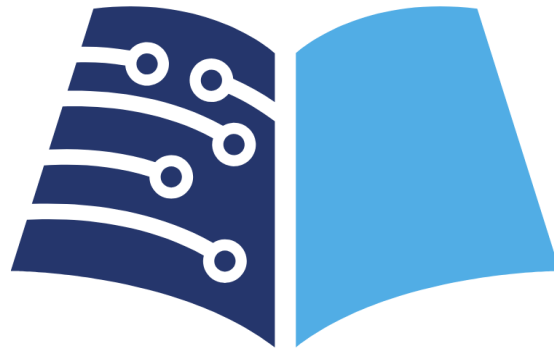




DIGITABILITY



DIGITABILITY

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

BASIC KNOWLEDGE OF DEVICES

PHYSICAL 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 physical 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 Physical Impairments

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

Adaptive Keyboards

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

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

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

Alternatives to the standard keyboard are:

- Ergonomic keyboards

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



Figure 1. Ergonomic Keyboard 1



Figure 2. Ergonomic Keyboard 2



Figure 3. Ergonomic Keyboard 3

- Smaller, compact keyboards

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

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



Figure 4. A model of small Keyboards



Figure 5. Other types of small Keyboards

- Separate numeric keyboards

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



Figure 6. Different models of Separate Keyboards

- Keyboards with larger keys

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



Figure 7. Keyboard models with larger keys

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

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

Alternative Mice

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

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

Some common alternative mice are:

- Ergonomic Mice

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



Figure 8. Different models of Ergonomic Mice

- Vertical Mice

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



Figure 9. Different models of Vertical Mice

- Bar Mice

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



Figure 10. Different models of Mouse Bars

- Rollerball Mice

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



Figure 11. Different models of Rollerball Mice

- Larger ball tracking Mice

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



Figure 12. Different models of Large Trackball Mice

- Trackpads

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



Figure 13. Trackpad 1



Figure 14. Trackpad 2



Figure 15. Trackpad 3

- Pen Mice & Graphics Tablets

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



Figure 16. Example of Graphic Tablet and Pen Mice

- Joysticks

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

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



Figure 17. Different models of Joystic Mouse

- Touchscreens

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

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



Figure 18. Example of Touchscreen

- Head movement tracking

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



Figure 19. Head-tracking Device

- Eye Tracking Systems

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

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

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



Figure 20. A model of an Eye tracking Device

- Foot Mouse

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



Figure 21. Example of a Foot Mouse Device

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

1. Read the User Manual

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

2. Visit the Manufacturer's Website

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

3. Plug in the Device

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

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

2.1.2 Exercises

Quiz 1

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

A. Custom Keyboards

B. Processor

C. Electronic Circuits

A. Smaller, Compact Keyboards

B. Pen Mice & Graphics Tablets

C. Larger Ball Tracking Mice

A. Joysticks

B. Trackpads

C. Solid State Drive

Quiz 2

Select the most appropriate option for each question.

1. What is a common feature of adaptive keyboards?

- A. Built-in speakers for audio enhancement
- B. Programmable key layouts and larger buttons
- C. Compatibility with virtual reality applications

2. What is a characteristic of rollerball mice?

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

Quiz 3

Indicate whether the following statements are True or False.

1. Compact keyboards are larger than regular laptop keyboards.
2. Touchscreens are exclusively used in tablets and smartphones.

2.1.3 Resources

Adaptive Keyboards: Types and Usage

- <https://www.youtube.com/watch?v=Y98UIIPO44U>
- <https://www.youtube.com/watch?v=e6I7fdUk2ps>

Alternative Mice:

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

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 22. 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 23. 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 24. 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 25. 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.](#))

2.2.2 Accessibility devices for people with Physical Impairments

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

TrackBall Mice – Logitech MX Ergo Wireless Trackball Mouse



Figure 26. Image of a Trackball Mouse model

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

When it comes to connectivity, trackball mice are available in both wired and wireless options, and many are compatible with Mac devices. They can be connected to Mac computers via USB or Bluetooth, ensuring a seamless integration process. Typically, these mice operate as plug-

and-play devices, requiring no additional software installation for basic functionality. However, some models may come with software options that allow users to customize button assignments, sensitivity levels, and other settings based on their specific needs. The versatility and user-friendly design of trackball mice make them suitable for various tasks, from casual computer use to professional applications where precision and comfort are essential.

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

Switch Access Devices

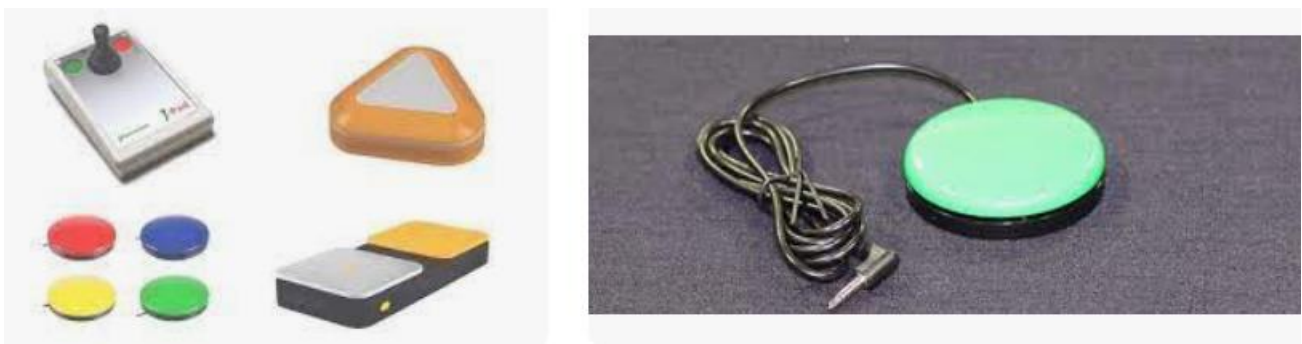


Figure 27. Images of different Switch Access Devices

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

Features:

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

Examples that connect to Mac OS:

1. TASH Jouse3:

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

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

2. Tecla Shield:

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

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

3. AbleNet Hook+ Switch Interface:

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

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

AbleNet BIGtrack Trackball Mouse



Figure 28. Image of Trackball Mouse

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

coded buttons for mouse clicks.

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

2.2.3 Exercises

Quiz 1

Select the Correct Word

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

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

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

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

Quiz 2

Select the sentence if it's True or False

1. Trackball mice are only available in wired options, and they are not compatible with Mac devices.

2. Trackball mice typically require additional software installation for basic functionality beyond plug-and-play.

Quiz 3

Choose the correct sentence:

1. Which of the following is a benefit of trackball mice?

- A. Increased need for extensive wrist movement
- B. Precise cursor control without moving the entire mouse
- C. Exclusively designed for professional applications

2. How can trackball mice be connected to Mac computers?

- A. Only via USB
- B. Only via Bluetooth
- C. Both via USB and Bluetooth

3. What customization options may trackball mice offer?

- A. Customizable sensitivity settings
- B. Fixed button assignments
- C. Limited user-friendly design

Quiz 4

Multiple Choice

1.What is the primary function of switch access devices?

- A. Enhancing screen brightness
- B. Providing an alternative means of input
- C. Acting as external speakers

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

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

3.What is a feature of switch access devices?

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

2.2.4 Resources

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

TrackBall Mice – Logitech MX Ergo Wireless Trackball Mouse

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

AbleNet BIGtrack Trackball Mouse

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

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.

2.3.3 Accessibility for people with Physical Impairments

Logitech MX Ergo Wireless Trackball

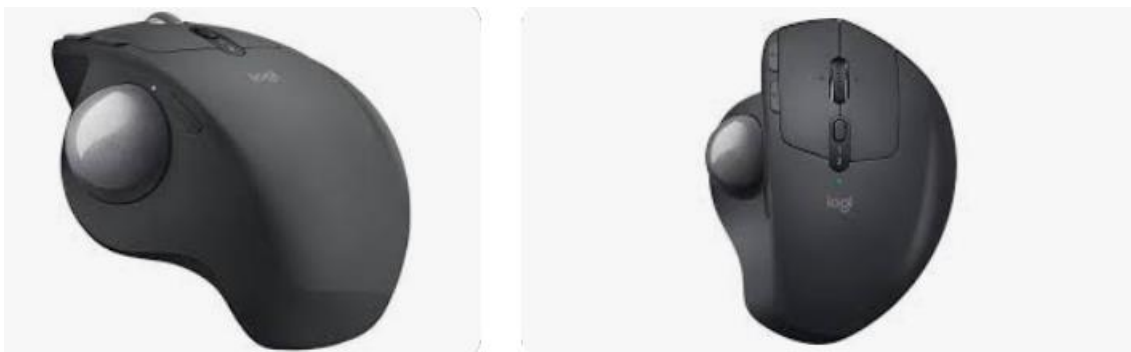


Figure 29. Wireless TrackBall

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

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

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

Origin Instruments HeadMouse Nano



Figure 30. Headmouse Nano

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

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

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

QuadJoy Sip/Puff Switch



Figure 31. Sip/Puff Switch Device

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

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

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

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

Wacom Intuos Pro Graphics Tablet



Figure 32. Graphics Tablet

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

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

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

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

2.3.4 Exercises

Quiz 1

Decide if the sentence is True or False

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

Quiz 2

Find the correct answer.

