Computer Basics: Hardware & Windows

Table of Contents

One of the problems with technology is that there are lots of terms that don't make a lot of sense, some terms that are interchangeable, and others that *sound* like they should be the same things but aren't.

This handout hopes to make things a little more clear.

Hardware vs Software

> Those parts of the system that you can hit with a hammer are called hardware; those program instructions that you can only curse at are called software.
>
> -- *Levitating Trains and Kamikaze Genes Technological Literacy for the 1990's*

PC Desktop

That's a succinct yet accurate description.

The hardware is the bit you can physically touch: a desktop tower, a laptop, a tablet, a phone. It's the part that you want to smash (not recommended) when it behaves badly.

Software is a little more complicated. You have the Operating System (OS) and you have programs or applications (apps) that run on top of the operating system. We'll look first at the hardware.

Computer / Device Hardware

Devices (hardware) using the Apple OS are almost always manufactured by Apple and have a specific look and design that is the same across all devices. These are iPhones and iPads, iMacs and MacBooks. These run Apple's operating systems: macOS and iOS.

iMac

Devices (hardware) using the Windows OS can be made by any number of hardware manufacturers: Dell, HP, Acer, IBM, Toshiba, and Lenovo are some popular PC (Personal Computer) hardware manufacturers.

PCs are ***not*** going to look identical and models will have different aesthetics and purposes. (Business laptop vs gaming laptop vs lightweight laptop.) Devices that run the Windows OS can usually run other operating systems, such as Linux or ChromeOS.

PC Laptop

If you know a kid in school in WV, they likely have a Chromebook, or laptop running the ChromeOS.

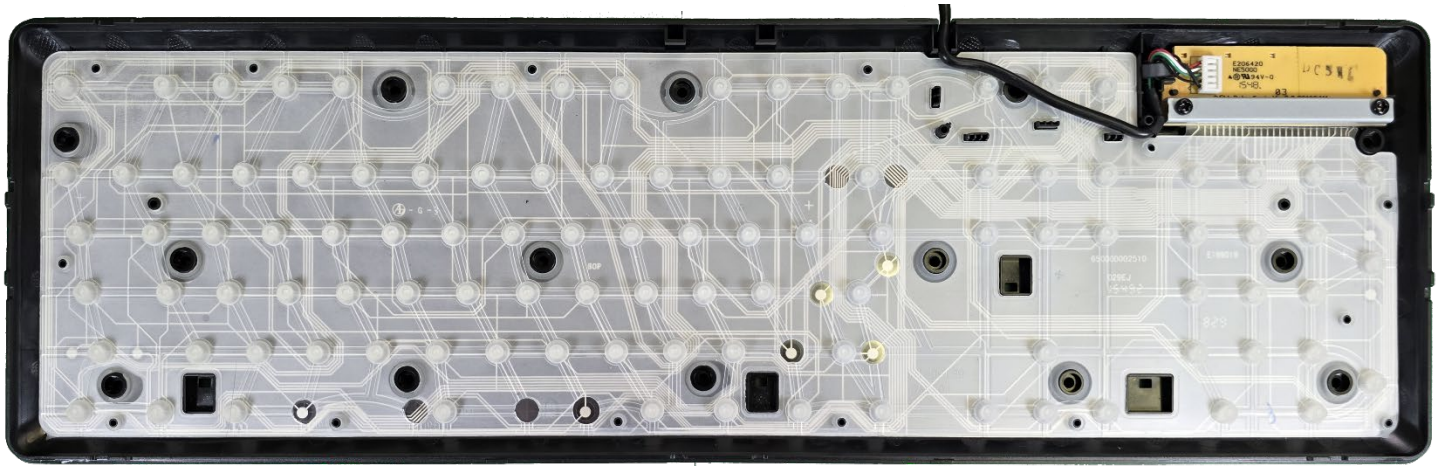
Input/Output (I/O)

I/O refers to the communications between a computer and connected peripherals, such as keyboards (input) and monitors (output).

Keyboard

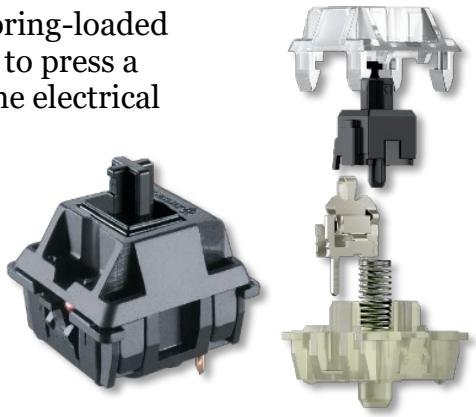
Keyboards were the first input devices for personal computers and were used to enter code to run programs. Eventually a Graphic User Interface (GUI) was invented that allowed users to interact with visual elements rather than typing in commands.

Most keyboards are one of two types: mechanical or membrane.



Membrane keyboards use two sheets of rubber material printed with electrical circuits, and small cavities between the sheets. When you press a key, two lines touch, completing an electrical circuit.

A mechanical keyboard uses a spring-loaded mechanism (Cherry MX Switch) to press a physical switch that completes the electrical circuit.



The QWERTY keyboard used by most English speakers was developed in 1878 for the typewriter. Its nonsensical layout was in part to overcome the limitations of the devices of the time. (ie, to keep the typebars from getting stuck together.)

Another theory is the layout is in part due to wanting to make demonstrations easier for salesmen, so all the letters for TYPEWRITER were placed in the first row.

One alternative to the QWERTY keyboard is the Dvorak keyboard, which is arranged for the comfort and ease of the typist—and can even be used one handed by some.

