answer: False

5.Night Light adjustments are made in Settings > Accessibility > Seeing.

Answer: True

Quiz 2

Select the correct answer

1. How can you increase the font size of the text?

- a. Settings > Accessibility > Hearing
- b. Settings > Accessibility > Seeing > Large Text
- c. Settings > General > Display

Answer: B

2. Where can you adjust the scale to enlarge all visual elements on the screen?

- a. Settings > Displays > Screen Resolution
- b. Settings > Accessibility > Seeing > Cursor Size
- c. Settings > Displays > Built-in Display

Answer: C

3. What setting can be modified for a large mouse pointer?

- a. Settings > General > Pointer Options
- b. Settings > Accessibility > Hearing
- c. Settings > Accessibility > Seeing > Cursor Size

Answer: C

Hearing Accessibility

Quiz 1

Choose if the sentence is True or False

1. Visual alerts in Linux can only be configured to flash the entire screen.

True / False:

2. The accessibility settings in Ubuntu 21.10 can be accessed through the shortcut Windows + A.
3. Visual Alerts can be beneficial for individuals with hearing impairments.

Answers: F, T, T

Quiz 2

Select the correct answer

1. Which keyboard shortcut opens the Applications Menu in Ubuntu 21.10?

- A) Ctrl + A
- B) Windows + A
- C) Alt + A
- D) Shift + A

- 2) Where can you find the accessibility settings in Linux based on the GNOME desktop environment?

- A) Display
- B) Appearance
- C) Accessibility
- D) System

- 3) What is the purpose of Visual Alerts in the context of hearing features?

- A) Adjust screen brightness
- B) Flash the entire screen or active window in response to an alert sound
- C) Change system language
- D) Enable touchpad gestures

Answers: B, C, B

Quiz 3

Match the following sentences with the correct action:

1. Turn on Visual Alerts.

Action:

A) Click Show Applications Button

B) Navigate to Accessibility

C) Settings → Accessibility → Hearing → Visual Alerts

2. Access the accessibility settings in Ubuntu 21.10.

Action:

A) Click the Settings gear icon

B) Use shortcut Windows + A

C) Turn on Visual Alerts

3. Configure visual alerts to flash the entire screen.

Action:

A) Navigate to Accessibility

B) Flash the active window

C) Settings → Accessibility → Hearing → Visual Alerts

Answers: C, B, A

Quiz 4

1. In Linux, where can the user find the option to turn on Visual Alerts for hearing features?

- a) Accessibility → Sound
- b) Settings → Display
- c) Settings → Accessibility → Hearing
- d) Applications Menu → Hearing

Answer: c

Physical Accessibility

Quiz 1

1. Sticky Keys in Linux are designed to facilitate multi-key combinations by holding down each system key until an alpha-numeric key is pressed. (T/F)

Answers: T

Quiz 2

Select the correct option

1. Where can the user find the option to activate Sticky Keys in Linux?

- a) Settings > Display > Keyboard
- b) Settings > Accessibility > Pointing & Clicking
- c) Settings > Accessibility > Typing
- d) Applications Menu > System Tools

Answers: c

Quiz 3

Write the correct path and choose if the next sentence is True or False

- 1. Slow Keys in Linux can be adjusted by navigating to _____.
- 2. Bounce Keys in Linux are used to extend the duration needed between accepting successive key presses. (T/F)

Answers:

- 1 - Settings > Accessibility > Typing,
- 2 - True

Quiz 4

Choose the correct answer

Where can the user enable Mouse Keys in Linux for controlling the mouse pointer using the keyboard?

- a) Settings > Accessibility > Pointing & Clicking
- b) Applications Menu > Accessories > Mouse
- c) Settings > Display > Mouse & Touchpad
- d) Settings > Accessibility > Typing

Answers: a)

Cognitive Accessibility

Quiz 1

Choose if the sentence is True or False

- 1. The option to increase the font size of text in Linux is found in Settings > Accessibility > Seeing. (T/F)

Answer: T

Quiz 2

- 1. Where can the user find the settings to enlarge all visual elements on the screen in Linux?

- a) Settings > Accessibility > Seeing
- b) Settings > Displays > Built-in Display
- c) Settings > Appearance > Window colours
- d) Settings > Accessibility > Hearing

Answer: b)

Quiz 3

1. Enabling Dark Mode in Linux is done through Settings > Appearance > Window colours.

- a) True
- b) False

Answer: a)

Quiz 4

Where can the user enable High Contrast settings in Linux?

- a) Settings > Accessibility > Seeing
- b) Settings > Displays > Built-in Display
- c) Settings > Accessibility > Hearing
- d) Settings > Appearance > Window colours

Answer: a) Settings > Accessibility > Seeing

Quiz 5

Match the correct sentence to the given statement.

1. Statement: "Linux provides settings to adjust screen contrast, brightness, and color schemes."

Matching Sentence:

- a) Adjust the Sticky Keys toggle
- b) Adjust colour and contrast
- c) Increase the font size of the text

Answers: b)

3.3.1.6 Resources

Available resources for Linux Accessibility features:

- General Accessibility features: <https://www.youtube.com/watch?v=UycAnCaB8lc>
- Ubuntu Desktop - a popular and user-friendly Linux distribution:
<https://www.youtube.com/watch?v=Eq2fJFVixtg>
- Orca Screen Reader: <https://www.youtube.com/watch?v=mDVG0DfwuxQ>
- Ubuntu and GNOME Orca screen reader:
https://www.youtube.com/watch?v=3krdly2_sZs

3.3.2 File Management

Linux offers a variety of desktop environments, which are graphical user interfaces (GUIs) that provide users with a way to interact with their operating system. Each desktop environment has its own look, feel, and set of features. Some of the popular Linux desktop environments include:

- GNOME: Known for its simplicity and modern design, GNOME is the default desktop environment for several Linux distributions, including Ubuntu.
- KDE Plasma: KDE is known for its feature-rich and customizable environment. KDE Plasma is the desktop environment associated with the KDE project.
- Xfce: Designed to be lightweight and fast, Xfce is suitable for systems with lower hardware specifications. It provides a balance between performance and features.
- LXQt: Another lightweight desktop environment, LXQt is the successor to LXDE. It aims to provide a clean and easy-to-use interface.
- Cinnamon: Developed by the Linux Mint team, Cinnamon provides a traditional desktop environment with a familiar layout for users transitioning from other operating systems.
- MATE: A continuation of the GNOME 2 desktop environment, MATE offers a classic desktop experience and is designed to be a stable and reliable choice.

- Unity: Originally developed by Canonical for Ubuntu, Unity offers a unique interface with a launcher on the left side of the screen. While no longer the default for Ubuntu, Unity can still be used.

File managers are an integral part of the desktop environment, and their choice often aligns with the design principles and goals of the desktop environment and the Linux distribution. Users have the flexibility to choose file managers based on their preferences and requirements, and they can customize their Linux experience accordingly.

The desktop environment on a Linux PC is contingent on the chosen distribution (distro). Different Linux distributions are equipped with distinct default desktop environments. GNOME stands out as a prevalent desktop environment and serves as the default for several prominent Linux distributions, though it is not the sole option.

Other of Linux distributions include:

- Ubuntu: In the standard version, Ubuntu, a well-known Linux distribution, utilizes GNOME as its default desktop environment. However, Ubuntu also offers official flavors with different desktop environments such as Kubuntu (KDE), Xubuntu (Xfce), and Lubuntu (LXQt).
- Fedora: Fedora Workstation, sponsored by Red Hat, adopts GNOME as its default desktop environment. Fedora provides spins featuring alternative desktop environments.
- Debian: Debian presents various installation options, allowing users to opt for a minimal installation devoid of a desktop environment. If a desktop environment is chosen during installation, GNOME and other options are available.
- openSUSE: openSUSE caters to both the GNOME and KDE Plasma desktop environments. Users can select their preferred desktop environment during the installation process.
- Arch Linux: Arch Linux empowers users to construct their system from scratch. Users enjoy the flexibility to install and configure their preferred desktop environment, including GNOME.

3.3.2.5 Exercises

Exercise 1:

What is the default desktop environment for Ubuntu?

a) KDE

b) GNOME

c) Xfce

Answer: b) GNOME

Exercise 2:

What is GNOME?

a) A popular Linux distribution

b) A desktop environment

c) A web browser

Answer: b) A desktop environment

3.3.2.6 Resources

Available resources for more interest:

- Top 5 File Managers for Linux: <https://www.youtube.com/watch?v=9k5WGYzBv9U&t=215s>
- Nautilus: <https://www.youtube.com/watch?v=la2CaltxTEk>
- Servers with Gnome file manager: https://www.youtube.com/watch?v=Yek6tA_qomo
- Gnome version: https://www.youtube.com/watch?v=VRFZXx_Mmrl

4. Other Working Tools – Smart Devices

4.1 Accessibility features in Android Tablets

4.1.1 Visual Accessibility

Android systems offer a range of accessibility features catering to individuals with vision impairments, aiming to enhance their mobile experience. Features such as TalkBack, a screen reader, provide spoken feedback and audible cues, enabling users to navigate through menus, apps, and content effortlessly. Additionally, magnification gestures, colour inversion, and high contrast options contribute to a more inclusive and customizable experience for users with varying degrees of visual challenges.