1. What is a notable feature of the Logitech MX Ergo Wireless Trackball?
 - A. Pressure-sensitive stylus
 - B. Head tracking technology
 - C. Adjustable angle of the trackball
 - D. Sip and puff actions

2. How does the HeadMouse Nano typically capture head movements?
 - A. Through a traditional mouse
 - B. Via a reflective dot on the user's forehead or glasses
 - C. By tracking hand gestures
 - D. Using a joystick

Quiz 3

Chose the correct word.

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

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

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

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

Quiz 4

Find the correct answer.

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

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

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

- A. "The tablet lacks pressure sensitivity and tilt recognition."
- B. "ExpressKeys and Radial Menu are not available on the tablet."
- C. "Wacom generally provides drivers that support Linux for its tablets."

2.3.5 Resources

Some videos related to assistive technology:

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

3. Operating System Accessibility Management for Computers

3.1 MS Windows OS

3.1.1 Built in features & Settings

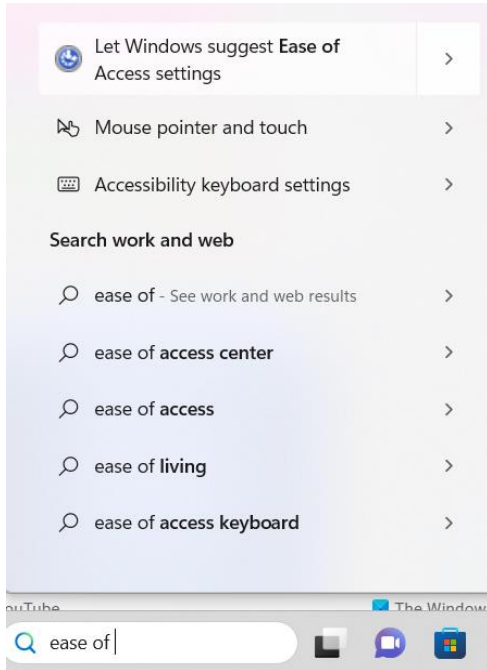
3.1.1.1 Physical Accessibility

Windows offers a comprehensive suite of built-in accessibility features aimed at making the operating system more inclusive and user-friendly for individuals with diverse needs. In this accessibility toolkit, users will find various functionalities that enhance interaction with their devices. The features range from screen magnification, speech recognition, on-screen keyboards, and voice commands to assistive input devices, customizable keyboard shortcuts, and text-to-speech software. By integrating these capabilities, Windows ensures that everyone, regardless of their abilities, can access, navigate, and utilize their computers effectively. These built-in features foster an inclusive and adaptable digital environment, enabling users to tailor their Windows experience to their unique requirements.

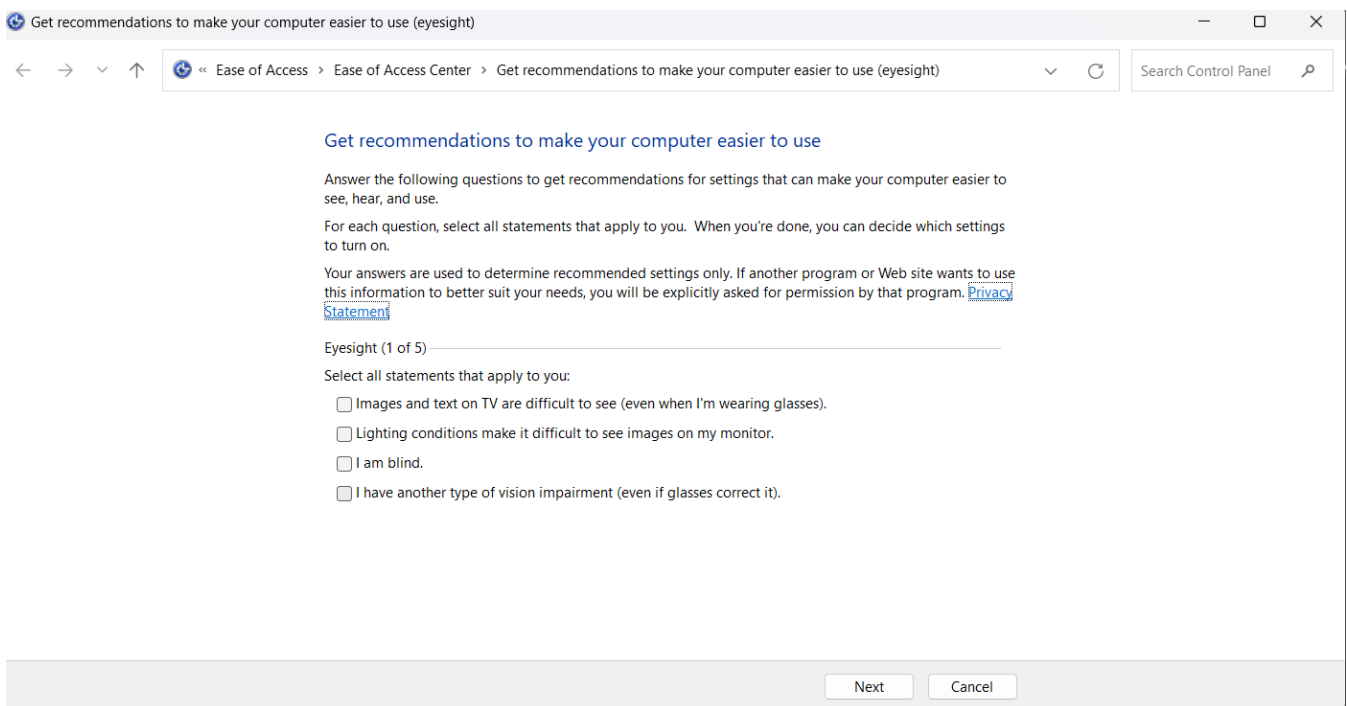
Windows Ease of Access Center

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

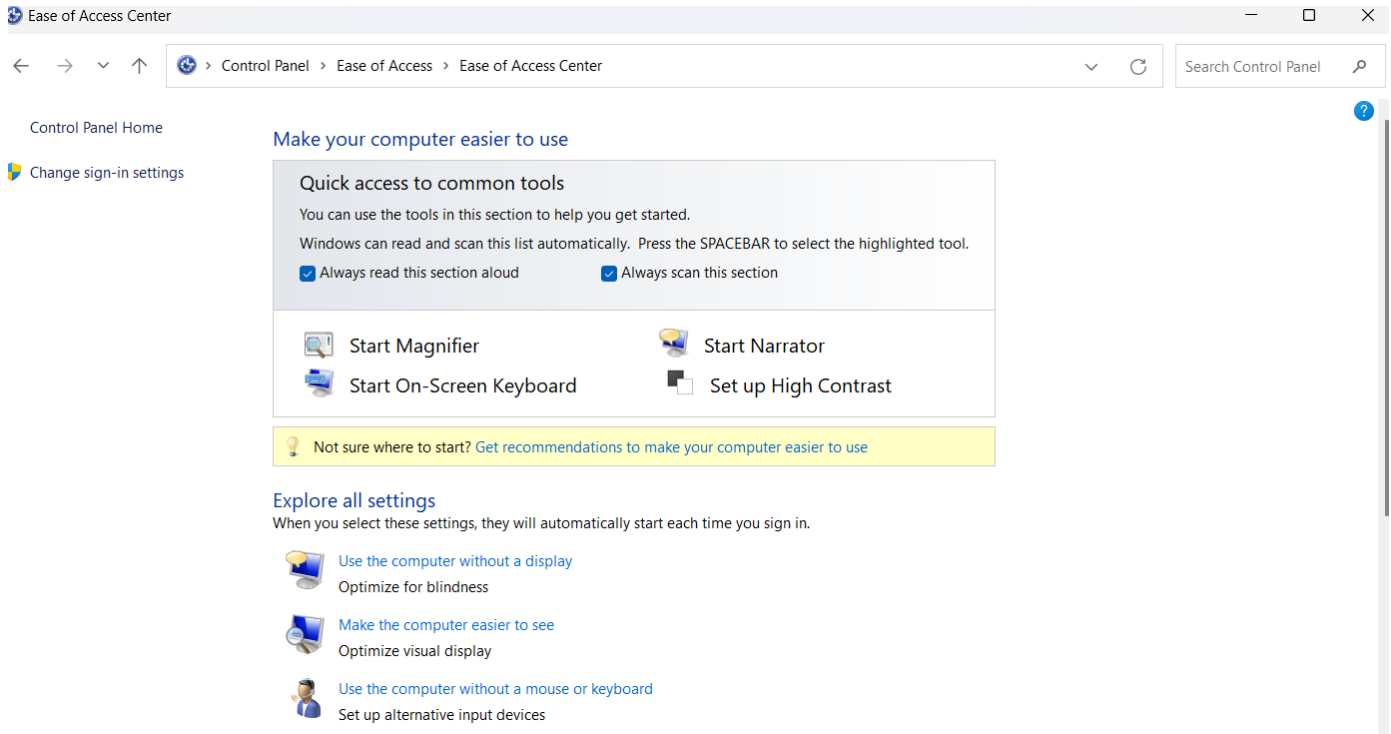
No specific global keyboard shortcuts exist for opening or closing the Ease of Access Center, but the user can access its settings by pressing "Windows + U".