In addition to entering data, the keyboard lets you command the operating system and programs.

Use the **Tab** key and the **arrow** keys to move around the screen.

The **Windows** key, located near the Alt and Ctrl keys, provides access to a variety of Windows commands.

For example, to shut down a windows computer without a mouse, tap the **Windows** key on your keyboard, then use the **arrow keys** to move through the menu until you reach the **Shut Down** command, then press the **Enter** key on your keyboard.

If your laptop keyboard stops working, you can plug a wired keyboard into a USB port.

Mouse

The computer mouse appeared on the scene in 1968.

The first personal computer to use a mouse was the Xerox Alto in 1973.

It is the mouse that allowed things like hyperlinking, the use of multiple windows, and all the other elements of modern computing.

Hawley, who manufactured mice for Xerox, stated that "Practically, I have the market all to myself right now"; a Hawley mouse cost $415.

Using a Mouse

left click	single	select item
	double	open item
right click		context menu
scroll wheel		move up and down the screen without using scroll bars

To change the mouse options, open **Settings.** In the search box type “mouse” and then select **Mouse settings**.

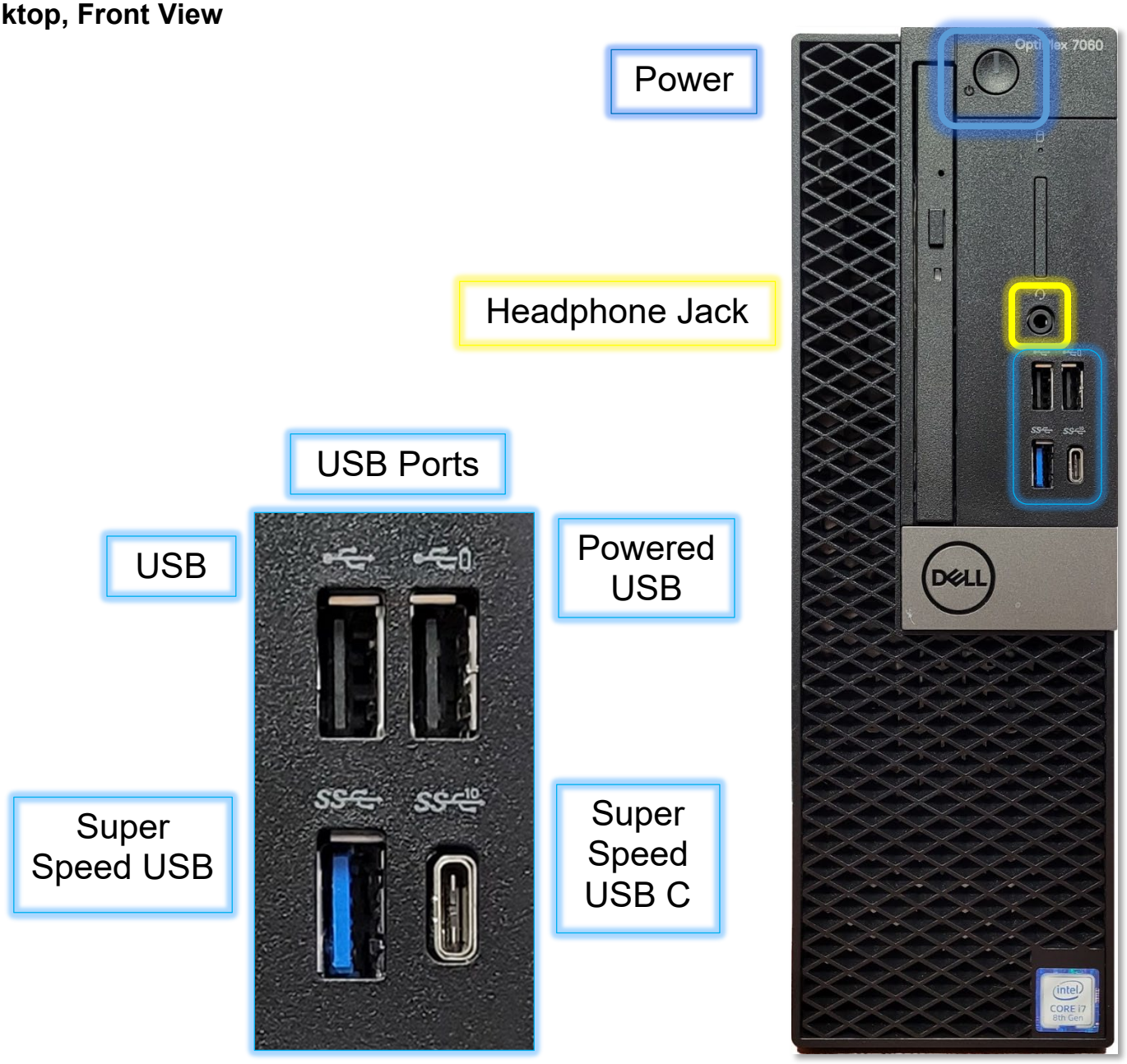
Mouse pointer allows you to change the size and color of the pointer.

