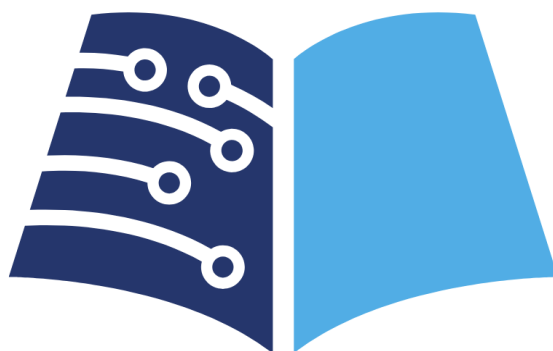




DIGITABILITY

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

BASIC KNOWLEDGE OF DEVICES

VISUAL ACCESSIBILITY



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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 visual 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 Brailiant Series

HumanWare's commitment to accessibility is evident in the Brailiant 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 Exercises

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

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

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."

2.1.3 Resources

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

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 Dokers include:

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



Figure 5. 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 6. 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 7. 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 8. 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 9. 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 10. 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 Exercises

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.

Quiz 2: True or False

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

2.2.3 Resources

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>

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 11. 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 12. 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 13. 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 14. 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 Exercises

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.

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

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

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."

2.3.3 Resources

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

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.

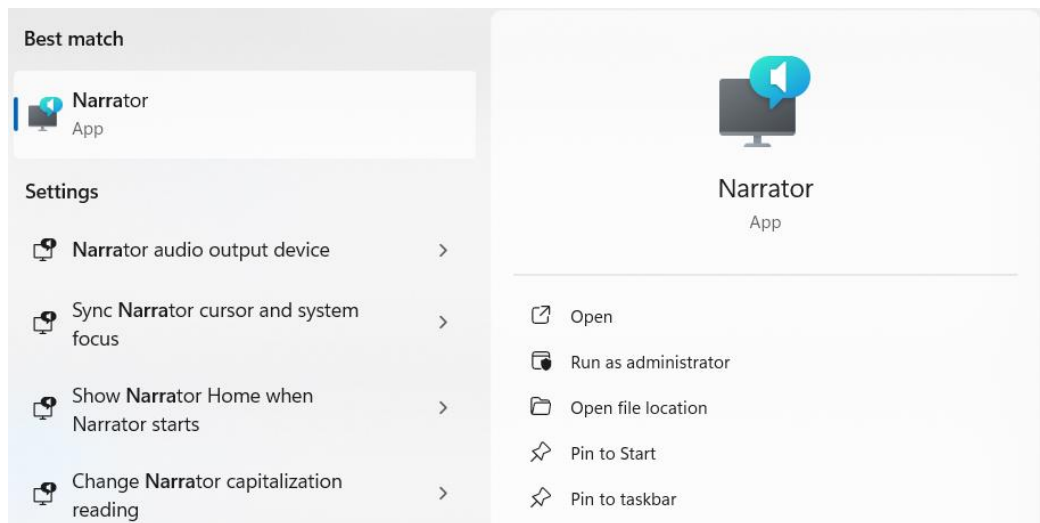
When Narrator is activated, reads the headlines or the first sentences/paragraphs of the page you are screening.

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.