When you click enter, a window makes its appearance:



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



 [Change sign-in settings](#)

Explore all settings

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

-  [Use the computer without a display](#)
Optimize for blindness
-  [Make the computer easier to see](#)
Optimize visual display
-  [Use the computer without a mouse or keyboard](#)
Set up alternative input devices
-  [Make the mouse easier to use](#)
Adjust settings for the mouse or other pointing devices
-  [Make the keyboard easier to use](#)
Adjust settings for the keyboard
-  [Use text or visual alternatives for sounds](#)
Set up alternatives for sounds
-  [Make it easier to focus on tasks](#)
Adjust settings for reading and typing
-  [Make touch and tablets easier to use](#)
Adjust settings for touch and tablets

On-Screen Keyboard

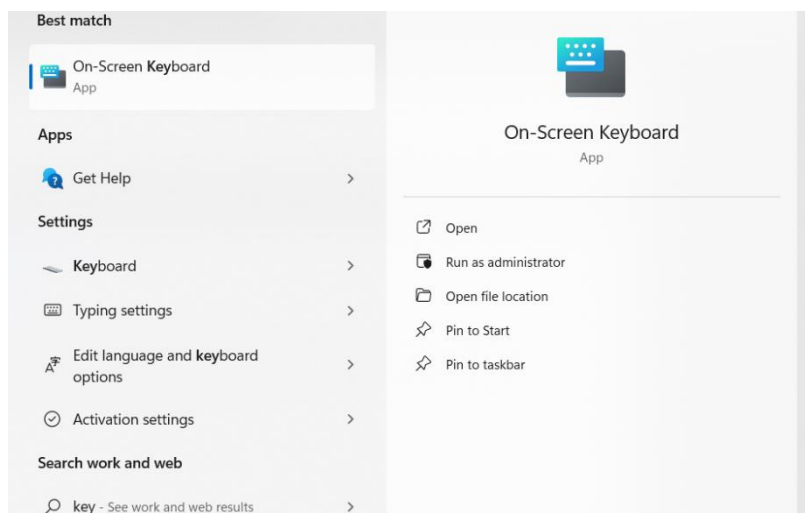
A virtual keyboard that appears on the computer screen.

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

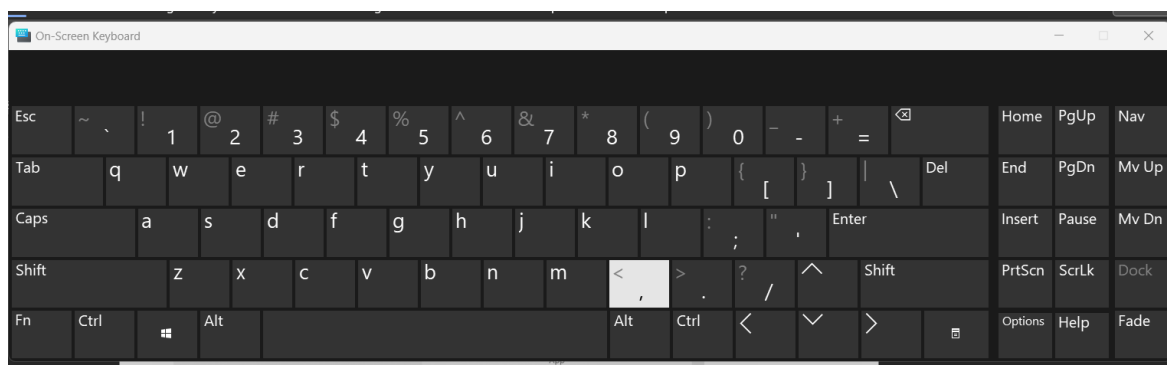
Features for Windows 11:

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

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



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



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

Windows Speech Recognition

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

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

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

i. A microphone

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

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

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

ii. The PC settings in order to understand their voice

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

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

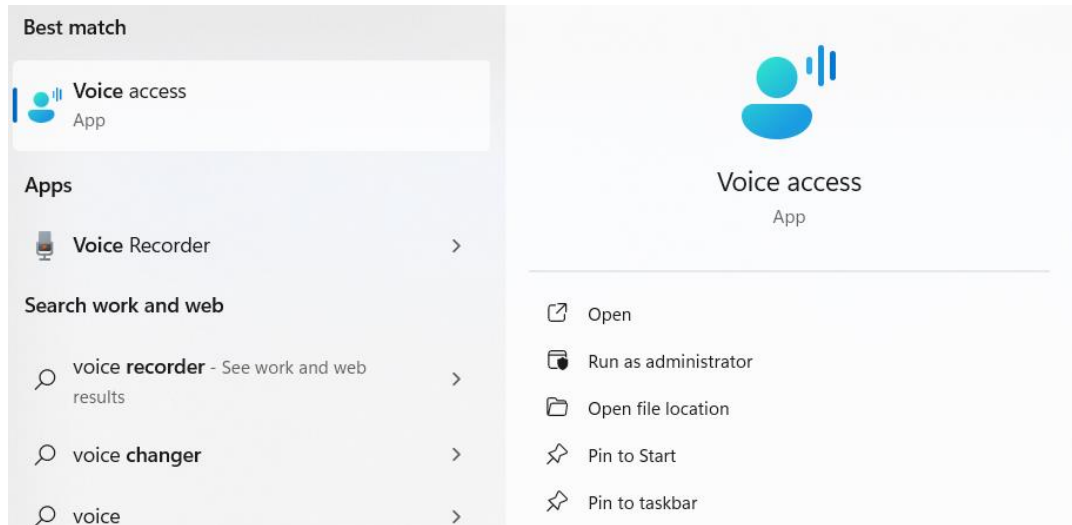
3rd step: After the setup is complete, you can choose to take a tutorial to learn more about speech recognition. To take the tutorial, select Start Tutorial in the wizard window. To skip the tutorial, select Skip Tutorial. You can now start using speech recognition.

General Commands

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

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

Voice Access



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

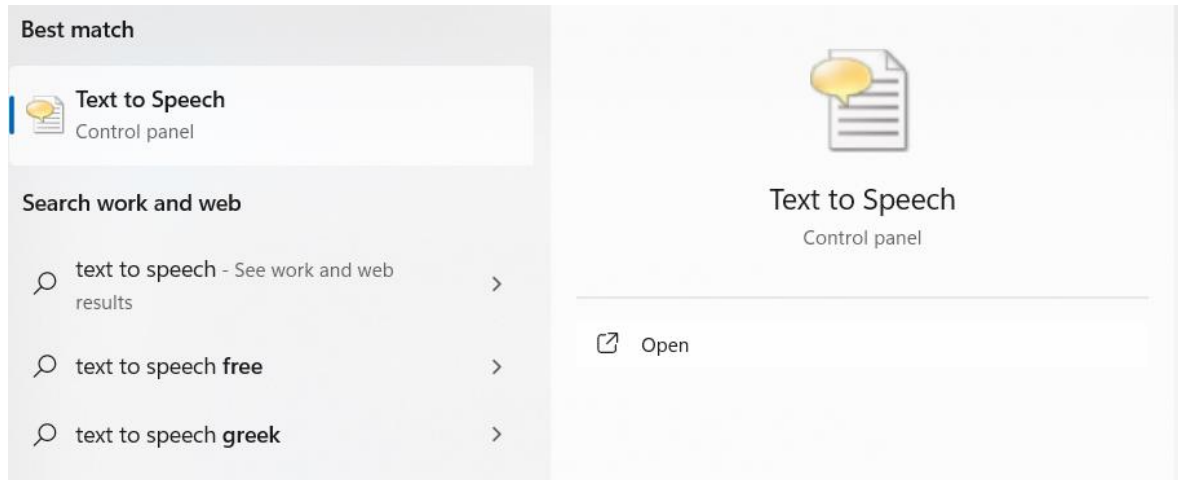
In Windows 11 the user can follow this path-procedure to activate Voice Access:

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

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

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

Text-to-Speech Software



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

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

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

- ReadLoud
- Free TTS
- Text 2 MP3
- TTSReader

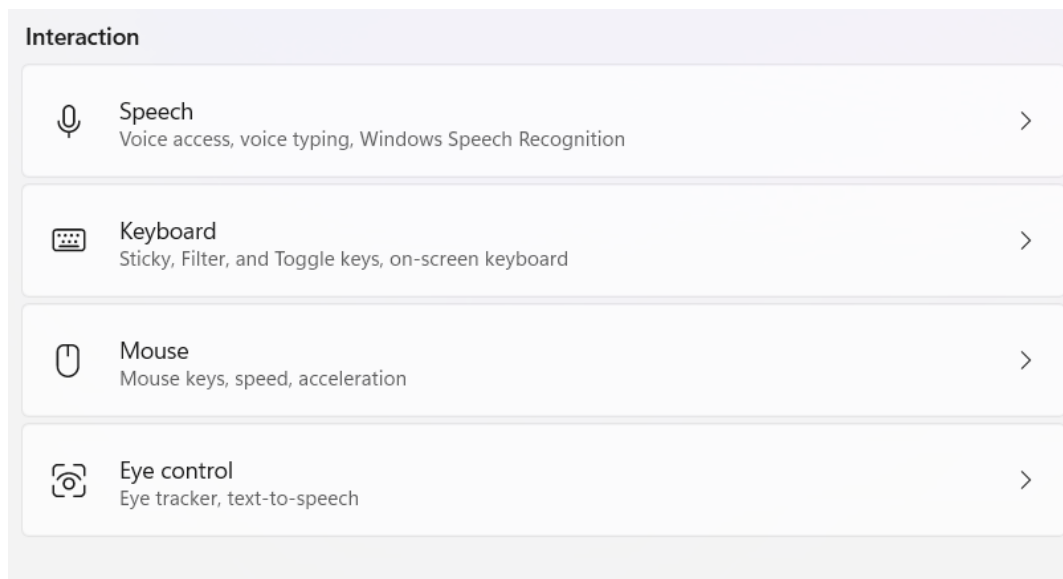
For ease of use, the user can make the following settings on their computer:

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

Accessibility Settings

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

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



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

Speech:

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

Mouse:

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

Keyboard:

- Sticky keys: When enabled, it allows the user to press modifier keys like Shift, Ctrl, or Alt one at a time, and Windows will treat them as if they were held down until the user press another key.
- Filter keys: When filter keys is activated, it filters out rapid or repeated key presses. Is designed to ignore brief or repeated keystrokes, which can help users who have mobility

issues and may accidentally press keys multiple times.