If your mouse fails, you can still control your computer using only the keyboard. (See page 53)

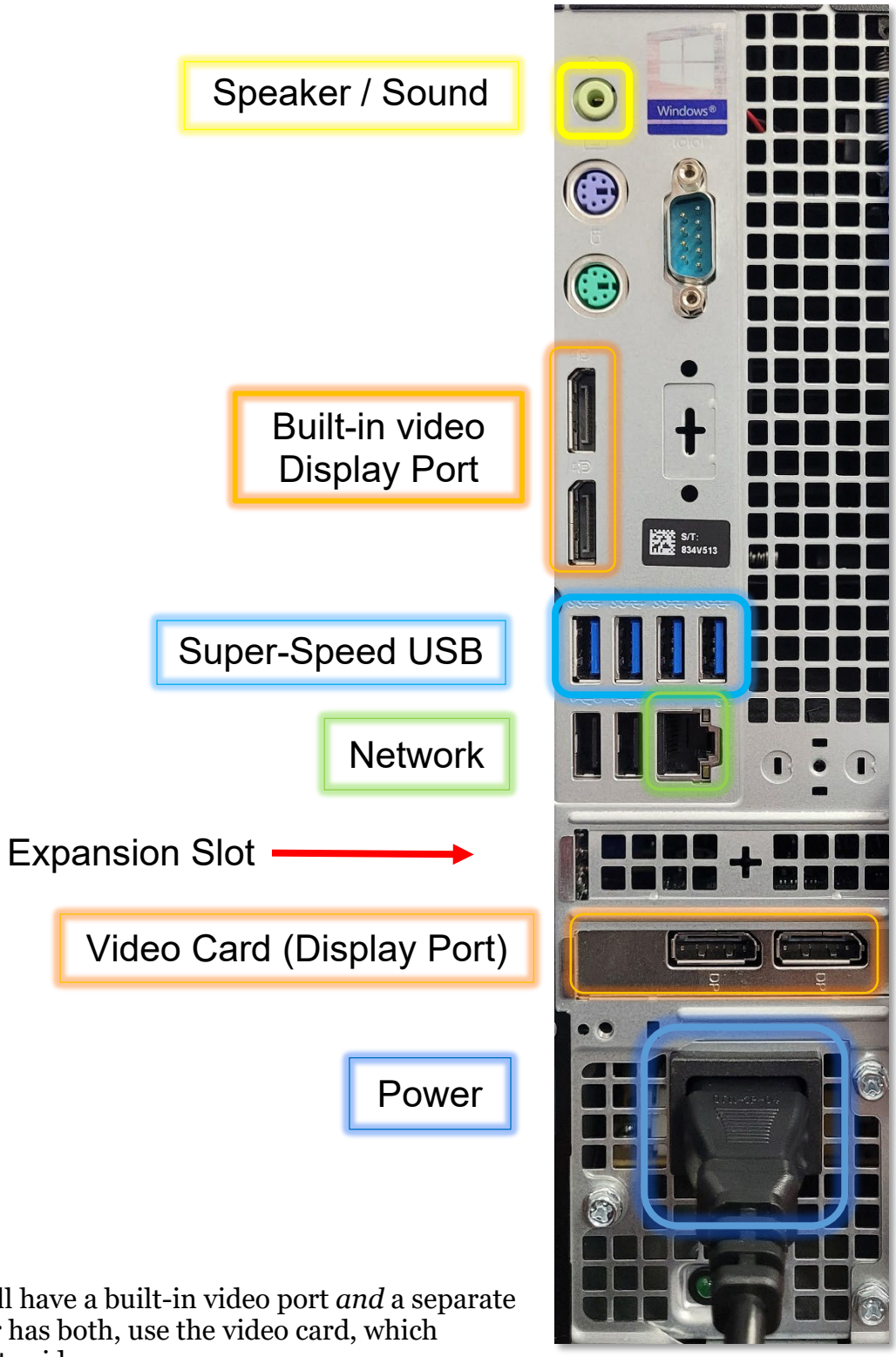
Anatomy of a PC Desktop Computer

Every computer is different, but the majority will have features similar to those below.