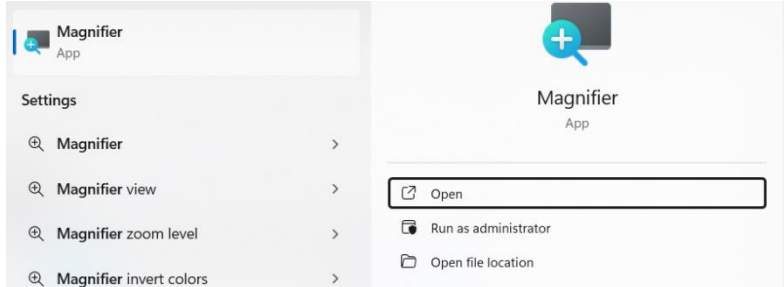
General Commands

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

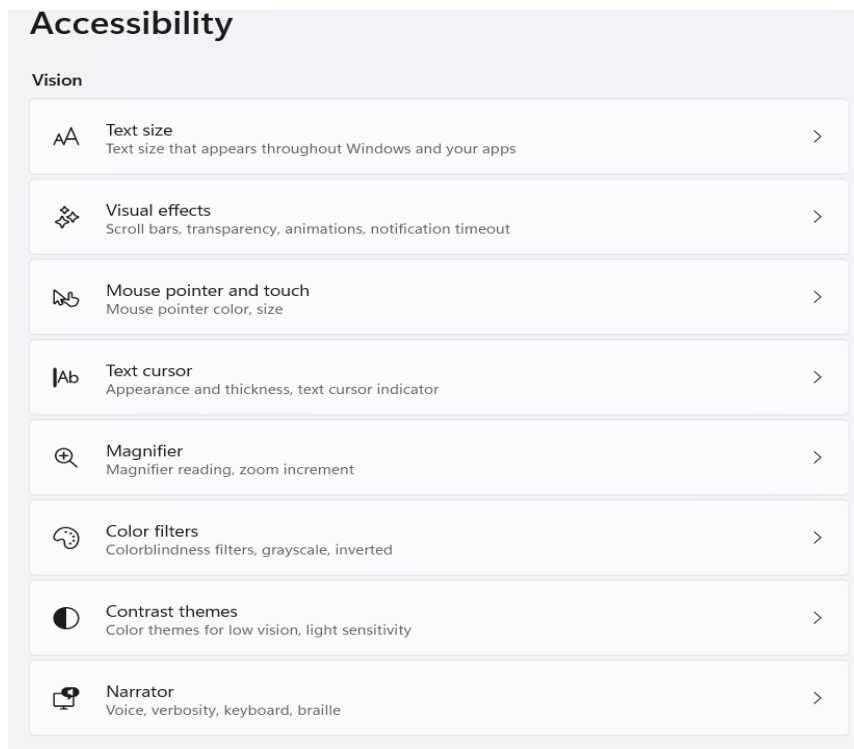
For ease of use, the user can make the following settings on their computer:

- **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 Exercises

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)

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.

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

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

3.1.1.3 Resources

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-dIzoi_Y
- <https://www.youtube.com/watch?v=oxBCapWFqmw>
- <https://www.youtube.com/watch?v=JDSwbVMOxWE>

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 Exercises

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)