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

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

3.1.1.2 Exercises

Exercise 1:

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

2. To open the Ease of Access Center, press "Windows + U." (T/F)
3. The On-Screen Keyboard is a physical keyboard. (T/F)
4. The on-screen keyboard can be activated by pressing Win + Ctrl + O. (T/F)
- 5: Voice Access allows users to control their devices through touch commands. (T/F)

Exercise 2:

Fill in the Blank with the given words.

- 1.The On-Screen Keyboard is a _____ keyboard that appears on the computer screen.
- 2.To activate Voice Access in Windows 11, the user needs to type "Voice Access" in _____.
- 3.Text-to-Speech (TTS) software converts written text into _____.
- 4.Sticky keys allow the user to press modifier keys like Shift, Ctrl, or Alt _____.

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

Exercise 3:

Multiple Choice

1. What is the purpose of the On-Screen Keyboard?
 - A. To control the mouse
 - B. To browse the web
 - C. To type text and control the computer
2. How can the user activate Voice Access in Windows 11?
 - A. Press Windows + U
 - B. Type "Voice Access" in Windows Search

C. Press Win + Ctrl + O

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

A. Converts written text into spoken words

B. Creates text documents

C. Organizes files on the computer

3.1.2 File Management

3.1.2.1 Physical Accessibility

File Management with Speech Recognition

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

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

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

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

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

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

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

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

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

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

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

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

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

3.1.2.2 Exercises

Quiz 1

Choose if the sentence is True or False

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

Quiz 2

Choose the correct option

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

c) Say "Create new folder"

Quiz 3

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

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

Options:

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

Quiz 4

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

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

Match with:

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

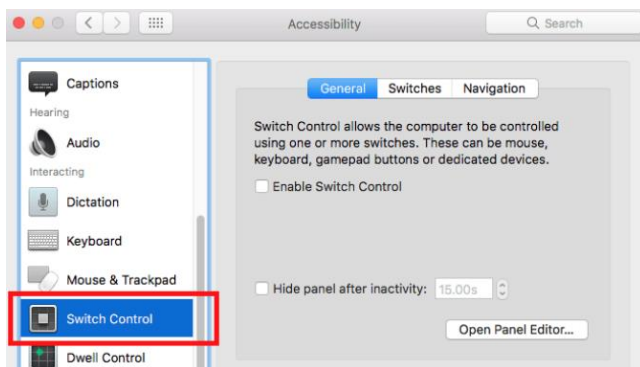
3.2 Mac OS

3.2.1 Built in features & Settings

3.2.1.1 Physical Accessibility

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

Switch Control



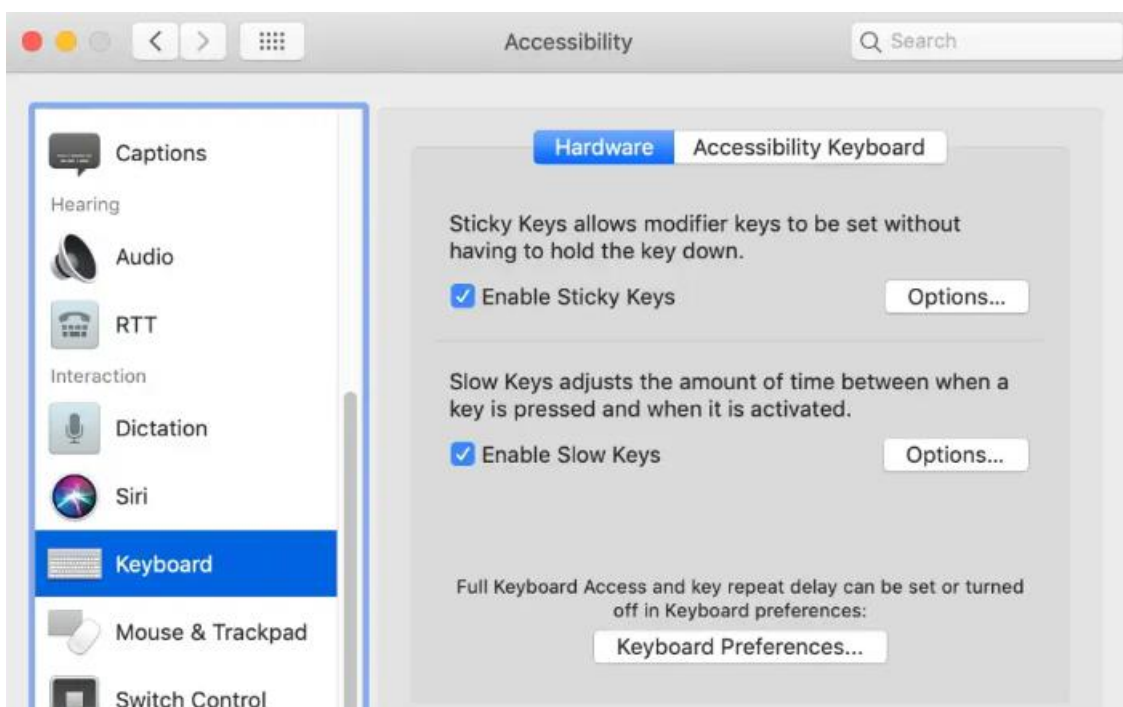
Switch Control is a powerful accessibility feature on Apple macOS that enables the users to interact with their Mac computers using external adaptive devices, such as switches, buttons, or a keyboard. This feature is designed to provide an alternative input method, allowing users to navigate the interface,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

Key Aspects:

Features	Description
Activation and Setup	Users can activate Switch Control in the Accessibility settings of their Mac. Once enabled, users can configure the feature to work with their specific adaptive devices.
Navigation and Interaction	The scanning cursor moves across the screen, highlighting different elements. Users activate their adaptive switch to select the highlighted item, initiate an action, or navigate through menus.

Features	Description
Custom Actions and Gestures	Users can assign custom actions or gestures to specific switches, providing a tailored and efficient way to interact with the computer. This customization enhances the user's ability to control their Mac effectively.
Full Keyboard Control	Switch Control allows users to emulate full keyboard control using their adaptive switches. This includes entering text, navigating through applications, and executing keyboard shortcuts.
Point Mode	Point Mode enables users to move a cursor freely around the screen, offering precise control for tasks such as drawing or graphic design.
Head Pointer	Switch Control supports the Head Pointer feature, allowing users to control the cursor using head movements. This is particularly beneficial for individuals who may not be able to use traditional input methods.
Menu Control	Users can access contextual menus and control various functions within applications using Switch Control. This feature enhances the overall usability of the Mac interface.

Sticky Keys and Slow Keys



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

Key Aspects for Sticky Keys:

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

Key Aspects for Slow Keys:

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

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

Dictation



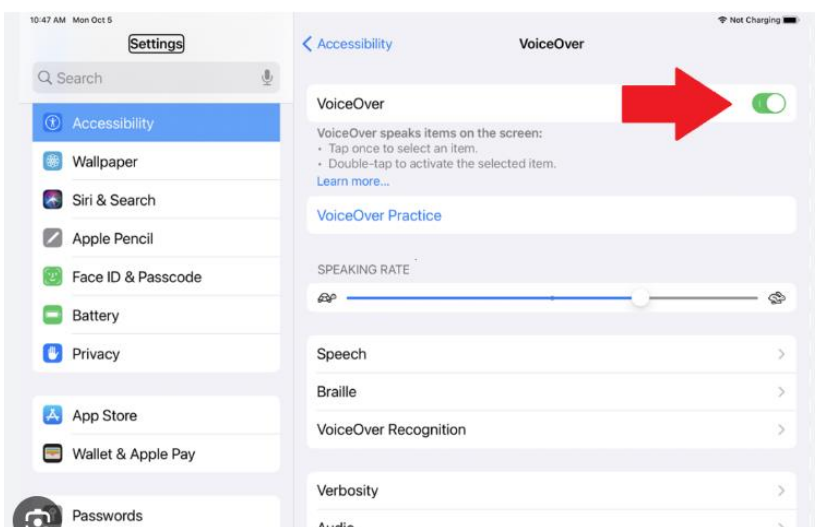
Dictation is a built-in feature on Apple Mac computers that enables users to input text by speaking rather than typing. This accessibility feature is designed to assist users who may have difficulty typing or prefer the convenience of speech input.

Key Aspects:

Features	Description
Activation	Users can activate Dictation on their Mac by going to System Preferences > Keyboard > Dictation. Once activated, users can use a customizable keyboard shortcut to start and stop Dictation.
Internet Connection	Dictation relies on an internet connection for processing speech-to-text. When a user speaks into the microphone, the audio is sent to Apple servers for transcription, and the resulting text is sent back to the user's device.