Let's delve into the native features provided by the Android tablet:

- **Talkback**

Enabling the TalkBack screen reader allows users to engage with their device through a combination of touch and spoken feedback.

Basic Android and Talkback settings:

1) Open Quick Settings

Access the Quick Settings panel by performing a two-finger swipe down from the top of the screen, whether your device is locked or unlocked. In the case of an unlocked device, swipe down twice after opening the notification shade to reveal the Quick Settings panel.

2) Open the Settings app

There are multiple ways to open the Settings app. In the Quick Settings panel, find the Settings button and double-tap. Alternatively, on the Home screen, locate "Apps," double-tap to open, find "Settings," and double-tap. If "Ok Google" is enabled, use voice commands by saying "Ok Google" and then "Open settings."

3) Recommended Accessibility Settings

For accessibility settings, navigate to the Settings app and locate the Accessibility section. Adjust the Auto-rotate screen setting to avoid interruptions in spoken feedback. Manage the Speak passwords setting for password privacy. Enable the Power button ends call setting for a quicker hang-up experience.

4) Recommended Keyboard Settings

Ensure an optimal TalkBack experience by using the Google Keyboard. Check your current keyboard in Settings > Language & input. Download the Google Keyboard from Google Play if it's not already installed.

5) Recommended TalkBack Settings

Access TalkBack settings via Settings > Accessibility > TalkBack > Settings. Enable "Shake to start continuous reading" for an alternative reading method. Adjust the intensity level to your preference. Change TalkBack speech volume by placing a finger on the touch screen and using the volume up or down keys.

- **Select To Speak**

If you prefer spoken feedback selectively, you can activate the Select to Speak option. Simply choose items on your screen, and the system will read or describe them aloud.

Basic Settings:

Step 1: Activate Select to Speak

- Access your device's Settings app.
- Navigate to Accessibility and select Select to Speak.
- Toggle the On/Off switch located at the top.

Step 2: Utilize Select to Speak

- Tap the Select to Speak button, a permanent fixture on your screen. Follow the prompt to identify the specific portion you want to be read.
- To designate content for reading, either tap an item on your screen or swipe your finger across to hear multiple items.

NOTE
Select to Speak may not be compatible with all browsers

For Android 8.0 Oreo Updates:

- Access Select to Speak by tapping Accessibility.

If you don't see this icon, you may be using an earlier version of TalkBack. Refer to the steps below.

- Select an item on your screen, such as text or an image.
- To listen to multiple items, swipe your finger across the screen.
- For a comprehensive reading, tap Play. Use the player's buttons to pause, play, skip forward or backward, and adjust speed.

NOTE

- To halt spoken feedback, tap anywhere on the screen.
- To reposition the Select to Speak button, touch and hold the button, then drag it.

- **Font size**

Modify the text size on your screen by adjusting the font size. This action will alter the displayed text's size in different applications, including email and messaging apps. Keep in mind that it won't impact the text size in all third-party applications.

Adjust Font Size

To resize your font for smaller or larger text:

- 1) Launch your device's Settings app.
- 2) Access Accessibility and then select Font size.
- 3) Utilize the slider to pick your preferred font size.

NOTE

The font size adjustment does not affect the Google Chrome app or specific third-party applications, as they may have their own text scaling control.

- **Display size**

The display size feature alters not only the font size but also other on-screen elements like app icons, the navigation bar, and menus. In essence, it adjusts the size of everything visible on your screen, not solely the text.

Adjust Display Size

To resize items on your screen:

- 1) Launch your device's Settings app.
- 2) Access Accessibility and select Display size.

3) Utilize the slider to pick your desired display size.

NOTE

The positions of some apps on your screen may be altered.

- **Magnification gestures**

For a momentary screen zoom or magnification, employ magnification gestures.

Basic Settings:

Step 1: Activate Magnification Gestures

- 1) Access your device's Settings app.
- 2) Navigate to Accessibility and tap Magnification gestures.
- 3) Toggle the On/Off switch at the top.

Step 2: Utilize Magnification Gestures

Zoom In:

- 1) Triple-tap anywhere on the screen, excluding the keyboard or navigation bar.
- 2) Now, you can pan or adjust the zoom level:
 - To pan across the screen, drag two or more fingers.
 - To adjust the zoom level, pinch two or more fingers together or spread them apart.
- 3) To Zoom Out  Triple-tap the screen.

To momentarily magnify the screen:

- 1) Triple-tap and hold anywhere on the screen, except the keyboard or navigation bar.
- 2) Move the magnified area by dragging your finger across the screen.
- 3) To stop magnifying, lift your finger.

NOTE

- After enabling magnification gestures, single taps may have a slight delay to differentiate from triple-taps.
- Opening or closing an app when zoomed in automatically zooms out. To zoom in again, triple-tap.

- **Contrast and colour options**

For contrast or colour adjustments, employ high-contrast text, color inversion, or color correction features.

- To enable or disable high contrast text, follow these steps:

- 1) Navigate to Settings > Accessibility.
- 2) Choose High contrast text.

Please note that high-contrast text is currently an experimental feature and may not function perfectly across all areas of your device.

- To enable or disable color inversion, follow these steps:

- 1) Go to Settings > Accessibility.
- 2) Select Color inversion.

Color inversion is currently an experimental feature, and its functionality may vary across your device.

- To enable or disable color correction, follow these steps:

- 1) Go to Settings > Accessibility > Color correction.
- 2) Toggle the switch to the on or off position.
- 3) To modify the color correction mode, select Correction mode and choose from the following options:

- Deuteranomaly (red-green)

- Protanomaly (red-green)
- Tritanomaly (blue-yellow)

- **BrailleBack**

Connect your device to a refreshable Braille display via Bluetooth. BrailleBack seamlessly integrates with TalkBack, offering a comprehensive experience that combines speech and Braille. This functionality enables you to edit text and engage with your device effectively.

Installation settings:

Step 1: Ensure Compatibility with Your Braille Device

Verify that your braille device is compatible with the current version of BrailleBack. The supported devices include:

- APH Refreshabraille
- Baum VarioConnect
- Esys EuroBraille
- Freedom Scientific Focus Blue (14 and 40 cell models)
- HandyTech (Basic Braille, Active Braille, Braille Star, Braille Wave, Braillino, Easy Braille)
- Harpo Braillepen 12
- HIMS (BrailleSense, Braille EDGE, Smart Beetle)
- Humanware Brailiant (1st generation and BI models)
- Optelec Alva (BC640, BC680)
- Optelec EasyLink 12 Touch
- Papenmeier Braillex Trio
- Seika (notetaker and 40 cell display)

Step 2: Install BrailleBack on Your Android Device

Download BrailleBack from Google Play using one of the following options:

- Option 1: Use this direct link to BrailleBack on Google Play, then select Install. Choose a device for installation, then proceed with the installation process.

- Option 2: Open the Play Store app on your Android device, search for "BrailleBack," select BrailleBack from the search results, and then choose Install.

Step 3: Activate BrailleBack and Establish Pairing with Your Braille Display

Before enabling BrailleBack, ensure that TalkBack is already enabled.

To enable BrailleBack on your Android device, follow these steps:

- 1) Navigate to Settings > Accessibility > BrailleBack.
- 2) Slide the BrailleBack switch to the on position.
- 3) Return to Settings. Under Wireless & networks, select Bluetooth.
- 4) Turn on Bluetooth if it's not already enabled.
- 5) Choose the name of your braille display.
- 6) If your braille display is not listed, ensure it is in pairing mode, then select Search for devices on your Android device.

Refer to your braille device's documentation for specific pairing instructions.

- **Google Assistant**

Enables users to accomplish numerous tasks through voice commands. These tasks encompass making phone calls, reading, composing and sending emails and text messages, controlling smart home appliances, opening applications, obtaining basic information like time, date, and weather, conducting Google searches, listening to the news, playing music, creating shopping lists, viewing and creating reminders, adding items to the calendar, setting alarms, performing mathematical calculations, reviewing photos, setting a kitchen timer, translating language, converting measurements and currencies, and more.