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

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

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

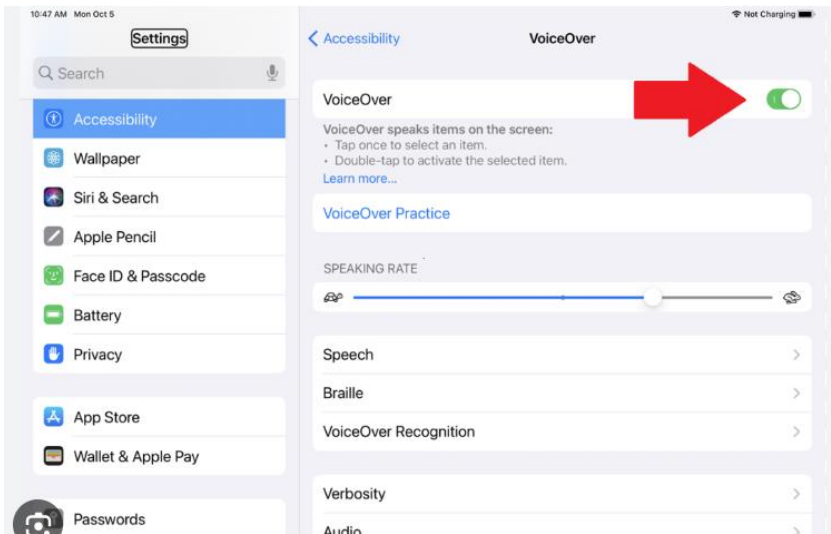
3.2 Mac OS

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



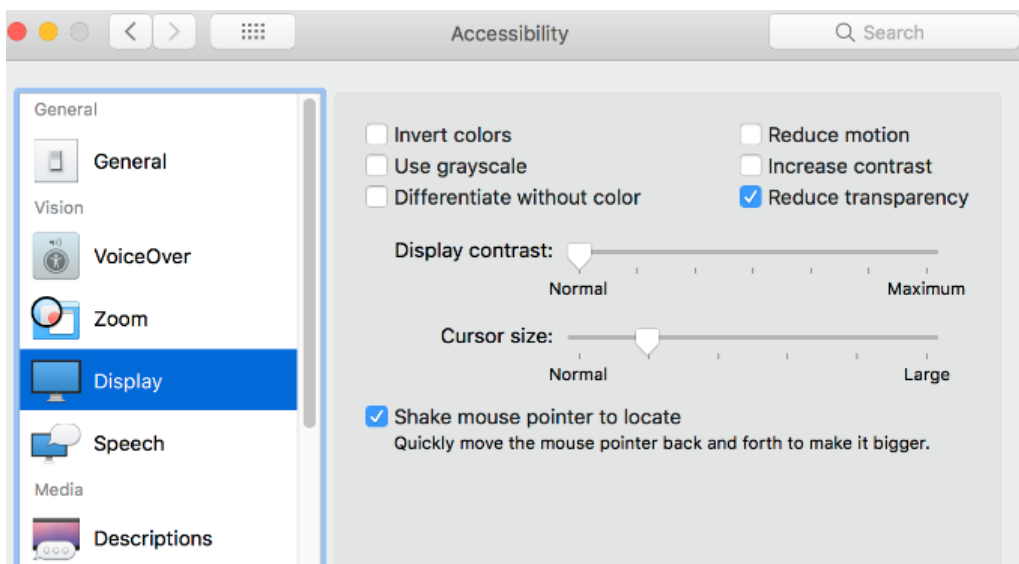
VoiceOver is a screen reader feature integrated into Apple's macOS operating system for Mac computers. It is designed to assist the user with visual impairments by providing spoken descriptions of on-screen elements and enabling the user to navigate and interact with their Mac using keyboard commands.

Key aspects of VoiceOver:

Features	Description
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.

Features	Description
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.

Features	Description
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



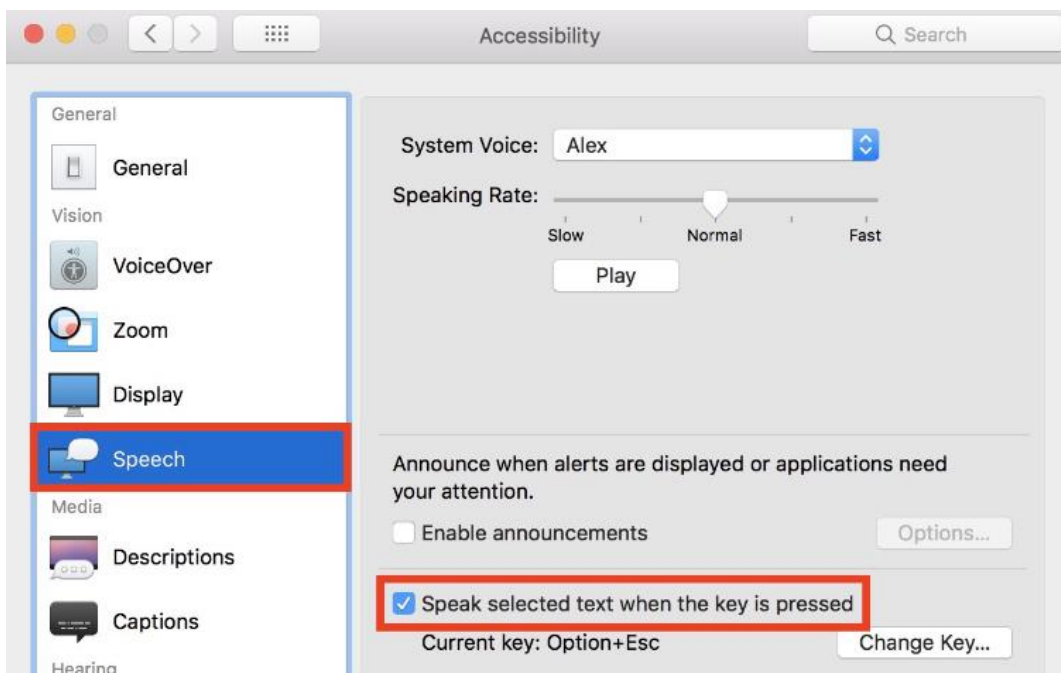
Dictation is a built-in feature on Apple Mac computers that enables users to input text by speaking rather than typing. This accessibility feature is designed to assist users who may have difficulty typing or prefer the convenience of speech input.

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.