Features	Description
Languages and Dialects	Dictation supports a variety of languages and dialects. Users can choose their preferred language for speech input in the Dictation settings.
System Integration	Dictation is integrated into the macOS system, allowing users to use speech input in various applications, including text editors, word processors, email clients, and web browsers.
Editing and Corrections	Users can make corrections and edits using voice commands. For instance, users can say "delete that" to remove the last segment of dictated text or "select previous word" to highlight a specific portion for editing.
Privacy and Security	Similar to other Apple features, Dictation prioritizes user privacy. The audio recordings of dictated speech are anonymized and processed in a way that doesn't link them to the user's Apple ID. Users can also choose to disable the option for Apple to store their audio recordings
Continuous Learning	Dictation improves over time as it learns from the user's speech patterns and corrections. This continuous learning helps enhance the accuracy of transcriptions.

VoiceOver



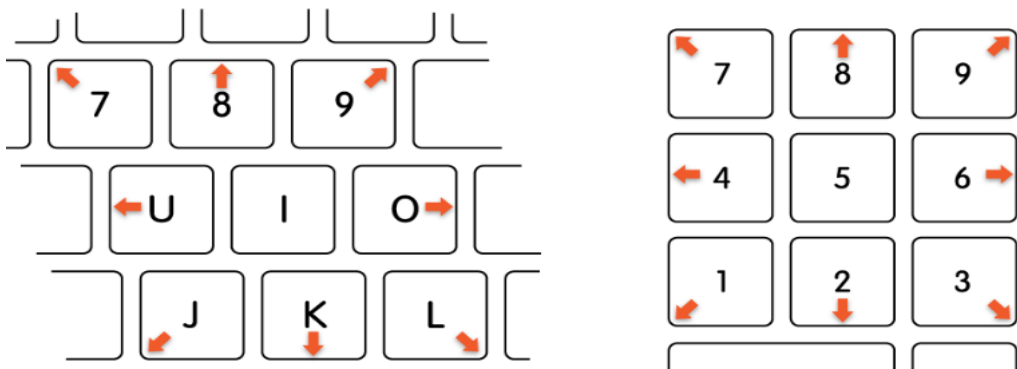
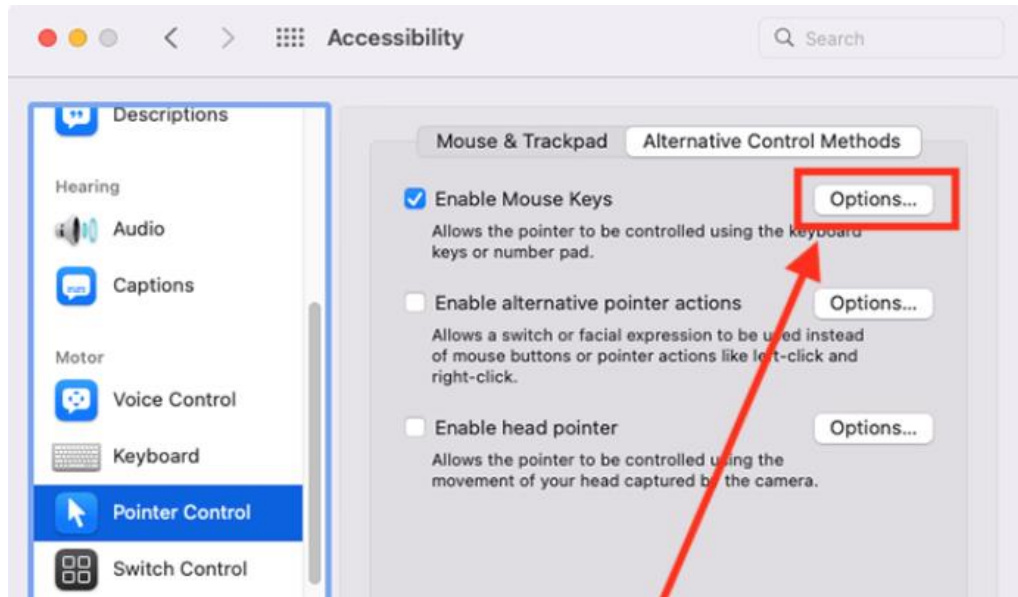
VoiceOver is a screen reader feature integrated into Apple's macOS operating system for Mac computers. It is designed to assist the user with visual or physical impairments by providing

spoken descriptions of on-screen elements and enabling the user to navigate and interact with their Mac using keyboard commands.

Key aspects of VoiceOver:

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

Pointer Control



The Pointer Control accessibility feature in Apple macOS offers users a diverse set of options to tailor and improve the functionality of the on-screen cursor. This feature is particularly valuable for users who may have specific preferences or require customized settings for their pointing devices, such as mice or trackpads. By navigating to the Trackpad and Mouse Preferences in the System Preferences menu, users can adjust settings like tracking speed and double-click speed, ensuring a personalized and comfortable pointing experience.

Key Aspects:

Features	Description
Mouse Options	Within the Accessibility preferences, users can fine-tune mouse settings, including tracking speed. This allows users to control the cursor's movement across the screen based on their preferences and comfort.

Features	Description
Scrolling and Zooming	Pointer Control includes settings for scrolling speed and zooming options. Users can personalize how quickly content scrolls or zooms in and out, providing a tailored experience for individual needs.
Cursor Size and Color	Customization options extend to the cursor itself, allowing users to adjust its size and color. This feature is particularly beneficial for users who may have visual challenges or difficulty locating a standard-sized cursor.
Shake to Locate	A unique and helpful feature, "Shake to Locate," enables users to shake the mouse or trackpad to temporarily enlarge the cursor. This aids users in quickly locating the cursor on the screen, enhancing visibility and ease of use.
Custom Clicking Options	Users can personalize clicking options to suit their preferences. For example, they can enable Tap to Click or adjust the dwell time for a click to be registered. This flexibility accommodates users with varying clicking capabilities.
Secondary Click	The feature allows users to configure the secondary click (right-click) behavior. Users can choose between different options, such as using two fingers, the bottom-right corner of the trackpad, or an external mouse.
Integration with Accessibility Keyboard	Pointer Control settings seamlessly integrate with the Accessibility Keyboard, offering alternative methods for pointing and clicking. This on-screen keyboard enhances accessibility for users with diverse needs.
Compatibility with Other Accessibility Features	Pointer Control can be used in conjunction with other accessibility features, such as Switch Control, VoiceOver, or Head Pointer. This ensures a comprehensive and adaptable solution for users with various accessibility requirements.

Accessibility Keyboard



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

Access the On-Screen Keyboard through Accessibility Settings

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

1. Select Apple Menu > System Preferences.
2. Navigate to Accessibility.
3. Choose Keyboard.
4. Select Accessibility Keyboard.

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

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

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

NOTE

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

Opening the On-Screen Keyboard from the Login Screen

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

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

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

6. Click Apply to implement the changes.

NOTE

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

Opening the On-Screen Keyboard Using Keyboard Shortcuts

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

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

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

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

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

Siri



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

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

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

Siri's Activation

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

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

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

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

- Choose Siri's speech mode: Access "Select" beside "Siri voice" for a preview, and then pick the desired voice from the options in "Variety of voices" and "Siri voice" (note that some languages may offer only one choice).
- Silence Siri: Navigate to "Siri Answers," and disable "Voice Feedback" to have Siri's response displayed in the Siri window without vocalization.

- Display Siri's spoken words on-screen: Opt for "Siri Replies," and activate the "Always show Siri captions" setting to view Siri's responses in text form.
- Display your spoken words on-screen: Click on "Siri Answers," and enable the "Always show speech text" option to have your spoken input presented as text on the screen.
- Utilize "Hey Siri" or "Siri": If supported for your device and language, activate "Listen for" or designate the specific phrase you wish to utter to initiate Siri. When this feature is enabled, and you also activate the "Allow Siri from locked screen" option, you can interact with Siri even when your Mac is locked or in sleep mode.

Siri's Deactivation

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

3.2.1.2 Exercises

Quiz 1

Choose if the sentence is True or False

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

Quiz 2

Choose the correct answer

1. How does Sticky Keys assist users with keyboard shortcuts?
 - a) Requires simultaneous key presses
 - b) Allows pressing one key at a time

- c) Disables keyboard shortcuts
- d) Only works with the Shift key

2. What is the purpose of Slow Keys?

- a) Speeds up key presses
- b) Prevents unintended key presses
- c) Disables key registration
- d) Enhances keyboard shortcuts

3. How can users activate Sticky Keys?

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

Quiz 3

Match the numbers with the letters.

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

Match them with the sentences:

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

Quiz 4

Choose the correct answer.

1. What customization options are available for the cursor in Pointer Control?

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

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

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

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

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

3.2.1.3 Resources

Examples of accessibility features and functions:

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

Official Apple channel:

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

3.2.2 File Management

3.2.2.1 Physical Impairments

File Management with Siri

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

Some steps to manage files on Mac using Siri:

Basic Commands

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

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

Find Specific Files

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

File Operations

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

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

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

File Information

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

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

Some examples of Siri commands for desktop-related tasks:

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

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

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

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

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

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

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

Accessibility Settings

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

File Management with general Keyboard Shortcuts

Desktop Shortcuts:

- Desktop Navigation

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

- Cycle Through Desktop Spaces

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

- Create a New Folder on Desktop

Shift + Command + N: Creates a new folder on the desktop.

- Rename Selected Item

Return: Select an item on the desktop, then press Return to enter rename mode.

- Move to Trash

Command + Delete: Sends the selected item to the Trash.

- Empty Trash

Shift + Command + Delete: Empties the Trash.

- View Options for Desktop

Control + Click on the desktop, then select "Show View Options" to customize how items are displayed on the desktop.