4.1.2 Hearing Accessibility

For users with hearing impairments, Android devices incorporate accessibility features designed to ensure a seamless and inclusive mobile experience. Live Transcribe, for instance, converts spoken words into real-time, readable text, facilitating communication. Furthermore, users can

rely on vibration alerts, visual notifications, and LED flash notifications to stay informed about incoming calls, messages, and other alerts, making Android devices accessible and accommodating to diverse auditory needs.

Let's delve into the native features provided by the Android tablet:

- **Captions**

The user has the option to enable captions on their device and customize settings such as language, text, and style for closed captioning.

Basic settings:

Captions Activation

- 1) Launch the Settings app on your device
- 2) Navigate to Accessibility, then select Captions (For Samsung devices: Settings > Accessibility > Hearing)
- 3) Toggle the On/Off switch at the top (For Samsung devices: Samsung subtitles (CC) or Google subtitles (CC))

Customize caption preferences

Once captions are enabled, you can modify the following settings in Settings > Accessibility > Captions.

- Language: Choose the language for captions
- Text size: Adjust the size of your caption text
- Caption style: Customize the style and color of your caption text and background

The user may note that their caption settings may not affect specific applications.

- **Mono Audio**

Simultaneously plays audio from both the left and right channels through any currently active sound output.

Activate Mono Audio

- 1) Launch your device's Settings app
- 2) Access Accessibility, then toggle the On/Off switch.

- **Vibration**

The phone will produce vibrations for incoming calls, alarms, and notifications.

Activate Call-Only Vibration

- 1) Open your device's Settings app
- 2) Navigate to Sound and toggle the On/Off switch for "Also vibrate for calls."

Activate Continuous Vibration

When your device's ring volume is set to Vibrate:

- Notifications configured for sound will vibrate.
- Notifications configured for vibration will continue to vibrate.
- Your phone will vibrate for incoming calls.

Enable Vibration for Emails or Text Messages

Certain apps provide options for customizing vibration settings. Explore the settings menu within each app, such as Gmail, Microsoft Outlook, and Google Messenger, to select vibration preferences.

4.1.3 Physical Accessibility

Android systems prioritize accessibility for individuals with physical impairments by offering features that allow customization for easier device interaction. Switch Access, for example, enables users to control their devices using external switches or keyboards, providing an alternative input method. Moreover, gesture-based navigation and voice commands empower users with limited dexterity to navigate through menus, launch apps, and perform various tasks, ensuring an inclusive mobile experience.

Let's delve into the native features provided by the Android tablet.

- **Switch Access**

Switch Access allows the user to interact with their Android device using one or more switches instead of the touch screen. This feature can be beneficial for individuals with dexterity impairments that hinder direct interaction with the Android device.

The user can rely on Switch Access to scan the items on the screen, highlighting each item in sequence until a selection is made. To utilize Switch Access, the user will need one or more switches, and there are various types of switches available.

- **External switch:** A switch refers to a device that transmits a keystroke signal to the Android device. Various companies, including AbleNet, Enabling Devices, RJ Cooper, and Tecla, offer such devices. These switches establish a connection with the Android device either through USB or Bluetooth. (It's important to note that Google does not endorse these companies or their products.)
- **External keyboard:** You have the option to configure a standard USB or Bluetooth keyboard to function as a switch device by assigning one or more of its keys to specific actions.
- **Utilization of buttons on the Android device:** The built-in buttons on your Android device, such as the volume up and volume down buttons, can also be designated for specific actions. However, this option is primarily designed for developers. If you opt for this method, you can skip the initial two setup steps outlined in the following article.

These steps outline the process of setting up Switch Access for your Android device.

NOTE
If you intend to utilize the built-in buttons on your Android device as switches, you can skip both Step 1 and Step 2 below.

Step 1: Connect switches to your Android device

For users employing an external switch device or keyboard, the initial step is to establish a connection with your Android device.

- USB: Connect the switch or keyboard to your Android device using a compatible USB cable.
- Bluetooth: On your Android device, navigate to Settings > Bluetooth. Refer to the documentation for your switch or keyboard for more instructions, or learn about connecting to Bluetooth devices.

Step 2: Enable the on-screen keyboard

Upon connecting an external switch device or keyboard, Android automatically hides the on-screen keyboard. To input text with Switch Access, you must re-enable the keyboard.

To re-enable the on-screen keyboard

- 1) Open the Settings app on your Android device
- 2) Select Language & input. Follow the steps based on your Android version:
 - Android 7.0 and later: Choose Physical keyboard > Show virtual keyboard
 - Android 6.0 and earlier: Choose Current keyboard > Hardware (Show input method)

Step 3: Choose basic scanning settings

Select your basic scanning settings to align with your preferences and the number of switches you have. If you wish to experiment with a different setup later, you can always modify your settings.

- **Voice Access**

If interacting with a touch screen poses challenges, the Voice Access app offers the capability to command the users device using spoken instructions. User can employ their voice to initiate apps, move around, and edit text without the need for hands-on interaction. Voice Access is presently available in a restricted beta release and supports English exclusively.

User's Guidance

Step 1: Device Compatibility

NOTE

Voice Access is currently in a limited beta release in English only.

Before installing Voice Access, ensure your device meets the following criteria:

- Required: Android version 5.0 or later. Check your Android version in Settings > About phone or About tablet.
- Required: Google app. Download or update the Google app from Google Play to ensure you have the latest version.
- Recommended: Enable "Ok Google" detection from any screen. Learn how to activate "Ok Google."
- Recommended: Install Google Now Launcher from Google Play.

Step 2: Voice Access Installation

1) Download Voice Access from Google Play.

Step 3: Voice Access Activation

To enable Voice Access, follow these steps:

- 1) Open your device's Settings app
- 2) Navigate to Accessibility and tap Voice Access.
- 3) Toggle the On/Off switch at the top.
- 4) Access your notification shade.
- 5) Tap the Voice Access notification labeled "Touch to start."
- 6) Speak a command, such as "Open Gmail."

Upon the first activation of Voice Access, two additional steps guide you:

- A guide to "Ok Google" settings ensures an optimal hands-free experience.
- An interactive tutorial explains how Voice Access functions.

- **Google Assistant**

Enables users to accomplish numerous tasks through voice commands. These tasks encompass making phone calls, reading, composing and sending emails and text messages, controlling smart home appliances, opening applications, obtaining basic information like time, date, and weather, conducting Google searches, listening to the news, playing music, creating shopping lists, viewing and creating reminders, adding items to the calendar, setting alarms, performing mathematical calculations, reviewing photos, setting a kitchen timer, translating language, converting measurements and currencies, and more.

4.1.4 Cognitive Accessibility

Android devices incorporate features aimed at supporting individuals with cognitive impairments, promoting a more user-friendly and accommodating mobile environment. The use of communication aids, such as the Text-to-Speech engine, assists users in understanding and interacting with content. Additionally, simplified interface options, visual aids, and customizable settings contribute to a more straightforward and intuitive user experience, addressing the diverse cognitive needs of Android users.

Let's delve into the native features provided by the Android tablet:

- **Select to Speak**

If you prefer spoken feedback selectively, you can activate the Select to Speak option. Simply choose items on your screen, and the system will read or describe them aloud.

Basic Settings:

Step 1: Activate Select to Speak

- 1) Access your device's Settings app.
- 2) Navigate to Accessibility and select Select to Speak.

3) Toggle the On/Off switch located at the top.

Step 2: Utilize Select to Speak

- Tap the Select to Speak button, a permanent fixture on your screen. Follow the prompt to identify the specific portion you want to be read.
- To designate content for reading, either tap an item on your screen or swipe your finger across to hear multiple items.

NOTE

Select to Speak may not be compatible with all browsers.

For Android 8.0 Oreo Updates:

- Access Select to Speak by tapping Accessibility.

If you don't see this icon, you may be using an earlier version of TalkBack. Refer to the steps below.

- Select an item on your screen, such as text or an image.
- To listen to multiple items, swipe your finger across the screen.
- For a comprehensive reading, tap Play. Use the player's buttons to pause, play, skip forward or backward, and adjust speed.

NOTE

To halt spoken feedback, tap anywhere on the screen.

To reposition the Select to Speak button, touch and hold the button, then drag it.

4.1.5 Exercises

Visual Accessibility

Exercise 1:

How can you adjust the font size on an Android device?