Desktop, Front View



Desktop, Rear View



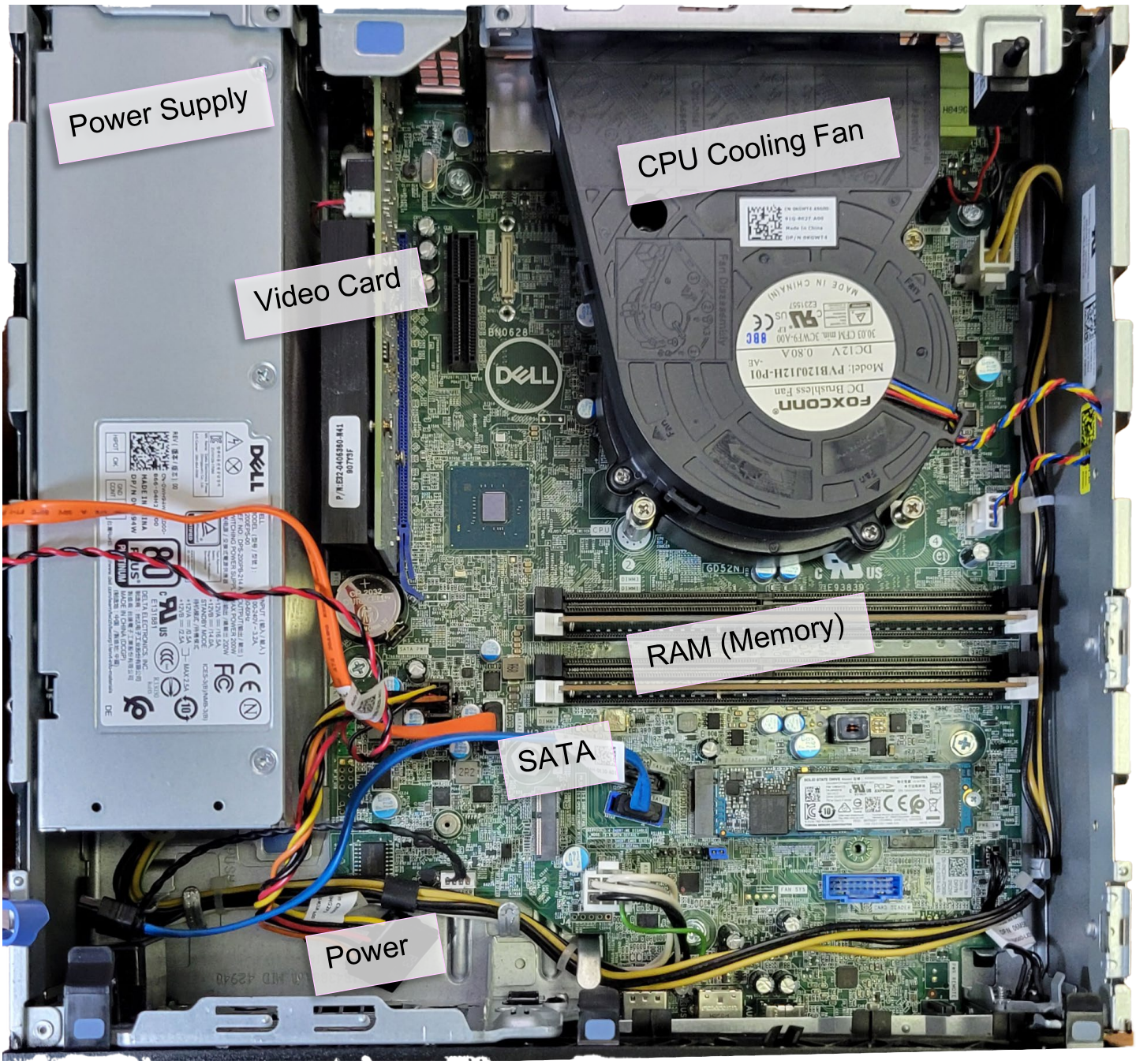
Some desktop computers will have a built-in video port *and* a separate video card. If your computer has both, use the video card, which should give you higher quality video.

A video card goes in an *expansion slot*, which is a place to add new devices to the motherboard. Not all motherboards have expansion slots, even if a case looks like it has space.

Desktop, What's Inside

Opening the case of a computer and looking inside can be intimidating. But it's not only helpful to know what some of the main bits are—such as the parts that can be easily replaced on a desktop computer—it also makes it a little less scary.

Anyone can replace the components of a desktop computer (assuming you have the proper screwdrivers). The important thing to know is that before you do anything, UNPLUG the computer.



If you are going to attempt to replace a part on your computer, take pictures of the process as you go, so you know where things came from, what they were plugged into, and what things should look like when you're done.

And double check to make sure the device is unplugged.

Some Terms

Circuit boards are metal lines printed on a surface that allow electrical connections to be made between components.

Bus (also data highway or databus) is a communication system that transfers data between components inside a computer or between computers.

Motherboard

A motherboard is a printed circuit board that holds the different parts and allows communication between those parts. It generally holds the Central Processing Unit, Random Access Memory, onboard audio and video, maybe some expansion cards, and other parts integral to the working of the computer.

Central Processing Unit (CPU)

The CPU (Central Processing Unit) is often described as the brain of the computer. It gives instructions and processes data.

There are some parts that a computer can function without; the motherboard and CPU are not those parts.

Some Important Terms

Computer don't use feet, meters, gallons, or kilograms to designate size. They use bits and bytes, and size is given in units from kilobytes (KB) to terabytes (TB).

Bit

A bit is a unit of data represented as a 0 or a 1. Bits are typically used to define data in motion: how much data you can transfer in one second.

1	or	0

Byte

A byte is eight bits, given as zeros and ones. Bytes are used to define storage units of data.

0	1	0	0	1	1	0	1

Kilobyte

A kilobyte is 1024 bytes, or 1000 letters or characters.

The text to the right is 1000 characters (including spaces).

Watoga State Park sits atop a former African American separatist community. Development began in 1933, when several CCC camps were established: Camp Watoga, Camp Seebert, an African American CCC Camp, and Camp Will Rogers. The 1st projects included roads, cabins, the restaurant building, the superintendent's residence, and the dam. The arboretum was established in 1938 with 6 ½ miles of trails. The last CCC project, the swimming pool, was completed in 1940. Watoga State Park opened July 1, 1937. In the 1920s and 1930s the area that is now Babcock State Park was impacted by timbering, coal mining, forest fires and drought. Babcock Coal and Coke Company donated 2000 acres of land to establish Camp Beaver and Camp Lee to create Babcock and Hawk's Nest State Parks. Each had about 200 men, an infirmary, kitchen, barracks & heavy equipment. Workers built the stone administration building, the Glade Creek dam, log cabins, picnic areas, and recreational facilities, as well as roads and trails.