- Toggle Icon View Options

Command + J: Opens the View Options for the current desktop window in icon view.

- Select All Items on Desktop

Command + A: Selects all items on the desktop.

- Navigate Through Items

Use arrow keys to navigate through items on the desktop.

- Sort Items on Desktop:

Control + Command + 1 (Sort by name), Control + Command + 2 (Sort by date modified), Control + Command + 3 (Sort by kind), etc.

- Clean Up By

Control + Command + R: Automatically arranges icons on the desktop.

Other related-file shortcuts:

- Open Finder

Command + N: Opens a new Finder window.

Command + O: Opens the selected item.

- Navigate Through Folders

Command + Up Arrow: Moves to the parent folder.

Command + Down Arrow: Opens the selected folder.

- Copy, Cut, and Paste

Command + C: Copies the selected item.

Command + X: Cuts the selected item.

Command + V: Pastes the copied or cut item.

- Undo and Redo

Command + Z: Undoes the previous action.

Command + Shift + Z or Command + Y: Redoes the undone action.

- Delete and Move to Trash

Command + Delete: Moves the selected item to the Trash.

- Empty Trash

Command + Shift + Delete: Empties the Trash.

- Select All Files

Command + A: Selects all items in the active window.

- Deselect All Files

Command + Shift + A: Deselects all items.

- Minimize and Maximize Windows

Command + M: Minimizes the active window.

Command + Option + M: Minimizes all windows.

Command + F: Enters or exits full-screen mode.

- Close Window

Command + W: Closes the active window.

- Show/Hide Sidebar:

Command + Option + S: Toggles the visibility of the sidebar.

- Show/Hide Toolbar

Command + Option + T: Toggles the visibility of the toolbar.

Other Shortcuts

- Get Info

Command + I: Opens the Get Info window for the selected item.

- Search

Command + F: Initiates a search in the active window.

3.2.2.2 Exercises

Quiz 1

1. Select All Items on Desktop (Command + A):

True/False

2. Toggle Icon View Options (Command + J) opens the View Options for the current desktop window in list view:

True/False

3. Empty Trash (Command + Shift + Delete) permanently deletes items without any confirmation:

True/False

4. Deselect All Files (Command + Shift + A) removes the selection from all items in the active window:

True/False

Quiz 2

Select the correct answer.

1. Minimize and Maximize Windows (Command + M) is used for:

- a. Maximizing the active window.
- b. Minimizing the active window.
- c. Closing the active window.

2. Show/Hide Sidebar (Command + Option + S) is used for:

- a. Toggling the visibility of the sidebar.
- b. Opening a new Finder window.
- c. Creating a new folder.

3. Navigate Through Folders (Command + Down Arrow) does:

- a. Moves to the parent folder.
- b. Opens the selected folder.
- c. Deletes the selected item.

4. Search (Command + F) initiates a search in:

- a. The active window.
- b. The Trash.
- c. The desktop.

Quiz 3

Fill in the Blanks with the given words.

- 1. Create a new folder on the desktop: Command Siri to "_____"
- 2. Toggle Icon View Options: _____ + J opens the View Options for the current desktop window in icon view.
- 3. Select All Items on Desktop: Command + _____ selects all items on the desktop.
- 4. Navigate Through Folders: Command + _____ Arrow moves to the parent folder.

Options:

- a. Up
- b. A
- c. Command
- d. Create a new folder on the desktop

Quiz 4

Choose the correct sentence that accurately describes the action:

- 1. Toggle Icon View Options (Command + J):
 - a. Opens a new Finder window.
 - b. Toggles the visibility of the toolbar.
 - c. Opens the View Options for the current desktop window in icon view.
- 2. Empty Trash (Shift + Command + Delete):

- a. Moves the selected item to the Trash.
 - b. Permanently deletes items without any confirmation.
 - c. Undoes the previous action.
3. Create a New Folder on Desktop (Shift + Command + N):
- a. Creates a new folder on the desktop.
 - b. Opens the selected item.
 - c. Toggles the visibility of the sidebar.
4. Show/Hide Toolbar (Command + Option + T):
- a. Initiates a search in the active window.
 - b. Toggles the visibility of the toolbar.
 - c. Closes the active window.

3.2.2.3 Resources

Some helpful videos for guidance and learning about folder management functions on a Mac.

- Moving files with VoiceOver: <https://www.youtube.com/watch?v=2q84Tqcux0E>
- General File Management: <https://www.youtube.com/watch?v=hldUlvog6kI>
- A series of videos – Mac files and folders:
<https://www.youtube.com/watch?v=mYNchWitkyg&list=PL1bsBsPtN-9TY3YnJIY3haZ9v48i4i3Xy>

3.3 Linux OS

3.3.1 Built in features & Settings

3.3.1.1 Accessibility for Physical Impairments

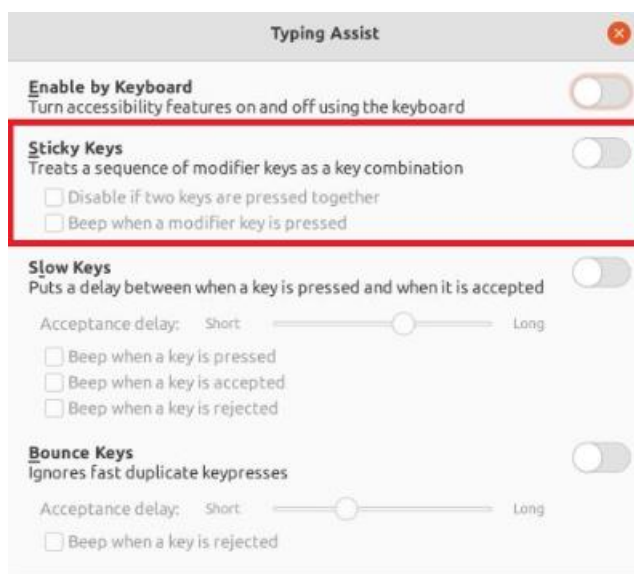
Linux operating systems provide a range of built-in accessibility features designed to enhance the computing experience for individuals with physical impairments. These features aim to make the Linux desktop environment more adaptable and user-friendly, catering to the diverse needs

of users facing challenges related to motor skills and physical dexterity. From customizable keyboard shortcuts to mouse alternatives and input device adjustments, Linux's accessibility features empower users to navigate and interact with their systems in ways that suit their unique requirements.

Adaptive Keyboard and Mouse Settings (AccessX)

- Activation of Sticky Keys

1. Settings > Accessibility > Typing
2. Adjust the Sticky Keys toggle

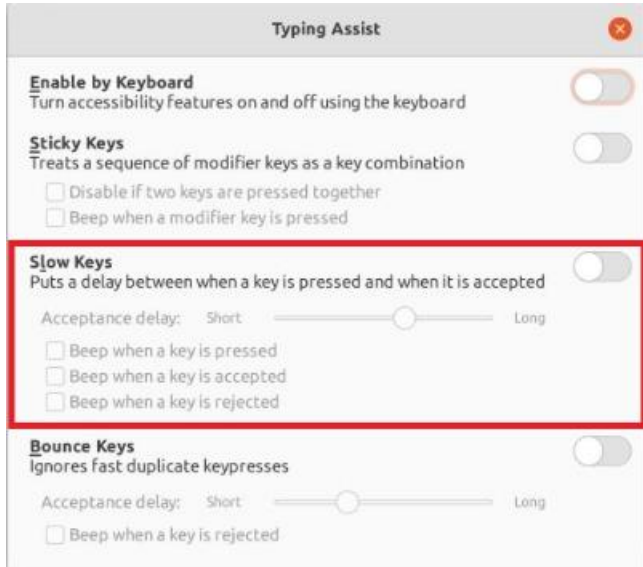


NOTE

Sticky Keys is crafted to facilitate single-handed activation of multi-key combinations, like CTRL + P (print) or Alt + Tab (switch windows). This functionality ensures that each system key (CTRL, ALT, Shift, or Windows) remains engaged until an alpha-numeric key is pressed, streamlining the process of executing complex keyboard commands for users with specific mobility needs.

- Slow Keys

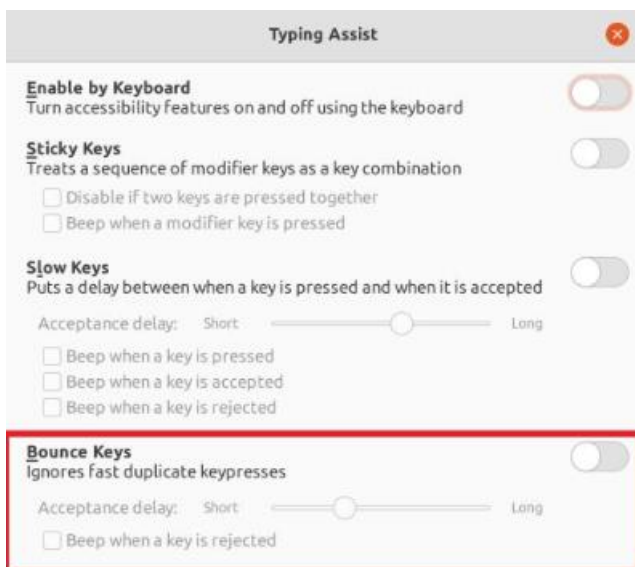
1. Settings > Accessibility > Typing
2. Adjust the Slow Keys toggle



NOTE

Slow Keys can be employed to disregard brief or repeated keystrokes by extending the time interval between key press and activation.