- a) Change the device color
- b) Access Accessibility and select Display size
- c) Double tap on the screen

Answer: b) Access Accessibility and select Display size

Exercise 2:

3. How can you activate Select to Speak?

- a) Single tap on the screen
- b) Access Quick Settings
- c) Navigate to Accessibility and toggle the switch

Answer: c) Navigate to Accessibility and toggle the switch

Exercise 3:

The Android tablet's "Select to Speak" option allows users to hear spoken descriptions of selected items on the screen. (T/F)

Answer: True

Hearing Accessibility

Select if the sentences are True or False

1. Captions on an Android tablet can be customized for language, text size, and style. (T/F)

Answer: True

2. Mono Audio on an Android device plays audio separately from the left and right channels. (T/F)

Answer: False

3. Vibration on an Android phone can be activated for incoming calls, alarms, and notifications. (T/F)

Answer: True

Physical Accessibility

1. Which of the following is an external switch device?

- a. Microphone
- b. Camera
- c. Keyboard
- d. USB

Answer: c. Keyboard

2. What do you need to connect an external switch device or keyboard to your Android device?

- a. Internet connection
- b. USB cable or Bluetooth
- c. Headphones
- d. Wireless mouse

Answer: b. USB cable or Bluetooth

3. Voice Access is available in which language during its limited beta release?

- a. English only
- b. Multiple languages
- c. Spanish only
- d. French only

Answer: a. English only

4. To enable Voice Access, you need to download the app from which source?

- a. App Store
- b. Google Play
- c. Samsung Galaxy Store
- d. Amazon Appstore

Answer: b. Google Play

Cognitive Accessibility

Exercise 1.

Select to Speak allows users to read or describe items on the Android tablet screen using touch gestures. (T/F)

Answer: False

In Android 8.0 Oreo, if the Select to Speak icon is not visible, users can access it by tapping on the Accessibility icon. (T/F)

Answer: True

To designate content for reading with Select to Speak, users can only tap items on the screen and not swipe. (T/F)

Answer: False

Select to Speak is guaranteed to be compatible with all web browsers on Android tablets. (T/F)

Answer: False

Users can reposition the Select to Speak button by tapping it once. (T/F)

Answer: False

Exercise 2.

How can users activate Select to Speak on their Android device?

- a. Shake the device
- b. Access Settings > Accessibility > Select to Speak
- c. Tap the home button
- d. Speak the command "Select to Speak"

Answer: b. Access Settings > Accessibility > Select to Speak

4.1.6 Resources

For a better understanding of the chapter, the following resources are provided:

- Accessibility Features on an Android Tablet:
<https://www.youtube.com/watch?v=Is8NM21Jxb4>
- Talkback: <https://www.youtube.com/watch?v=1yRVwhEv5I>
- Google assistant: <https://www.youtube.com/watch?v=hpAEVaA4ajc>
- All Accessibility features explained:
<https://www.youtube.com/watch?v=X47mjVa81pg>

4.2 Accessibility features on I-Pad

4.2.1 Visual Accessibility

The iPad's robust accessibility features play a crucial role in facilitating productivity across various job positions. VoiceOver ensures that individuals with visual impairments can efficiently navigate through applications, read documents, and manage tasks. The Magnifier and Zoom features provide flexibility, enabling precise control for users with low vision, ensuring that everyone, regardless of their visual abilities, can actively contribute to their respective roles.

Let's look at the features of this product that make it easy to use and work with:

Change Colors

Related features and settings are:

- **Change color:**

Some actions the user/you can do to their/your device:

- **Invert Colors:**

Enhance readability on your iPad by inverting colors, especially in apps and websites lacking Dark Mode support.

1) Navigate to Settings > Accessibility > Display & Text Size.

2) Choose either Smart Invert to reverse colors everywhere (excluding images) or Classic Invert to reverse all on-screen colors.

- **Filter Colors to Adjust Hues:**

Customize your display's color scheme for better visibility.

1) Go to Settings > Accessibility > Display & Text Size.

2) Access Color Filters, toggle them on, and select a filter.

3) Adjust intensity or hue using the sliders. Note that color filters may impact the appearance of images and videos.

4) Tone down bright colors by enabling Reduce White Point.

- **Make Transparent Items Solid:**

Simplify transparent or blurred backgrounds by giving them a solid color.

- 1) Navigate to Settings > Accessibility > Display & Text Size.
- 2) Activate Reduce Transparency to make transparent backgrounds opaque.
 - Differentiate Without Color:

Replace color-dependent indicators with alternative cues like shapes or text.

- 1) Go to Settings > Accessibility > Display & Text Size.
- 2) Enable Differentiate Without Color to enhance item differentiation.
 - Use Ones and Zeros for On/Off Switches:

Modify the appearance of switches to represent "1" for on and "0" for off.

- 1) Visit Settings > Accessibility > Display & Text Size.
- 2) Activate On/Off Labels for a numerical representation of switch status.

- **Dark Mode:**
 - Adjust Screen Brightness:

Tailor your iPad screen's brightness effortlessly:

- 1) Open Control Center, drag the brightness bar up or down.
- 2) Alternatively, go to Settings > Display & Brightness and adjust the slider.
 - Auto-Brightness:

Let your iPad adapt to ambient light conditions automatically:

- 1) In Settings, access Accessibility.
- 2) Tap Display & Text Size and enable Auto-Brightness.
 - Dark Mode Control:

Enhance your iPad experience with Dark Mode for low-light settings:

- 1) Use Control Center: Touch and hold the Brightness button, then tap the Appearance button.

2) Or visit Settings > Display & Brightness: Choose Dark for Dark Mode, or Light to turn it off.

Enhance Readability

There are features that can be activated in order to be easier for the user to read the device's content/text more efficiently. Below you will find the features and some settings of their:

- **Zoom**

Configure Zoom

Access Settings > Accessibility > Zoom, and enable Zoom.

Customize preferences such as:

- Follow Focus: Track selections, text insertion point, and typing.
- Smart Typing: Switch to Window Zoom when the keyboard appears.
- Keyboard Shortcuts: Control Zoom with external keyboard shortcuts.
- Zoom Controller: Activate the controller, set actions, and adjust color and opacity.
- Zoom Region: Select Pinned Zoom, Full Screen Zoom, or Window Zoom.
- Zoom Filter: Opt for None, Inverted, Grayscale, Grayscale Inverted, or Low Light.
- Maximum Zoom Level: Slide to set the desired level.

- **Legibility**

Enhance Text Legibility

Tailor your text experience by adjusting weight, size, and darkness in apps supporting Dynamic Type like Settings, Calendar, Contacts, Mail, Messages, and Notes.

Navigate to Settings > Accessibility > Display & Text Size.

Optimize as follows:

- Enlarge Text: Tap Larger Text, then slide to set your preferred text size (activate Larger Accessibility Sizes for more options).

You can also visit Settings > Display & Brightness > Display Zoom, and choose Larger Text for more sizable controls.

- **Bolden Text:** Activate Bold Text.
- **Darken Text:** Enable Increase Contrast for improved legibility, making the text more prominent.
- **Highlight Tappable Text:** Switch on Button Shapes to underline text associated with specific actions upon tapping.
- **Magnifier**

Activate Magnifier

Access the Magnifier app through the following methods:

- Tap the Magnifier app icon directly on your iPad. (If the Magnifier app icon isn't visible on the Home Screen, navigate to the App Library and check the Utilities folder.)
- Utilize the Accessibility Shortcut for quick access.
- Open Control Center and select the Magnifier button.

(If the Magnifier button is not visible, include it in Control Center by going to Settings > Control Center, and tapping the Insert button next to Magnifier.)

- **Hover Text**

Activate Hover Text

Navigate to Settings > Accessibility > Hover Text.

Customize the following:

- **Display Mode:** Choose where the Hover Text window appears—inline (near the cursor), at the top, or at the bottom of the screen.

- **Scrolling Speed:** Adjust the scrolling speed for lengthy text descriptions.
- **Appearance:** Personalize the font, size, text color, insertion point color, background color, and border color of the Hover Text window.
- **Activation Modifier and Lock:** (requires a connected keyboard) Select the activation modifier key (Control key is default) and choose to activate Hover Text with a triple-press of the modifier key by enabling Activation Lock.

Enhance Visibility

- **Motion Control**

Minimize or halt onscreen motion on your iPad by adjusting various settings. If you prefer a less dynamic visual experience, you can stop or reduce motion in elements like the parallax effect, screen transitions, Siri animations, typing autocompletion, and more. Navigate to Settings > Accessibility > Motion to access these motion control settings:

- **Reduce Motion:** Turn on to limit user interface animations, such as the parallax effect of icons.
- **Auto-Play Message Effects:** Turn off to prevent automatic playback of full-screen effects in the Messages app. Manually play effects by tapping "Replay" below the message bubble.
- **Auto-Play Video Previews:** Turn off to disable automatic video previews in apps like the App Store.
- **Auto-Play Animated Images:** Turn off to stop automatic playback of rapid animated images and GIFs in Messages and Safari.
- **Dim Flashing Lights:** Turn on to automatically dim the display when flashes or strobe effects are detected in media.
- **Limit Frame Rate:** Turn on (for models with ProMotion display technology) to cap the maximum frame rate at 60 frames per second.