Bits & Bytes

A…	Equals	…which is…
Bit		One binary number (0 or 1)
Byte	Eight bits	The letter M in binary (01001101)
KB (Kilobyte)	1024 Bytes	6 ¼ text messages (1000 letters or characters)
MB (Megabyte)	1024 KB	6 of Shakespeare's plays (Romeo and Juliet, Hamlet, King Richard III, Macbeth, Othello, Cymbeline)
GB (Gigabyte)	1024 MB	One hour of HD video
TB (Terabyte)	1024 GB	250,000 cell phone photos

Bytes	Characters	Pages	Book Approximation
242 KB	247808	152.5 - 198.2	*The Great Gatsby* by F. Scott Fitzgerald
360 KB	368640	226.9 - 294.9	*The Color Purple* by Alice Walker
1024 KB	1048576	645.3 - 838.9	*Anna Karenina* by Leo Tolstoy
3.75 MB	3932160	2419.8 - 3145.7	Sue Grafton's Kinsey Millhone series, books A through L
5 MB	5242880	3226.4 - 4194.3	Sue Grafton's Kinsey Millhone series, books A through O
10 MB	10485760	6452.8 - 8388.6	Sue Grafton's **complete** Kinsey Millhone series
20 MB	20971520	12905.6 - 16777.2	Sue Grafton's complete Kinsey Millhone series **PLUS** Patrick O'Brian's Aubrey/Maturin series **PLUS** Ian Fleming's James Bond series.
1 TB	1099511628000		The contents of the WVU Wise Library, twice

Floppy disks for early computers could hold from 160 KB to 1.44 MB.

1.0 MB floppy disk.

Inside of a floppy disk.

Hard Drives

Hard drives are where your data is stored. When you write a letter or edit a picture, those files are stored on your hard drive. (Caveat: they can also be stored on external media, but the default is to save files "locally" or on the hard drive.)

Hard Disk Drive (HDD)

A Hard Disk Drive (HDD) is a mechanical, magnetic device used for long term storage. HDDs were the standard computer storage for years.

A hard disk drive has one or more spinning platters, and heads that jump to a designated spot to read or write the data on the spinning disk. The data is all the information stored on the computer, from the operating system to software programs to personal files.

On an HDD, read and write speed (how quickly it takes your computer to open or save files) are dependent upon how quickly the platters can spin and the heads can move.

The problem with HDDs is that if they are jostled, it can disturb the spinning magnets, causing the HDD to stop working briefly—or permanently (such as if you dropped a laptop while it was writing files). Additionally, HDDs are slower because it takes time for the discs to start spinning and the heads to move.

HDDs and older SSDs most frequently use a SATA (Serial Advanced Technology Attachment) connection which has a cable that attaches the drive to the motherboard.

- In 1956, the IMB 305 had 3.75 MB of storage at a size of 5′ x 2.4′ x 5.6′, weighed over a ton, and a cost of $3200 ***per month*** rental.
- In 1980, the Seagate ST-506 had 5MB of storage, was 5.25 inches, weighed 5 pounds, and cost $1,500.
- In 1983, a 10 MB 3.5″ Rodime hard drive cost $320.
- Today you can buy a 20 TB HDD for just over $200.

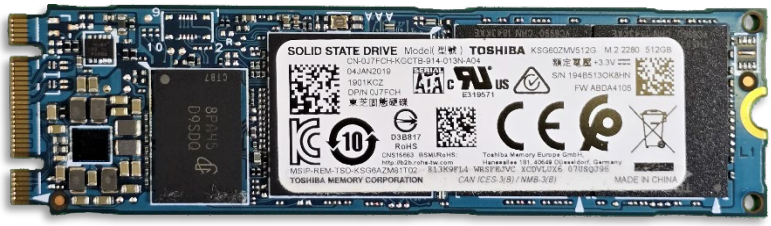
Solid State Disk Drive (SSD)

Solid state drives (SSDs) eventually replaced most HDDs. The Solid State Disk Drive (SSD) use a circuit board with integrated circuits and volatile memory to store data. SSDs are faster and more stable, because they have no moving parts. This makes them faster, more reliable, and more energy efficient.

- In 1991 a 20 MB SSD sold for $1000.
- Today, you can buy a 2TB SSD for a little over $159

Peripheral Component Interconnect Express (PCIe)

A PCIe M2 (Peripheral Component Interconnect Express) SSD also uses integrated circuits and volatile memory, but is mounted directly to the motherboard instead of using cables, which is one of the elements that make it faster.



- The first PCIe SSD was introduced in 2003 and cost $8000.
- Today you can purchase a 1 TB PCIe SSD for under $100.

Random Access Memory (RAM)

Random Access Memory, or RAM deals with data that is *actively* being used. The amount and speed of RAM in your computer is related to how quickly it will do tasks.

In 1965, IBM introduced a 16-bit chip.
In 1969, Intel premiered a 64-bit chip.

Today, a cheap computer likely has 4GB of RAM. A gaming computer will have 16 to 32 GB of RAM.

Power

Most desktop computers and monitors (and many other devices) will use a standard power cord. This means that when you replace your computer you can use the existing power cord and don't have to crawl around to replace it.

One end of the power cord will be the normal three prong plug you put in your wall outlet, the other will usually have three rectangular slots that go into the back of your computer. This is the connection to the power supply inside your computer.

Power Supply Unit (PSU)

The power supply is what takes your household power and distributes it to the bits that need power. The connectors are made so that you have to try *really hard* to put them in wrong.

True story: the first time I went to replace a power supply for a computer, I carefully put everything in place, triple checked everything, plugged it in and… nothing. I took it back apart, rechecked, put it back together, still nothing.

Turns out the new power supply we'd received was broken.

Network Interface Card/Controller (NIC)

A network card (NIC) is a piece of hardware that allows the computer to talk to other devices. It transmits data to and from your computer to the wider network. This function was previously done by modems, which required use of a phone line.

Without a NIC you can't surf the internet.

You can have a wired or wireless NIC. A wired NIC uses a cable to carry signal from your modem to your computer. A wireless NIC means you have one less cable to trip over. Today, most NICs are built into the motherboard—and many laptops don't even have network ports.

Network Cable

A network cable is used to connect your computer to your modem and looks like an extra-wide phone cable.