Features	Description
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



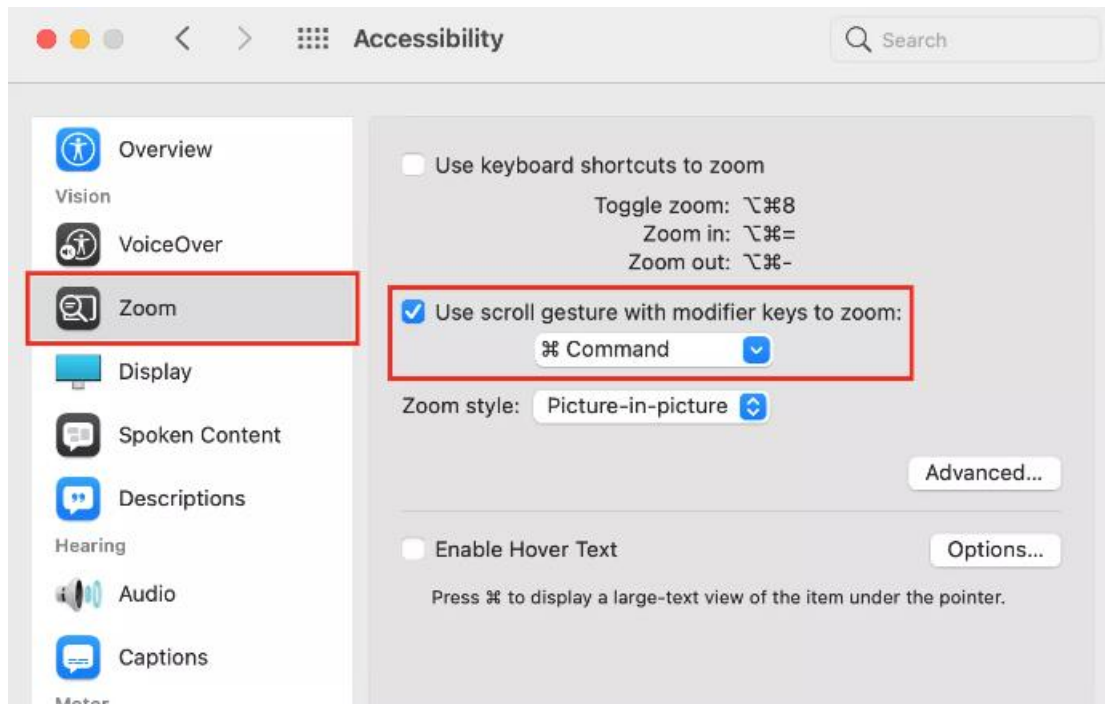
"Speak Selected Text" is a built-in accessibility feature on Apple Mac computers that allows users to have the computer read aloud selected text. This feature is particularly helpful for individuals with visual impairments, those who prefer auditory learning, or anyone who wants text content to read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

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.

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

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

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

3.2.1.3 Resources

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>

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 Exercises

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.

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

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 _____.

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

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=hIdUlvog6kI>
- A series of videos – Mac files and folders:
<https://www.youtube.com/watch?v=mYNchWitkyg&list=PL1bsBsPtN-9TY3YnJIY3haZ9v48i4i3Xy>