- **Pointer**

For improved visibility and ease of tracking, adjust the size and color of your mouse or trackpad pointer on the iPad. Follow these steps:

Navigate to Settings > Accessibility > Pointer Control.

Customize various settings to suit your preferences:

- Increase Contrast
- Automatically Hide Pointer
- Color
- Pointer Size
- Pointer Animations
- Trackpad Inertia (available when connected to a supported multi-touch trackpad)
- Scrolling Speed

To tailor the buttons of your pointing device, visit Settings > Accessibility > Touch > AssistiveTouch > Devices.

Voice Descriptions

- **Audio descriptions**

If your screen is not visible, and your content features audio descriptions, you can activate Audio Descriptions—a distinct audio track providing narration or descriptions of the visual elements in a clip, show, or movie.

- 1) Navigate to Settings > Accessibility > Audio Descriptions.
- 2) Toggle on Audio Descriptions.

- **VoiceOver**

Activate or Deactivate VoiceOver

Note: Activating VoiceOver alters the gestures required to control iPad. When VoiceOver is active, you must employ VoiceOver gestures to navigate iPad.

To enable or disable VoiceOver, perform any of the following:

- 1) Navigate to Settings > Accessibility > VoiceOver, then toggle the setting on or off.
- 2) Utilize Control Center if you have included it.
- 3) Employ the Accessibility Shortcut if configured.

4) Use Siri by saying something like: "Turn on VoiceOver" or "Turn off VoiceOver."

- **Spoken Content**

Even if VoiceOver is deactivated, you can instruct iPad to articulate chosen text or the entire screen. iPad is capable of delivering feedback, vocalizing text corrections, and providing suggestions while typing.

Configure Spoken Content Modes:

Navigate to Settings > Accessibility > Spoken Content.

Enable any of the following:

- **Speak Selection:** Choose the content you want vocalized.
- **Speak Screen:** Instruct iPad to read everything displayed on the screen.
- **Speech Controller:** Swiftly access Speak Screen and Speak on Touch when Speak Screen is active.
- **Highlight Content:** Move a cursor over words or sentences while listening.
- **Typing Feedback:** Have iPad articulate each character, complete words, autocorrections, autocapitalizations, and typing predictions.

Use Braille

Braille Support on iPad

iPad offers compatibility with various international braille tables and refreshable braille displays. By connecting to a Bluetooth wireless braille display, users can access VoiceOver output in both contracted and uncontracted braille, as well as equations using Nemeth Code. When editing text, the braille display provides contextual text representation, seamlessly converting edits between braille and printed text. Additionally, a braille display with input keys can be utilized to navigate and control iPad functions when VoiceOver is active.

To connect a braille display and familiarize yourself with commands for iPad control:

- 1) Activate the braille display.
- 2) On iPad, navigate to Settings > Bluetooth, enable Bluetooth, and select the desired display.
- 3) On iPad, go to Settings > Accessibility > VoiceOver > Braille, and choose the braille display.

4) To access braille commands for iPad control, tap "More Info" and select "Braille Commands."

Voice Commands

The features and some settings for the user to "speak and make things done":

- **Dictation**

Dictation on iPad allows you to speak and convert your words into text wherever typing is possible. It supports both typing and handwriting, and you can seamlessly switch between speaking, typing, or handwriting with the open keyboard or tools palette. For instance, you can select text using touch or Pencil and replace it using your voice. Dictation processes requests on your device in multiple languages without the need for an internet connection. In search fields, dictated text may be sent to the search provider for processing.

Activate Dictation by navigating to Settings > General > Keyboard. Toggle on "Enable Dictation," and if prompted, tap to confirm.

- **Siri**

If you didn't set up Siri when you first set up your iPad, do any of the following:

- If you want to activate Siri with your voice: Go to Settings > Siri & Search, tap "Listen for," then choose "Hey Siri" or "Siri" (if you have that option).
- If you want to activate Siri with a button: Go to Settings > Siri & Search, then turn on Press Home for Siri (on an iPad with a Home button), or Press Top Button for Siri (on other iPad models).

To prevent unintended activations, either place your iPad face down or adjust settings in Settings > Siri & Search.

Siri can also be activated with a button press, such as holding the Home button on iPads with a Home button or the top button on other iPad models.

If Siri responds silently due to mute status, this can be adjusted in settings.

Use supported AirPods for voice activation; details are available in the AirPods User Guide.

4.2.2 Hearing Accessibility

In a professional setting, effective communication is paramount. iPad's Live Listen feature, compatible with hearing aids, becomes a valuable asset during meetings, conferences, and collaborative work. This ensures that individuals with hearing impairments can actively participate in discussions, enhancing their engagement and contribution to diverse job positions.

Let's look at the features of this product that make it easy to use and work with:

Sound to Text

- **Sound recognition**

Activate Sound Recognition on your iPad to enable continuous monitoring for specific sounds, such as doorbells, sirens, or a crying baby, with instant notifications when identified.

To set up Sound Recognition:

- 1) Navigate to Settings > Accessibility > Sound Recognition.
- 2) Toggle the Sound Recognition switch to turn it on.
- 3) Tap "Sounds" and enable recognition for the specific sounds you want your iPad to detect.

For custom sounds like alarms, appliances, or doorbells:

- 1) In Settings, go to Accessibility > Sound Recognition > Sounds.
- 2) Choose "Custom Alarm," "Custom Appliance," or "Custom Doorbell" and assign a name.
- 3) Ensure your iPad is close to the sound source with minimal background noise.
- 4) Tap "Start Listening" and follow the onscreen instructions to train your iPad to recognize the custom sound.

- **Live Captions**

Configure and personalize Live Captions on your device with the following steps:

- 1) Access Settings > Accessibility > Live Captions and activate Live Captions (Beta).

2) Customize the appearance of captions by tapping on "Appearance." Adjust settings such as text style, size, and color according to your preferences.

3) By default, Live Captions are displayed across all applications. If you prefer to enable live captions exclusively for specific apps like FaceTime or RTT, switch on the option for In-App Live Captions.

- **RTT**

Establishing RTT on your iPad involves the following steps:

- 1) Ensure Wi-Fi calling is set up for both making and receiving calls on your iPad.
- 2) Navigate to Settings > Accessibility > RTT.
- 3) Activate Software RTT and perform any of the subsequent actions:
 - Specify a Relay Number by tapping on "Relay Number" and entering the phone number for relay calls through Software RTT/TTY.
 - Enable or disable "Send Immediately" to send characters as you type or complete messages before sending.
- 4) Once RTT is enabled, the RTT icon will be visible in the status bar at the top of the screen.

Initiating an RTT call is done as follows:

- 1) Open the FaceTime app on your iPad.
- 2) Tap "New FaceTime," input the desired name or number, or select contacts using the Add button.
- 3) Press the Call button, then choose "RTT Call" or "RTT Relay Call."

During an RTT call, you can type text by following these steps:

- 1) After accepting or starting an RTT call in the FaceTime app, tap "Use RTT" and select the RTT button.

- 2) Enter your message in the provided text field.
- 3) If "Send Immediately" is activated, your recipient sees each character as you type. Otherwise, press the Send button to transmit the complete message.
- 4) For audio transmission, tap the Microphone Off Muted button in the top-right corner if needed.

Other features that can be explored by the user through their device or on apples website are:

- **Homepod intercom transcriptions**
- **Audio messages transcriptions**
- **Subtitles and captions**

Enhance Hearing

- **MFi hearing devices**

Use hearing devices with ipad

If your hearing devices are already paired to another nearby device, such as a Mac or iPad, make sure Bluetooth® is turned off on those devices. (When you finish pairing your hearing devices to your iPad, you can turn Bluetooth on again on those devices.)

- 1) On iPad, go to Settings > Bluetooth, then make sure Bluetooth is turned on.
- 2) Go to Settings > Accessibility > Hearing Devices.
- 3) Turn your hearing devices off and back on again.

If you're unsure how to turn them off, refer to the instructions that came with them, or check with the audiologist who helped you set them up.

- 4) When their name appears below MFi Hearing Devices (this could take a minute), tap the name and respond to the pairing requests.

- **AirPods**

If you have AirPods (3rd generation), AirPods Pro, or AirPods Max, you can adjust the accessibility settings to suit your mobility or hearing needs.