For information on Internet and network speeds, see the handout for The Internet.

Sound

Most desktops have a sound jack—a round port that can take a 3.5mm headphone plug. Many new headphones and speakers are Bluetooth or USB-C instead of 3.5mm, so you may not never your sound jack. (Many new phones do not have a 3.5mm jack.)

If your computer has multiple jacks, one is likely for input (microphone) the other for output (headphone, speakers).

Your computer can have sound built into the motherboard or use a separate sound card.

The icons for sound can be confusing, so you may want to check a manual if labels like the one to the right don't mean anything to you, however, your basic audio inputs are usually blue and green.

Sound Card

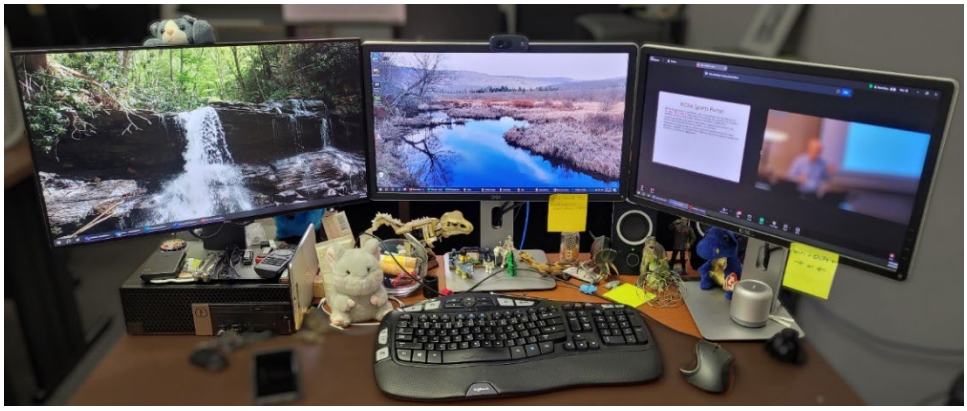
Most computers have a small sound card built into the motherboard, However, if you want to do audio processing—especially of music—you may want a separate sound card.

Video Cards vs GPU

Most motherboards come with an integrated video card or Graphics Processing Unit (GPU). This processes digital images and accelerates computer graphics.

A separate GPU card can speed up how quickly a computer can process graphics for video games or video images as those cards often have their own CPU (Central Processing Unit).

A graphics card is also used when you want to use multiple monitors with your computer.



Monitor

The monitor is what displays the User Interface (UI). A monitor can be a separate piece of equipment or a permanent part of the device. Most modern TVs can be used as external monitors.

Laptops and phones have built-in monitors. Desktop computers (and laptops with a docking stations) use external monitors to display information. You can even display some mobile device content on external monitors.

The advantage of desktop computers is that if the monitor dies, you can continue to use the device with a different monitor. If a laptop or phone display goes bad, the device has lost its core use. However, if the screen on your laptop dies, you can hook up an external monitor to continue to access your data.
The easiest way to deal with a monitor is to lay it face down on a table; if you can rotate the pedestal—even better! This will give you a clear(er) view of the ports available and what kind of video cable you will need to attach the monitor to your computer.

This monitor can use HDMI and DisplayPort cables and has spots for USB and audio. (See page 15)

If you are dealing with a wall-mounted TV, use your phone camera to check out the hidden ports.

USB

USB stands for Universal Serial Bus. USB was implemented to eliminate proprietary cables. (remember when every cell phone had a unique charger cable?) Because USB has evolved and improved over time, and because there are so many different types of devices that use USB cables, you will need to check your ports and your cables to see what matches.

There are approximately a zillion types of USB cables, so it helps to know what you are looking at when you try to determine what a cable does; there are charts with pictures at the back of this handout to help with that (See page 16).

Flash Drive (Thumb Drive)

Thumb drives (AKA flash drives AKA pen drives) came on the scene around 2000, and quickly replaced floppy disks as a way to transfer information between devices. Unlike Hard Disk Drives (HDDs) which used spinning disks to write and read information, thumb drives use flash memory and a small circuit board to store data.

The first thumb drives were USB-A, but now there are plenty of UCB-C thumb drives, which can hold up to a terabyte of data.

Anatomy of a Laptop

A laptop is a computer with all components needed to use it built into the body. Laptops are generally light-weight and easily moved from one location to another.

You can plug a keyboard, mouse, and monitor up to a laptop, to make it easier for use for longer periods of time, and if your laptop is your primary computer, you can even get a docking station, which allows you to access all the peripherals from a single thunderbolt or USB-C port.

Laptop, Side Views

Keyboard

Laptops have a keyboard built in. If your laptop keyboard stops working, you can plug a wired keyboard into a USB port.

Trackpad / Touchpad

The touchpad is the laptop's mouse and allows you to move your cursor around the screen. Drag your finger around the trackpad to move the cursor, the lower buttons are your left and right mouse buttons. If your touchpad stops working, you can plug a wired mouse into a USB port.