- Bounce Keys
1. Settings > Accessibility > Typing
 2. Adjust the Bounce Keys toggle

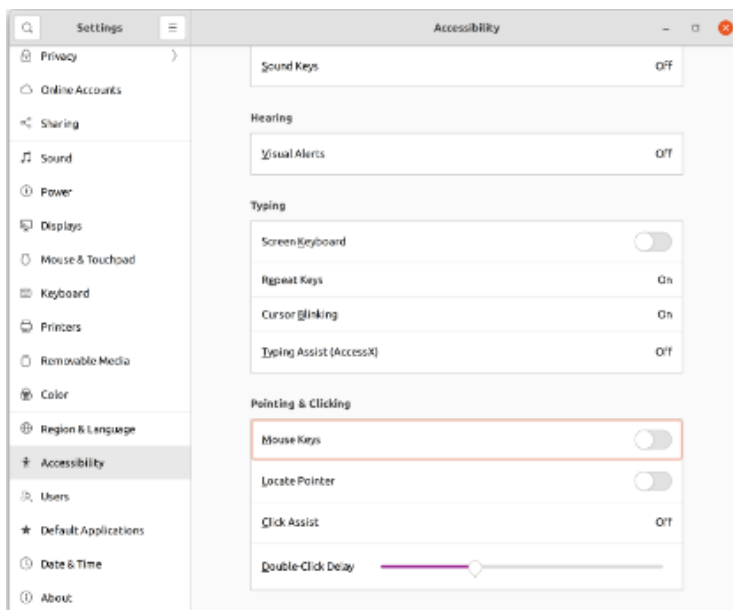


NOTE

Bounce Keys can be utilized to avoid unintended, repetitive keystrokes by extending the duration needed between accepting successive key presses.

- Mouse Keys

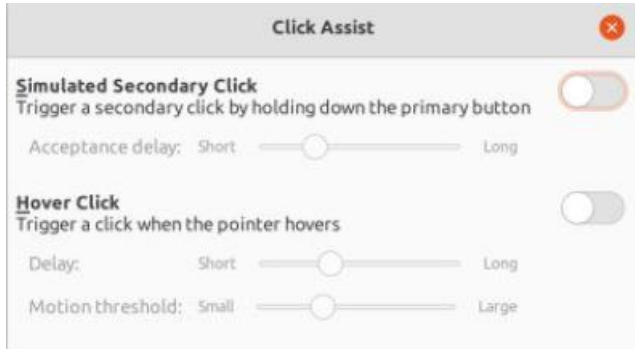
1. Settings > Accessibility > Pointing & Clicking
2. Adjust the Mouse Keys toggle


NOTE

Mouse Keys enables use of the keyboard to control the mouse pointer.

- Click Assist

1. Settings > Accessibility > Pointing & Clicking
2. Click Assist
3. Adjust the Hover Click toggle



NOTE

Click assist offers two features that simplify mouse usage for individuals facing challenges with the standard mouse buttons.

Simulated Secondary Click: This feature triggers a double-click action when the primary mouse button is held down for a predefined duration.

Hover Click: This functionality initiates a mouse click when the pointer remains stationary for a specified period.

3.3.1.2 Exercises

Quiz 1

1. Sticky Keys in Linux are designed to facilitate multi-key combinations by holding down each system key until an alpha-numeric key is pressed. (T/F)

Quiz 2

Select the correct option

1. Where can the user find the option to activate Sticky Keys in Linux?

- a) Settings > Display > Keyboard
- b) Settings > Accessibility > Pointing & Clicking
- c) Settings > Accessibility > Typing
- d) Applications Menu > System Tools

Quiz 3

Write the correct path and choose if the next sentence is True or False

1. Slow Keys in Linux can be adjusted by navigating to _____.
2. Bounce Keys in Linux are used to extend the duration needed between accepting successive key presses. (T/F)

Quiz 4

Choose the correct answer

Where can the user enable Mouse Keys in Linux for controlling the mouse pointer using the keyboard?

- a) Settings > Accessibility > Pointing & Clicking
- b) Applications Menu > Accessories > Mouse
- c) Settings > Display > Mouse & Touchpad
- d) Settings > Accessibility > Typing

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=Eg2fJFVixtg>
- 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

3.3.2.2 Resources

Available resources for more interest:

- Top 5 File Managers for Linux: <https://www.youtube.com/watch?v=9k5WGYzBv9U&t=215s>
- Nautilus: <https://www.youtube.com/watch?v=la2CaltxTEk>
- Servers with Gnome file manager: https://www.youtube.com/watch?v=Yek6tA_qomo
- Gnome version: https://www.youtube.com/watch?v=VRFZXx_Mmrl

4. Other Working Tools – Smart Devices

4.1 Accessibility features in Android Tablets

4.1.1 Physical Accessibility

Android systems prioritize accessibility for individuals with physical impairments by offering features that allow customization for easier device interaction. Switch Access, for example, enables users to control their devices using external switches or keyboards, providing an alternative input method. Moreover, gesture-based navigation and voice commands empower users with limited dexterity to navigate through menus, launch apps, and perform various tasks, ensuring an inclusive mobile experience.

Let's delve into the native features provided by the Android tablet.

- **Switch Access**

Switch Access allows the user to interact with their Android device using one or more switches instead of the touch screen. This feature can be beneficial for individuals with dexterity impairments that hinder direct interaction with the Android device.

The user can rely on Switch Access to scan the items on the screen, highlighting each item in sequence until a selection is made. To utilize Switch Access, the user will need one or more switches, and there are various types of switches available.

- External switch: A switch refers to a device that transmits a keystroke signal to the Android device. Various companies, including AbleNet, Enabling Devices, RJ Cooper, and Tecla, offer such devices. These switches establish a connection with the Android device either through USB or Bluetooth. (It's important to note that Google does not endorse these companies or their products.)

- External keyboard: You have the option to configure a standard USB or Bluetooth keyboard to function as a switch device by assigning one or more of its keys to specific actions.
- Utilization of buttons on the Android device: The built-in buttons on your Android device, such as the volume up and volume down buttons, can also be designated for specific actions. However, this option is primarily designed for developers. If you opt for this method, you can skip the initial two setup steps outlined in the following article.

These steps outline the process of setting up Switch Access for your Android device.

NOTE

If you intend to utilize the built-in buttons on your Android device as switches, you can skip both Step 1 and Step 2 below.

Step 1: Connect switches to your Android device

For users employing an external switch device or keyboard, the initial step is to establish a connection with your Android device.

- USB: Connect the switch or keyboard to your Android device using a compatible USB cable.
- Bluetooth: On your Android device, navigate to Settings > Bluetooth. Refer to the documentation for your switch or keyboard for more instructions, or learn about connecting to Bluetooth devices.

Step 2: Enable the on-screen keyboard

Upon connecting an external switch device or keyboard, Android automatically hides the on-screen keyboard. To input text with Switch Access, you must re-enable the keyboard.

To re-enable the on-screen keyboard

1) Open the Settings app on your Android device

2) Select Language & input. Follow the steps based on your Android version:

- Android 7.0 and later: Choose Physical keyboard > Show virtual keyboard
- Android 6.0 and earlier: Choose Current keyboard > Hardware (Show input method)

Step 3: Choose basic scanning settings

Select your basic scanning settings to align with your preferences and the number of switches you have. If you wish to experiment with a different setup later, you can always modify your settings.

- **Voice Access**

If interacting with a touch screen poses challenges, the Voice Access app offers the capability to command the users device using spoken instructions. User can employ their voice to initiate apps, move around, and edit text without the need for hands-on interaction. Voice Access is presently available in a restricted beta release and supports English exclusively.

User's Guidance

Step 1: Device Compatibility

NOTE

Voice Access is currently in a limited beta release in English only.

Before installing Voice Access, ensure your device meets the following criteria:

- Required: Android version 5.0 or later. Check your Android version in Settings > About phone or About tablet.
- Required: Google app. Download or update the Google app from Google Play to ensure you have the latest version.
- Recommended: Enable "Ok Google" detection from any screen. Learn how to activate "Ok Google."

- Recommended: Install Google Now Launcher from Google Play.

Step 2: Voice Access Installation

- 1) Download Voice Access from Google Play.

Step 3: Voice Access Activation

To enable Voice Access, follow these steps:

- 1) Open your device's Settings app
- 2) Navigate to Accessibility and tap Voice Access.
- 3) Toggle the On/Off switch at the top.
- 4) Access your notification shade.
- 5) Tap the Voice Access notification labeled "Touch to start."
- 6) Speak a command, such as "Open Gmail."

Upon the first activation of Voice Access, two additional steps guide you:

- A guide to "Ok Google" settings ensures an optimal hands-free experience.
- An interactive tutorial explains how Voice Access functions.

- **Google Assistant**

Enables users to accomplish numerous tasks through voice commands. These tasks encompass making phone calls, reading, composing and sending emails and text messages, controlling smart home appliances, opening applications, obtaining basic information like time, date, and weather, conducting Google searches, listening to the news, playing music, creating shopping lists, viewing and creating reminders, adding items to the calendar, setting alarms, performing mathematical calculations, reviewing photos, setting a kitchen timer, translating language, converting measurements and currencies, and more.