- 1) Go to Settings > Accessibility > AirPods.
- 2) If you have multiple AirPods, select one.
- 3) Set any of the following options:
 - Press Speed: Adjust how quickly you must press two or three times before an action occurs.
 - Press and Hold Duration: Adjust the duration required to press and hold on your AirPods.
 - Noise Cancellation with One AirPod: (AirPods Pro) Turn on noise cancellation even when you're using only one of your AirPods.
 - Spatial Audio Head Tracking: When you turn on Follow iPad, the audio adjusts based on your head movement (for supported audio and video content).
- 4) To customize your audio, tap Audio Accessibility Settings.

- **Live Listen**

Here's how to enable Live Listen and configure the settings:

- For AirPods Users:
 - 1) Ensure your AirPods are in your ears.
 - 2) If they don't connect automatically, access the Control Center or Lock Screen and tap the Playback Destination button. Choose your AirPods from the options.
 - Activate or Deactivate Live Listen:
 - 1) Open the Control Center, tap the Hearing Devices button, select your hearing device or AirPods, and toggle Live Listen.
 - 2) If the Hearing Devices button isn't visible, add it to the Control Center via Settings > Control Center and use the Insert button next to Hearing.
 - 3) If you've set up the Accessibility Shortcut, triple-click a designated button, tap Hearing Devices, and then enable or disable Live Listen.
- For Hearing Aid Users:

Navigate to Settings > Accessibility > Hearing Devices and switch on Live Listen.

- **Optimal Placement:**

Position your iPad in proximity to the sound source for optimal results.

Other features that can be explored by the user through their device or on apples website are:

- **Audio settings**
- **Audio settings, including Conversation Boost**
- **Background sounds**

Alerts

- **LED flash for alerts**

This feature activates the LED flash (located next to the camera lens on the back of the iPad) when alerts occur, and it works specifically when the iPad is locked.

To enable this, navigate to Settings > Accessibility > Audio & Visual, and switch on LED Flash for Alerts. If you prefer not to have the LED flash during Silent mode, you can disable the Flash on Silent option. This feature is particularly useful in noisy environments where audible alerts may be easily missed.

- **Siri notifications announcements**

Adjust Siri's settings on your iPad by going to Settings > Accessibility > Siri.

You can set Siri's response time, speaking rate, and activation methods. Customize the duration Siri waits for input, adjust the speaking speed, and choose when Siri responds aloud or in text under Spoken Responses.

If you prefer typing to Siri, enable Type to Siri in Settings > Accessibility > Siri. For hands-free activation, turn on Always Listen for "Hey Siri."

Siri can also announce calls and notifications for specific apps. Enable this feature in Settings > Accessibility > Siri by activating Announce Notifications on Speaker. You can choose which notifications to announce for each app under Announce Notifications.

4.2.3 Physical Accessibility

The inclusive design of iPad's Switch Control and AssistiveTouch features significantly impacts individuals with physical disabilities across various job roles. From navigating applications to executing commands, these features empower users with limited dexterity to perform tasks efficiently. By incorporating these functionalities, Apple promotes an inclusive work environment that accommodates diverse physical needs.

Let's look at some of the features of this product that make it easy to use and work with:

Hands-free Navigation

- **Voice Control**

Ensure your iPad is connected to Wi-Fi before enabling Voice Control. After an initial download, Voice Control doesn't require an internet connection. Activate Voice Control in Settings > Accessibility > Voice Control. Complete the setup, and the Voice Control icon appears in the status bar once the download finishes.

Customize Voice Control preferences:

- **Language:** Set your language and download languages for offline use.
- **Customize Commands:** View existing commands and create new ones.
- **Vocabulary:** Teach Voice Control new words.
- **Show Confirmation:** Receive visual confirmation when a command is recognized.
- **Play Sound:** Hear an audible sound when Voice Control recognizes a command.
- **Show Hints:** View command suggestions and hints.
- **Overlay:** Display numbers, names, or a grid over screen elements.
- **Attention Aware:** On Face ID iPads, Voice Control activates when you look at the device and sleeps when you look away.

Siri

Set up Siri on your iPad by going to Settings > Siri & Search. Choose to activate Siri with your voice by selecting "Hey Siri" or "Siri" (if available), or use a button by enabling Press Home for Siri (on iPads with a Home button) or Press Top Button for Siri (on other iPad models). To prevent unwanted responses, place your iPad face down or disable voice activation in Settings.

Activate Siri with your voice by saying "Siri" or "Hey Siri" followed by your question or request. For example, command Siri with tasks like setting alarms or checking the weather.

Siri can also be activated with supported AirPods. To use a button, press and hold the Home button (on iPads with a Home button) or the top button (on other iPad models). Siri responds silently when iPad is muted, and you can also activate it with EarPods by pressing and holding the center or call button.

- **Shortcuts**

Generate shortcuts for various actions such as getting directions to your upcoming Calendar event or transferring text between apps. You can select pre-built shortcuts from the Gallery or craft personalized ones that integrate multiple steps across different apps.

- **Call audio routing**

iPad allows you to set up automatic call answering after a specified duration.

Navigate to Settings > Accessibility > Touch > Call Audio Routing to choose your preferred audio destination.

For automatic call answering, enable Auto-Answer Calls, and then adjust the answering time duration using the Decrement or Increment buttons.

Let iPad type for you

- **Dictation**

Dictation on iPad offers the convenience of converting spoken words into text wherever you can input text. You can seamlessly switch between speaking, typing, or handwriting using either the keyboard or the tools palette, allowing for efficient text entry and editing. For instance, you can select and replace text using touch or a Pencil.

Dictation processes requests on your device, supporting multiple languages without requiring an internet connection. However, when dictating in a search field, your text might be sent to the search provider for processing.

To enable Dictation, navigate to Settings > General > Keyboard, and switch on Enable Dictation. Keep in mind that Dictation availability, features, and language support may vary across regions. Additionally, data charges may apply when using Dictation.

- **Predictive text**

Leveraging predictive text, you can effortlessly compose entire sentences with just a few taps. While using the iPad keyboard, suggestions for words, emoji, and information that you might type next are displayed as you input text.

For instance, in Messages, when you begin typing expressions such as "I'm at" followed by a space, your current location is presented as an option. Similarly, typing "My number is" followed by a space suggests your phone number as an option. Additionally, inline predictions are visible, assisting in completing the word or phrase you are currently typing.

- **Scribble**

If your iPad supports it, you can grab an Apple Pencil (sold separately) and use Scribble to write instead of using the keyboard. This is handy for replying to messages or jotting down quick reminders without even opening the onscreen keyboard. Scribble magically turns your handwriting into text right on your iPad, keeping what you write private.

Connect other inputs

- **Switch Control**

Switch Control is a helpful tool for people who might have difficulty moving a lot. With Switch Control, you can use an external button, move your head, or even make a sound to control your iPad. By using one or more switches, you can move a cursor on the iPad screen and choose different actions, like tapping, zooming in or out, and more, from a menu. It makes using the iPad easier for those with limited mobility.

- **Keyboards**

- If you have difficulty seeing the onscreen keyboard, you can set it to display only uppercase letters.

Go to Settings > Accessibility > Keyboards, then turn off Show Lowercase Keys.

- If you have difficulty using the touchscreen, you can use an external keyboard to control your iPad using shortcuts.

Go to Settings > Accessibility > Keyboards, tap Full Keyboard Access, then turn on Full Keyboard Access.

- **Bluetooth accessories**

Using a Bluetooth connection, you can use third-party devices such as wireless keyboards, headphones, speakers, car kits, game controllers, and more with iPad.

- 1) Follow the instructions that came with the device to put it in discovery mode.
- 2) On iPad, go to Settings > Bluetooth, turn on Bluetooth, then tap the name of the device.

Other important features are the following:

- **Head tracking**
- **Eye-tracking device**
- **iPad keyboards**

For more information the user can check the manufacturers/brand site and guidance.

4.2.4 Cognitive Accessibility

In today's dynamic workplaces, the iPad's cognitive accessibility features, such as Guided Access and Speak Selection, offer essential support for individuals with diverse cognitive needs. Guided Access helps maintain focus on specific tasks, contributing to increased productivity across job positions. Speak Selection aids in comprehension, making the iPad a versatile tool for professionals with varying cognitive requirements. Apple's commitment to accessibility ensures that every job position can benefit from an inclusive and supportive work environment.

Let's look at the features of this product that make it easy to use and work with:

Minimize disruptions and sensory input

- **Background sounds**

Create a peaceful environment by playing soothing sounds, like ocean or rain, to mask external noise and reduce distractions.

- 1) Simply go to Settings > Accessibility > Audio & Visual > Background Sounds and turn on Background Sounds.
- 2) Choose your preferred sound, adjust the volume, and customize settings such as using it when media is playing or stopping sounds when the iPad is locked.