Some Trackpad commands:

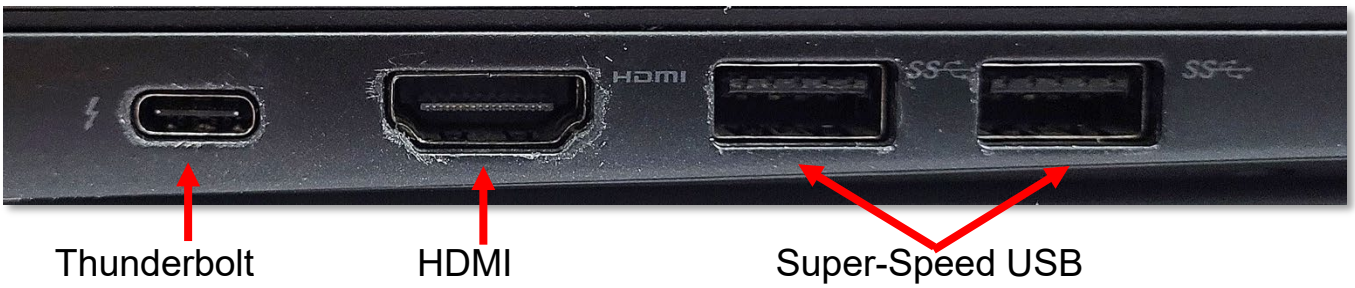
Select an item	Tap on the touchpad
Scroll	Place two fingers on the touchpad & slide horizontally or vertically
Zoom in or out	Place two fingers on the touchpad & pinch in or stretch out

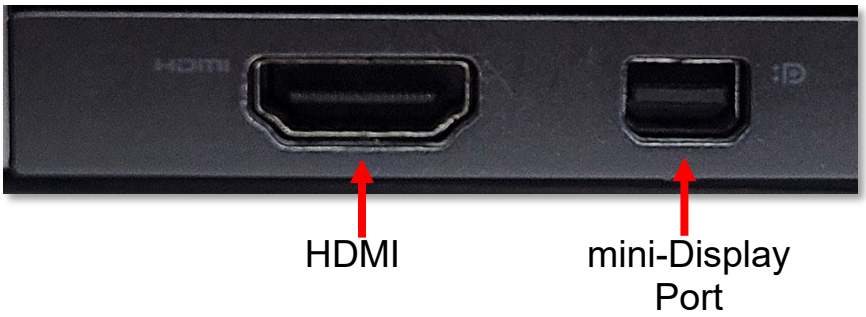
Camera

Some laptop cameras have a slide to cover the camera lens. If your video doesn't appear when using programs like Zoom, check to see if your camera has a cover.

Laptop Ports

Although you may need a magnifying glass and a cryptography manual, many laptop ports are labeled. Others you have to tell by shape. I have [a chart to help you match ports and cables](#).



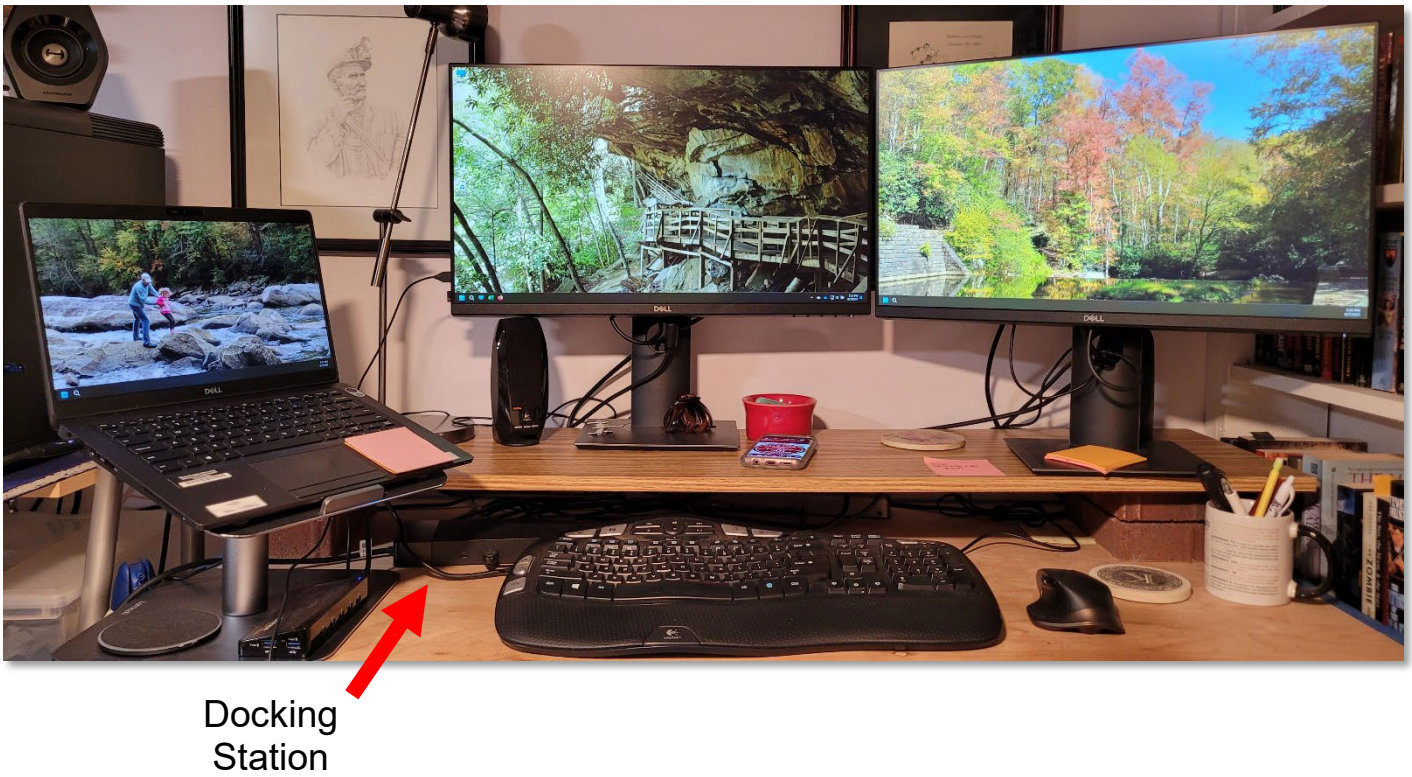


Docking Station

Because laptops have so few ports, docking stations are used to expand their inputs. Many hybrid workers will have a docking station at home and a docking station at work, which allows them to carry just their laptop back and forth, without having to lug around and set up all their peripherals.