4.1.2 Exercises

1. Which of the following is an external switch device?

- a. Microphone
- b. Camera
- c. Keyboard
- d. USB

2. What do you need to connect an external switch device or keyboard to your Android device?

- a. Internet connection
- b. USB cable or Bluetooth
- c. Headphones
- d. Wireless mouse

3. Voice Access is available in which language during its limited beta release?

- a. English only
- b. Multiple languages
- c. Spanish only
- d. French only

4. To enable Voice Access, you need to download the app from which source?

- a. App Store
- b. Google Play
- c. Samsung Galaxy Store
- d. Amazon Appstore

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=Is8NM21Jxb4>
- Talkback: <https://www.youtube.com/watch?v=1yRVwhEv5I>
- Google assistant: <https://www.youtube.com/watch?v=hpAEVaA4ajc>

- All Accessibility features explained:

<https://www.youtube.com/watch?v=X47mjVa81pg>

4.2 Accessibility features on I-Pad

4.2.1 Physical Accessibility

The inclusive design of iPad's Switch Control and AssistiveTouch features significantly impacts individuals with physical disabilities across various job roles. From navigating applications to executing commands, these features empower users with limited dexterity to perform tasks efficiently. By incorporating these functionalities, Apple promotes an inclusive work environment that accommodates diverse physical needs.

Let's look at some of the features of this product that make it easy to use and work with:

Hands-free Navigation

- **Voice Control**

Ensure your iPad is connected to Wi-Fi before enabling Voice Control. After an initial download, Voice Control doesn't require an internet connection. Activate Voice Control in Settings > Accessibility > Voice Control. Complete the setup, and the Voice Control icon appears in the status bar once the download finishes.

Customize Voice Control preferences:

- **Language:** Set your language and download languages for offline use.
- **Customize Commands:** View existing commands and create new ones.
- **Vocabulary:** Teach Voice Control new words.
- **Show Confirmation:** Receive visual confirmation when a command is recognized.
- **Play Sound:** Hear an audible sound when Voice Control recognizes a command.
- **Show Hints:** View command suggestions and hints.
- **Overlay:** Display numbers, names, or a grid over screen elements.
- **Attention Aware:** On Face ID iPads, Voice Control activates when you look at the device and sleeps when you look away.

Siri

Set up Siri on your iPad by going to Settings > Siri & Search. Choose to activate Siri with your voice by selecting "Hey Siri" or "Siri" (if available), or use a button by enabling Press Home for Siri (on iPads with a Home button) or Press Top Button for Siri (on other iPad

models). To prevent unwanted responses, place your iPad face down or disable voice activation in Settings.

Activate Siri with your voice by saying "Siri" or "Hey Siri" followed by your question or request. For example, command Siri with tasks like setting alarms or checking the weather. Siri can also be activated with supported AirPods. To use a button, press and hold the Home button (on iPads with a Home button) or the top button (on other iPad models). Siri responds silently when iPad is muted, and you can also activate it with EarPods by pressing and holding the center or call button.

- **Shortcuts**

Generate shortcuts for various actions such as getting directions to your upcoming Calendar event or transferring text between apps. You can select pre-built shortcuts from the Gallery or craft personalized ones that integrate multiple steps across different apps.

- **Call audio routing**

iPad allows you to set up automatic call answering after a specified duration.

Navigate to Settings > Accessibility > Touch > Call Audio Routing to choose your preferred audio destination.

For automatic call answering, enable Auto-Answer Calls, and then adjust the answering time duration using the Decrement or Increment buttons.

Let iPad type for you

- **Dictation**

Dictation on iPad offers the convenience of converting spoken words into text wherever you can input text. You can seamlessly switch between speaking, typing, or handwriting using either the keyboard or the tools palette, allowing for efficient text entry and editing. For instance, you can select and replace text using touch or a Pencil.

Dictation processes requests on your device, supporting multiple languages without requiring an internet connection. However, when dictating in a search field, your text might be sent to the search provider for processing.

To enable Dictation, navigate to Settings > General > Keyboard, and switch on Enable Dictation. Keep in mind that Dictation availability, features, and language support may vary across regions. Additionally, data charges may apply when using Dictation.

- **Predictive text**

Leveraging predictive text, you can effortlessly compose entire sentences with just a few taps. While using the iPad keyboard, suggestions for words, emoji, and information that you might type next are displayed as you input text.

For instance, in Messages, when you begin typing expressions such as "I'm at" followed by a space, your current location is presented as an option. Similarly, typing "My number is" followed by a space suggests your phone number as an option. Additionally, inline predictions are visible, assisting in completing the word or phrase you are currently typing.

- **Scribble**

If your iPad supports it, you can grab an Apple Pencil (sold separately) and use Scribble to write instead of using the keyboard. This is handy for replying to messages or jotting down quick reminders without even opening the onscreen keyboard. Scribble magically turns your handwriting into text right on your iPad, keeping what you write private.

Connect other inputs

- **Switch Control**

Switch Control is a helpful tool for people who might have difficulty moving a lot. With Switch Control, you can use an external button, move your head, or even make a sound to control your iPad. By using one or more switches, you can move a cursor on the iPad screen and choose different actions, like tapping, zooming in or out, and more, from a menu. It makes using the iPad easier for those with limited mobility.

- **Keyboards**

- If you have difficulty seeing the onscreen keyboard, you can set it to display only uppercase letters.

Go to Settings > Accessibility > Keyboards, then turn off Show Lowercase Keys.

- If you have difficulty using the touchscreen, you can use an external keyboard to control your iPad using shortcuts.

Go to Settings > Accessibility > Keyboards, tap Full Keyboard Access, then turn on Full Keyboard Access.

- **Bluetooth accessories**

Using a Bluetooth connection, you can use third-party devices such as wireless keyboards, headphones, speakers, car kits, game controllers, and more with iPad.

- 1) Follow the instructions that came with the device to put it in discovery mode.
- 2) On iPad, go to Settings > Bluetooth, turn on Bluetooth, then tap the name of the device.

Other important features are the following:

- **Head tracking**
- **Eye-tracking device**
- **iPad keyboards**

For more information the user can check the manufacturers/brand site and guidance.

4.2.2 Exercises

Quiz 1

Select if the sentence is True or False.

1. Voice Control requires a continuous internet connection for operation. (T/F)
2. Siri can only be activated by voice, and there is no option to use a button. (T/F)
3. Predictive text suggestions are only available in specific apps like Notes and Mail. (T/F)

Quiz 2

Choose the correct answer

1. How can you activate Siri with supported AirPods?
a) Say "Hey Siri"

- b) Press and hold the Home button
- c) Tap the Siri icon on the screen

2. What input device is required for using Scribble?

- a) Apple Pencil
- b) External keyboard
- c) Mouse

3. What is Switch Control primarily designed for?

- a) Improved touch gestures
- b) People with limited mobility
- c) Voice recognition

Quiz 3

Fill in the Blank

- 1. To choose your preferred audio destination, navigate to Settings > Accessibility > Touch > Call Audio _____.
- 2. Dictation processes requests on your device without requiring an _____ connection.
- 3. To control your iPad using shortcuts with an external keyboard, go to Settings > Accessibility > Keyboards, and turn on _____ Keyboard Access.

Quiz 4

Match each feature or aspect with its corresponding description:

Features/Aspects:

1. Switch Control
2. Bluetooth Accessories
3. Scribble

Descriptions:

- a. Control iPad using external buttons, head movement, or sound for people with limited mobility.
- b. Enables the use of third-party devices like wireless keyboards, headphones, and game controllers.
- c. Allows handwriting input using an Apple Pencil, turning it into text on the iPad.

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

Answers: A, A, B

Quiz 2

1.B

2.B

Quiz 3

A. False

B. False

2.2.3 Exercises

Quiz 1

1.A

2.B

Quiz 2

1. False

2. False

Quiz 3

1. B

2. C

3. A

Quiz 4

1. B

2. C

3. C

2.3.4 Exercises

Quiz 1

1. False

2. False

3. True

4. False

Quiz 2

1. C

2. B

Quiz 3

1. C
2. B

Quiz 4

1. A
2. C

3.1.1.2 Exercises

Exercise 1:

1. True
2. True
3. False
4. True
- 5: False

Exercise 2:

Fill in the Blank with the given words.

1. a. virtual
2. c. Windows Search
3. b. spoken words
4. a. one at a time

Exercise 3:

1. C

2. B

3. A

3.1.2.2 Exercises

Quiz 1

1. True

2. False

3. True

Quiz 2

1. c

2. a

Quiz 3

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

Quiz 4

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

3.2.1.2 Exercises

Quiz 1

1. True

2. False

3. True

Quiz 2

1. b

2. b

3. a

Quiz 3

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

Quiz 4

1. c

2. c

3. c

3.2.2.2 Exercises

Quiz 1

1. True

2. False

3. True

4. True

Quiz 2

1. b

2. a

3. b

4. a

Quiz 3

1. d. Create a new folder on the desktop.

2. c. Command

3. b. A

4. a. Up

Quiz 4

1. c

2. b

3. a

4. b

3.3.1.2 Exercises

Quiz 1

1. True

Quiz 2

1. c

Quiz 3

1. Settings > Accessibility > Typing,

2. True

Quiz 4

Where can the user enable Mouse Keys in Linux for controlling the mouse pointer using the keyboard?

Answers: a)

3.3.2.1 Exercises

Exercise 1:

Answer: b) GNOME

Exercise 2:

Answer: b) A desktop environment

4.1.2 Exercises

1. c. Keyboard
2. b. USB cable or Bluetooth
3. a. English only
4. b. Google Play

4.2.2 Exercises

Quiz 1

1. False
2. False
3. False

Quiz 2

1. a) Say "Hey Siri"
2. a) Apple Pencil
3. b) People with limited mobility

Quiz 3

1. Answer: Routing
2. Answer: Internet
3. Answer: Full

Quiz 4

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