3.3 Linux OS

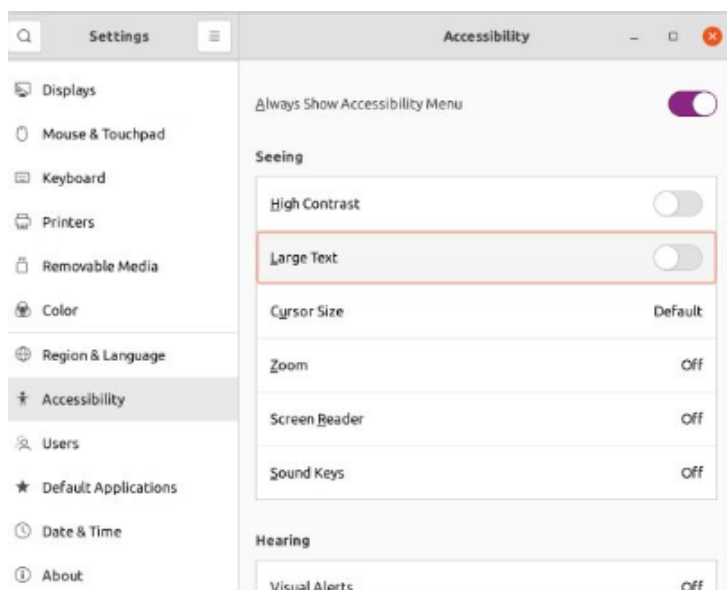
3.3.1 Built in features & Settings

3.3.1.1 Accessibility for Visual Impairments

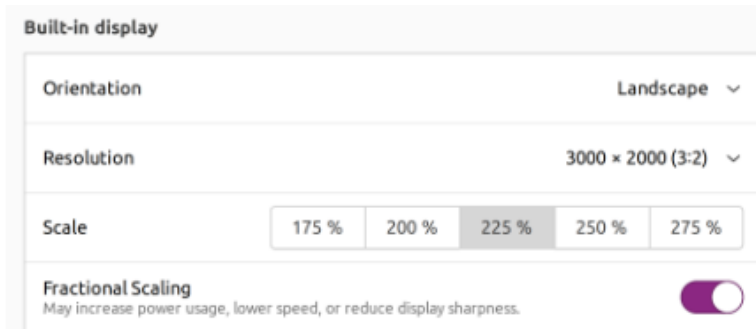
Accessibility Features

Enlarge the size of text, icons, and the pointer

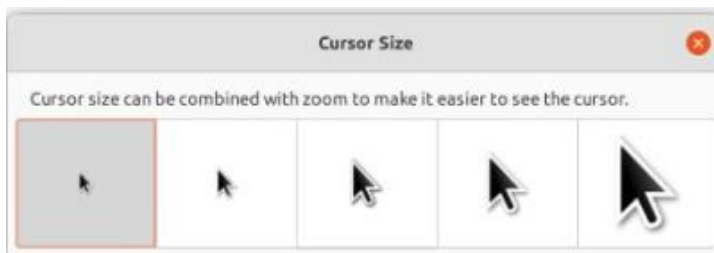
- Increase the font size of the text
 1. Settings > Accessibility > Seeing
 2. Large Text
 3. Adjust the toggle to on



- Enlarge all visual elements on the screen
 1. Settings > Displays > Built-in Display
 2. Scale
 3. Select from the options available

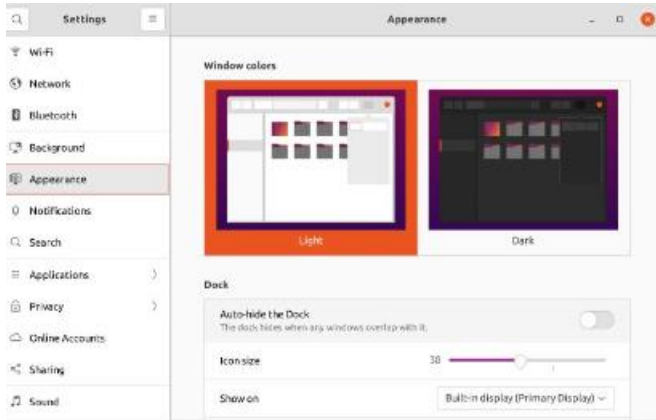


- Large Mouse Pointer
 1. Settings > Accessibility > Seeing
 2. Cursor Size
 3. Select a preferred size