- **Onscreen motion**

Reduce or eliminate onscreen motion on your iPad to create a more visually comfortable experience. Navigate to Settings > Accessibility > Motion to access various motion-related settings:

- **Reduce Motion:** Turn on to minimize animation, like the parallax effect of icons. When off, more items in the user interface animate.
- **Auto-Play Message Effects:** Turn off to prevent the Messages app from automatically playing full-screen effects. You can still manually play effects by tapping "Replay" below the message bubble.
- **Auto-Play Video Previews:** Turn off to disable automatic video previews, such as those in the App Store.
- **Auto-Play Animated Images:** Turn off to stop automatic playback of rapid animated images and GIFs in Messages and Safari.
- **Dim Flashing Lights:** Turn on to automatically dim the display when flashes or strobe effects are detected.
- **Limit Frame Rate:** Turn on to restrict the maximum frame rate of the display to 60 frames per second on models with ProMotion display technology.
- **Focus**

Establishing a Focus on your device allows you to manage notifications based on specific contexts such as Work, Personal, or Sleep. To create a Focus, follow these steps in Settings > Focus:

Select a Focus

- 1) Navigate to Settings > Focus.
- 2) Choose a Focus type, such as Personal, Sleep, or Work.

Customize Focus Settings

- 1) Define which apps and contacts can send notifications during this Focus.
- 2) Tap "Options" to access additional settings:
 - Toggle "Show On Lock Screen" to display silenced notifications on the Lock Screen or in Notification Center.
 - Enable "Dim Lock Screen" to darken the Lock Screen during this Focus.

- Turn on "Hide Notification Badges" to conceal notification badges on Home Screen apps.

3) Once configured, tap the Back button.

Choose Home Screen Page

- 1) Select a Home Screen page for this Focus.
- 2) Tap the miniature Home Screen under "Customize Screens," choose the screen, tap Done, and then Back.

Share Across Devices

Optionally, enable "Share Across Devices" to synchronize Focus settings across all your Apple devices linked to the same Apple ID.

Finalizing and Adjusting

After setting up a Focus, revisit Settings > Focus anytime to modify or refine the selected options.

By organizing your Focus settings, you can tailor your device's notifications to align with different aspects of your daily life.

• **Guided Access**

Configure Guided Access by following these steps:

1) Access Guided Access Settings:

- Navigate to Settings > Accessibility > Guided Access.
- Toggle the Guided Access switch to turn it on.

2) Passcode Settings:

- Tap "Set Guided Access Passcode" and input a passcode for added security.
- Optionally, enable Face ID or Touch ID to conclude a Guided Access session.

• **Hide ads and distractions in Safari**

Automatically use Reader for a website

- 1) On a supported website, tap the Page Settings button, then tap Website Settings.
- 2) Turn on Use Reader Automatically.

Block pop-ups

Go to Settings > Safari, then turn on Block Pop-ups.

Pair audio and text

- **Live Captions (beta)**

Set up and customize Live Captions

1. Go to Settings > Accessibility > Live Captions, then turn on Live Captions (Beta).
2. Tap Appearance to customize the text, size, and color of the captions.
3. By default, Live Captions are shown across all apps. To get live captions only for certain apps such as FaceTime or RTT, turn them on below In-App Live Captions.

- **Spoken content**

Even if VoiceOver is turned off, you can have iPad speak selected text or the entire screen. iPad can also provide feedback and speak text corrections and suggestions as you type.

Choose modes for Spoken Content

1. Go to Settings > Accessibility > Spoken Content.
2. Turn on any of the following:
 - **Speak Selection:** Select what you want spoken.
 - **Speak Screen:** Have iPad read everything onscreen.
 - **Speech Controller:** Quickly access Speak Screen and Speak on Touch when Speak Screen is on.
 - **Highlight Content:** Move a cursor over words or sentences as you listen.
 - **Typing Feedback:** Have iPad speak each character, entire words, autocorrections, autocapitalizations, and typing predictions.

- **Audio message transcripts**

You can use the Messages app to record and send audio messages, along with transcripts of what's said in the message. Audio messages are automatically deleted to save space on your iPad, but if you want to save them, you can.

There are other options for the user such as:

- **Siri**
- **Keychain**
- **Face ID**
- **Touch ID**
- **Facial recognition**
- **People detection**
- **Image descriptions**
- **Text detection**
- **Point and Speak**
- **Door detection**

4.2.5 Exercises

Visual Accessibility

Quiz 1

Select if the sentence is True or False.

1. Enabling "Reduce Transparency" makes transparent backgrounds opaquer. (T/F)

Answer: True

2. "Auto-Brightness" adjusts your iPad screen brightness automatically based on ambient light conditions. (T/F)

Answer: True

3. "Maximum Zoom Level" can be configured under Settings > Accessibility > Display & Text Size. (T/F)

Answer: True

Quiz 2

Choose the correct answer.

1. How can you enlarge text on your iPad for better legibility?

- a) Increase Contrast
- b) Bold Text
- c) Enlarge Text

Answer: c) Enlarge Text

2. Which setting is used to limit user interface animations, such as the parallax effect of icons?

- a) Reduce Motion
- b) Dim Flashing Lights
- c) Auto-Play Video Previews

Answer: a) Reduce Motion

3. How can you navigate and control iPad functions when VoiceOver is active with a braille display?

- a) Tap the screen
- b) Use the braille display input keys
- c) Shake the device

Answer: b) Use the braille display input keys

Quiz 3

Fill in the Blank

1. Navigate to Settings > Accessibility > _____ for Hover Text.

Answer: Hover Text

2. Activate Dictation by going to Settings > General > _____.

Answer: Keyboard

3. To enable or disable VoiceOver, navigate to Settings > Accessibility > _____.

Answer: VoiceOver

Quiz 4

Match each feature or aspect with its corresponding description:

Features/Aspects:

1. Smart Invert
2. Auto-Brightness
3. Hover Text

Descriptions:

- a. Reverse colors everywhere (excluding images) in low-light settings.
- b. Adjust screen brightness based on ambient light conditions.
- c. Choose where the Hover Text window appears and customize its appearance.

Answers: 1-a, 2-b, 3-c

Hearing Accessibility

Quiz 1

Select if the sentence is True or False

1. Sound Recognition continuously monitors sounds like doorbells or sirens on your iPad. (T/F)

Answer: True

2. In-App Live Captions are disabled by default. (T/F)

Answer: False

3. You can enable RTT on your iPad without setting up Wi-Fi calling. (T/F)

Answer: False

Quiz 2

Choose the correct answer.

1. What should you do if your hearing devices are already paired with another device nearby?

- a) Keep Bluetooth on those devices turned on.
- b) Turn on Bluetooth on both devices.
- c) Turn off Bluetooth on those devices.

Answer: c) Turn off Bluetooth on those devices.

2. Where is the LED flash located on the iPad for alerts?

- a) Next to the volume buttons
- b) Next to the camera lens on the back
- c) On the front display

Answer: b) Next to the camera lens on the back

Live Listen:

3. How can AirPods Pro users turn on noise cancellation with only one AirPods?

- a) In Control Center, tap the Hearing Devices button.
- b) Adjust Press Speed in AirPods settings.
- c) Enable Follow iPad in Spatial Audio settings.

Answer: c) Enable Follow iPad in Spatial Audio settings.

Quiz 3

Fill in the Blank spaces with the given words..

Position your iPad in proximity to the _____ for optimal results.

Answer: c) sound source

If AirPods don't connect automatically, access the Control Center or Lock Screen and tap the _____ button.

Answer: a) Playback Destination

To enable Siri announcing calls and notifications, go to Settings > Accessibility > Siri and activate _____.

Answer: b) Announce Notifications on Speaker

Given words: a) Playback Destination b) Announce Notifications on Speaker c) sound source

Quiz 4

Match the Word with the Meaning

Match each feature or aspect with its corresponding description:

Features/Aspects:

1. Live Listen
2. LED Flash for Alerts
3. Sound Recognition

Descriptions:

- a. Monitors specific sounds and provides instant notifications.
- b. Activates the LED flash for alerts when the iPad is locked.
- c. Allows users to listen to their surroundings through AirPods or hearing aids.

Answers: 1-a, 2-b, 3-c

Physical Accessibility

Quiz 1

Select if the sentence is True or False.