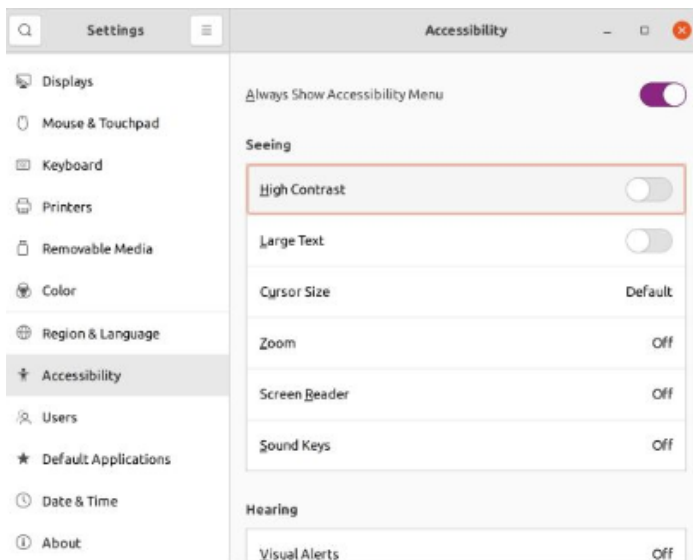


Adjust colour and contrast

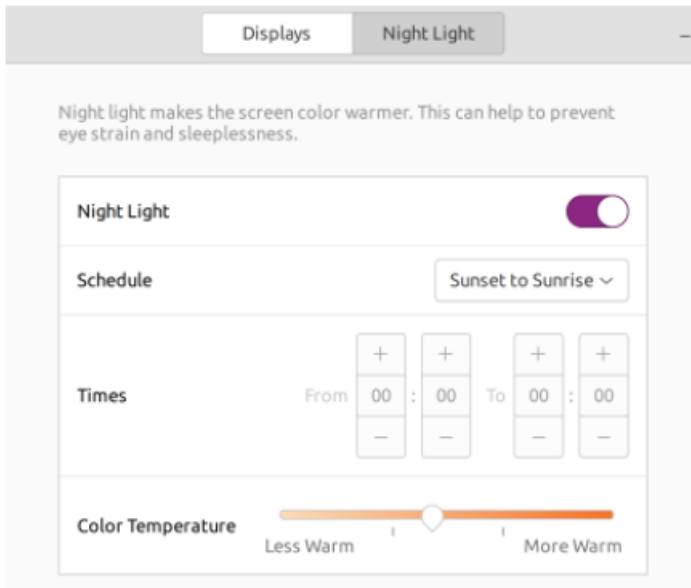
- Enable Dark Mode
 1. Settings > Appearance > Window colours
 2. Dark



- 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 Exercises

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

3.3.1.3 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=Eq2fJFVixtq>

- 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.

3.3.2.1 Exercises

Exercise 1:

What is the default desktop environment for Ubuntu?

- a) KDE
- b) GNOME
- c) Xfce

Exercise 2:

What is GNOME?

- a) A popular Linux distribution
- b) A desktop environment
- c) A web browser

3.3.2.3 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_MmrI

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
- HMS (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 Exercises

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)

4.1.3 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=ls8NM21Jxb4>
- 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 Exercises

Quiz 1

Select if the sentence is True or False.

1. Enabling "Reduce Transparency" makes transparent backgrounds opaquer. (T/F)
2. "Auto-Brightness" adjusts your iPad screen brightness automatically based on ambient light conditions. (T/F)
3. "Maximum Zoom Level" can be configured under Settings > Accessibility > Display & Text Size. (T/F)

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

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

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

Quiz 3

Fill in the Blank

1. Navigate to Settings > Accessibility > _____ for Hover Text.

2. Activate Dictation by going to Settings > General > _____.

3. To enable or disable VoiceOver, navigate to Settings > Accessibility > _____.

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.

4.2.3 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. Annex – Exercise answers

2.1.2 Exercises

Quiz 1

1. B, B, A

Quiz 2

1. B

Quiz 3

- A. True
- B. False
- C. True

Quiz 4: Select the Correct Sentence

Answer: B

2.2.2 Exercises

Quiz 1

Answer: C

Quiz 2:

Answer: True

2.3.2 Exercises

Quiz 1

1. False
2. False
3. False
4. False

Quiz 2

1. D

Quiz 3

1. B
2. C

Quiz 4

Answer: A.

3.1.1.2 Exercises

Quiz 1

1. True
2. False
3. True

Quiz 2

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

Quiz 3

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

Quiz 4

- 1.e-d
- 2.c
- 3.b
- 4.a

3.1.2.2 Exercises

Quiz 1

1. True
2. False
3. True

Quiz 2

1. b

2. a

3. b

Quiz 3

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

Quiz 4

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

3.2.1.2 Exercises

Quiz 1

1. True
2. True
3. True

Quiz 2

1. b
2. c
3. c

Quiz 3

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

Quiz 4:

1. a
2. b

3. b

3.2.2.2 Exercises

Quiz 1

1. True
2. True
3. True

Quiz 2

1. a
2. c
3. a

Quiz 3

1. VO-F1
2. Blank
3. Screen

Quiz 4

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

3.3.1.2 Exercises

Quiz 1

1. True
2. True
3. True

4. False

5. True

Quiz 2

1. b

2. c

3. c

3.3.2.1 Exercises

Exercise 1:

Answer: b) GNOME

Exercise 2:

Answer: b) A desktop environment

4.1.2 Exercises

Exercise 1:

Answer: b) Access Accessibility and select Display size

Exercise 2:

Answer: c) Navigate to Accessibility and toggle the switch

Exercise 3:

Answer: True

4.2.2 Exercises

Quiz 1

1. True
2. True
3. True

Quiz 2

1. c) Enlarge Text
2. a) Reduce Motion
3. b) Use the braille display input keys

Quiz 3

1. Hover Text
2. Keyboard
3. VoiceOver

Quiz 4

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