1. Voice Control requires a continuous internet connection for operation. (T/F)

Answer: False

2. Siri can only be activated by voice, and there is no option to use a button. (T/F)

Answer: False

3. Predictive text suggestions are only available in specific apps like Notes and Mail. (T/F)

Answer: False

Quiz 2

Choose the correct answer

1. How can you activate Siri with supported AirPods?

- a) Say "Hey Siri"
- b) Press and hold the Home button
- c) Tap the Siri icon on the screen

Answer: a) Say "Hey Siri"

2. What input device is required for using Scribble?

- a) Apple Pencil
- b) External keyboard
- c) Mouse

Answer: a) Apple Pencil

3. What is Switch Control primarily designed for?

- a) Improved touch gestures

- b) People with limited mobility
- c) Voice recognition

Answer: b) People with limited mobility

Quiz 3

Fill in the Blank

1. To choose your preferred audio destination, navigate to Settings > Accessibility > Touch > Call Audio _____.

Answer: Routing

2. Dictation processes requests on your device without requiring an _____ connection.

Answer: Internet

3. To control your iPad using shortcuts with an external keyboard, go to Settings > Accessibility > Keyboards, and turn on _____ Keyboard Access.

Answer: Full

Quiz 4

Match each feature or aspect with its corresponding description:

Features/Aspects:

- 1. Switch Control
- 2. Bluetooth Accessories
- 3. Scribble

Descriptions:

- a. Control iPad using external buttons, head movement, or sound for people with limited mobility.

- b. Enables the use of third-party devices like wireless keyboards, headphones, and game controllers.
- c. Allows handwriting input using an Apple Pencil, turning it into text on the iPad.

Answers: 1-a, 2-b, 3-c

Cognitive Accessibility

Quiz 1

Select if the sentence is True or False

- 1. Background Sounds require an internet connection for operation.

Answer: False

- 2. A Focus can only be configured for Work-related contexts.

Answer: False

- 3. Audio messages in the Messages app are not automatically deleted.

Answer: False

Quiz 2

Choose the correct answer.

- 1. What does "Auto-Play Message Effects" control?

- a) Background sounds in messages
- b) Automatic playback of message effects
- c) Reducing motion in messages

Answer: b) Automatic playback of message effects

- 2. How can you customize the appearance of Live Captions?

- a) In Siri settings
- b) In Live Captions settings under Accessibility
- c) In FaceTime settings

Answer: b) In Live Captions settings under Accessibility

3. What does Guided Access allow you to do?

- a) Customize Focus settings
- b) Configure Live Captions
- c) Restrict your iPad to a single app

Answer: c) Restrict your iPad to a single app

Quiz 3

Fill in the Blank with the given words.

1. To access motion-related settings, navigate to Settings > Accessibility > _____.

Answer: c) Motion

2. Turn on Use Reader Automatically to automatically use Reader for a website in _____.

Answer: a) Safari

3. Go to Settings > Accessibility > _____ to choose modes for Spoken Content.

Answer: b) Spoken Content

Given words: a) Safari, b) Spoken content, c) Motion

Quiz 4

Match each feature or aspect with its corresponding description:

Features/Aspects:

1. Background Sounds
2. Focus
3. Guided Access

Descriptions:

- a. Customize notifications based on contexts like Work, Personal, or Sleep.
- b. Play soothing sounds to mask external noise and reduce distractions.
- c. Restrict iPad to a single app, useful for controlled access.

Answers:

- 1-b. Play soothing sounds to mask external noise and reduce distractions.
- 2-a. Customize notifications based on contexts like Work, Personal, or Sleep.
- 3-c. Restrict iPad to a single app, useful for controlled access.

4.2.6 Resources

Available resources for more interest:

- VoiceOver — Apple Support: <https://www.youtube.com/watch?v=qDm7GiKra28>
- Speak Selection: https://www.youtube.com/watch?v=cRdUFvL1I_8
- Accessibility features: https://www.youtube.com/watch?v=Ai5iO_boRR8

5. Tests

Visual

Exercise 1

Match the accessibility MS Windows settings with their descriptions:

1. Text size
2. Visual effects
3. Mouse pointer and touch

4. Color filters

5. Contrast themes

Descriptions:

- a. Customize mouse pointer appearance and behavior.
- b. Adjust the size of the text throughout the Windows interface.
- c. Turn off or customize animations and transitions.
- d. Change the color palette of the entire screen.
- e. High-contrast themes with distinct foreground and background.

Answers: 1-b, 2-c, 3-a, 4-d, 5-e

Exercise 2

Fill in the Blank with the given words about Narrator.

1. Narrator is a _____ that allows the user to operate their computer without a mouse. It reads and communicates with onscreen items using simple words, acting as a _____.

2. Using Narrator, users can perform common tasks such as reading and writing emails, browsing the web, and working with _____.

3. When Narrator is activated, it reads the headlines, or the first sentences/paragraphs of the page being screened. Narrator is set by default in _____, and to change or download another language, users must go to:

Windows → Settings → Time & Language → Language & Region

and then download English United States or the preferred language.

4. Narrator, like other software, also contains a set of _____ with keyboard shortcuts for the convenience of users.

Given words: e. screen reader, d. screen reader, c. documents, b. English, a. instructions-commands

Answers: 1-e-d, 2-c, 3-b, 4-a

Exercise 3

Select the correct answer about MS Windows

1. What keyboard shortcut is used to open File Explorer with Magnifier?

- a) Ctrl + E
- b) Windows + E
- c) Alt + E

2. How can the user navigate through folders and files with Magnifier?

- a) Arrow keys
- b) Ctrl + Arrow keys
- c) Shift + Arrow keys

3. To create a new folder in File Explorer with Magnifier, the user should:

- a) Press Ctrl + N
- b) Right-click, go to "New," and select "Folder"
- c) Press Alt + F

Answers: b, a, b

Exercise 4

Regarding the Mac OS chapter, choose if the sentence is True or False.

4. VoiceOver is designed to assist users with visual impairments by providing spoken descriptions of on-screen elements.
5. To deactivate VoiceOver, users can use the keyboard shortcut Command + F5.
6. VoiceOver provides support for touch gestures on Mac computers.

Answers: T, T, T

Exercise 5:

What is GNOME in Linux OS?

- a) A popular Linux distribution
- b) A desktop environment
- c) A web browser

Answer: b) A desktop environment

Hearing

Exercise 1

Select if the sentence is True or False:

- 1.Windows software offers features for individuals with disabilities to make computer use more accessible. (T/F)

Answer: T

- 2.The Accessibility menu in Windows can be found by searching or writing in the menu. (T/F)

Answer: T

Exercise 2

Match the numbers with the letters about Mac OS

- 1.Notification Center aggregates alerts, notifications, and widgets.

2. MacOS supports banner notifications that appear in the upper-right corner.

3. Users can configure macOS to flash the screen when an alert occurs.

Match them with the sentence:

- a. Flash screen for alerts
- b. Banner notifications
- c. Notification Center

Answers: 1-c, 2-b, 3-a

Exercise 3

Select the correct answer

2. Which keyboard shortcut opens the Applications Menu in Ubuntu 21.10 (Linux OS)?

- A) Ctrl + A
- B) Windows + A
- C) Alt + A
- D) Shift + A

2) Where can you find the accessibility settings in Linux based on the GNOME desktop environment?

- A) Display
- B) Appearance
- C) Accessibility
- D) System

3) What is the purpose of Visual Alerts in the context of hearing features?

- A) Adjust screen brightness
- B) Flash the entire screen or active window in response to an alert sound
- C) Change system language
- D) Enable touchpad gestures

Answers: B, C, B

Physical

Exercise 1

Choose if the sentences about MS Windows Accessibility features are True or False.

1. The Windows Ease of Access Center is a set of accessibility features in the Windows operating system. (T/F)

Answer: True

2. The On-Screen Keyboard is a physical keyboard. (T/F)

Answer: False

- 3: Voice Access allows users to control their devices through touch commands. (T/F)

Answer: False

Exercise 2

Choose the correct answer regarding the Accessibility Mac OS features.

1. How does Sticky Keys assist users with keyboard shortcuts?

- a) Requires simultaneous key presses
- b) Allows pressing one key at a time
- c) Disables keyboard shortcuts

d) Only works with the Shift key

2. What is the purpose of Slow Keys?

- a) Speeds up key presses
- b) Prevents unintended key presses
- c) Disables key registration
- d) Enhances keyboard shortcuts

Answers: b, b

Exercise 3

Choose the correct path regarding the specific Linux OS Accessibility feature.

Slow Keys in Linux can be adjusted by navigating to _____.

Given options:

- 1 - Settings > Accessibility > Typing,
- 2 – Settings > Network & Internet
- 3 – Settings > Bluetooth & devices

Answer: 1

Exercise 4

Fill in the blanks in the following sentences related to file management with speech recognition from MS Windows chapter:

- 1. To open File Explorer, the user can use the voice command "_____."
- 2. The user can copy a file by saying "_____ [file name]."
- 3. Speech recognition allows the user to rename files by saying "Rename _____."

Match with:

- d. Copy
- e. Open File Explorer
- f. [file name]

Answers: 1-b, 2-a, 3-c