Most docking stations use Thunderbolt cables to connect to the Thunderbolt port on a laptop.

Here is my docking station setup, with keyboard, mouse, monitors, speakers, and USB hub. My husband uses the same setup up when he works from home and *also* on game nights with his personal computer. All we do is switch out the laptop—mouse, keyboard, monitors all remain the same.



Software

Software, as noted at the start, is the bits of the computer you can't touch, but can only curse at.

You will generally deal with two types of software: Operating Systems (OS) and programs installed within that operating system called Apps (Applications) or Programs or software.

Operating Systems

For end users (that's you) there are two primary flavors of Operating System for laptops and desktops: Apple OS and Windows OS. (There are other flavors, like Linux or ChromeOS, but these are the two you are most likely to have.)

The Apple Operating System is strictly controlled by Apple. The computer will update the operating system until the hardware can no longer support it.

Windows OS is licensed separately from the hardware. The Windows OS on your device is likely to be one of the following: Windows 10 (no longer supported) or Windows 11 (the current OS).

Once you have your hardware and operating system, you can install software, which is how you write a novel, listen to music, surf the internet, or send an email message.

ChromeOS was built to run on the internet, and although parts of it can run without the internet; Google says the "optimal" experience is with internet access.

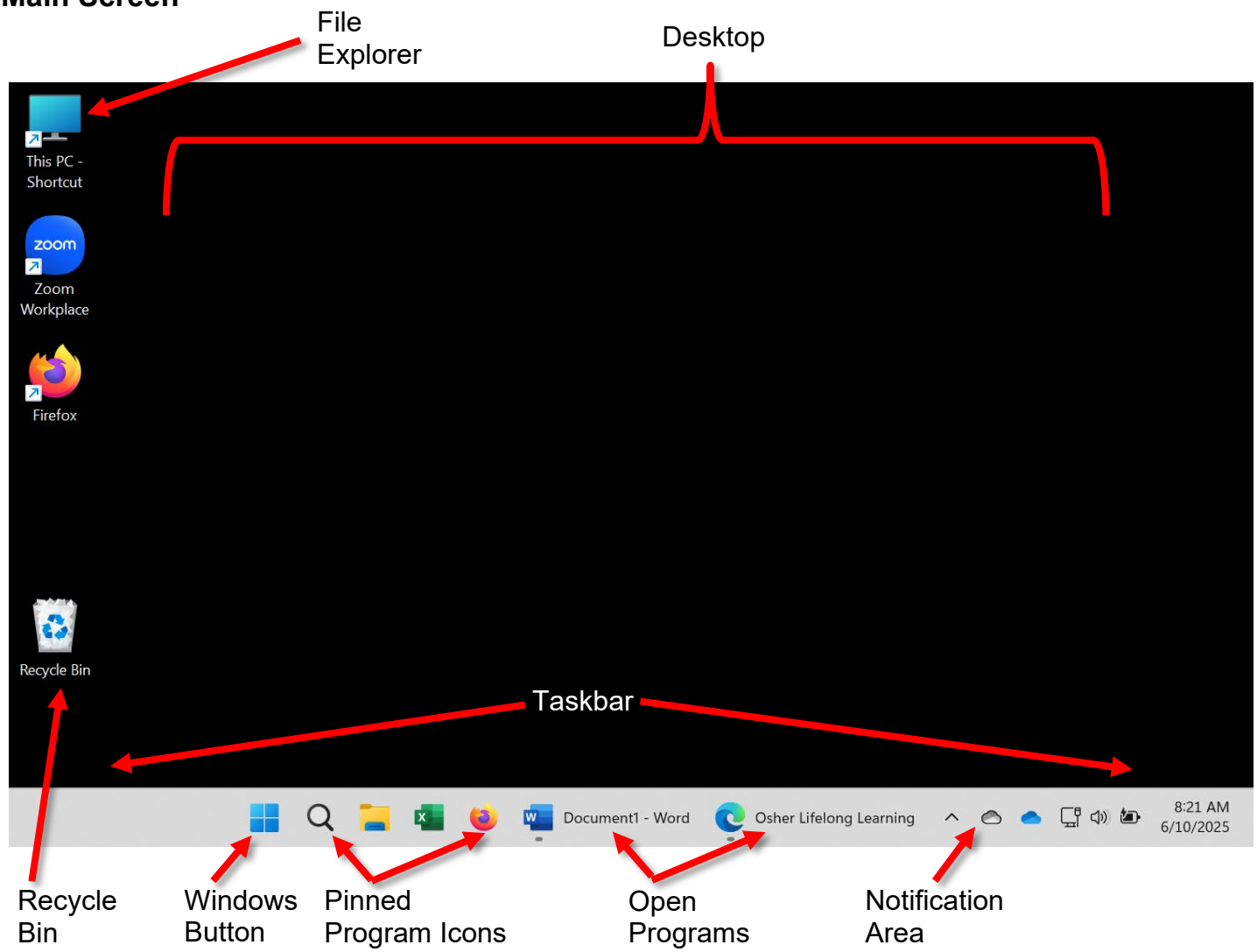
Unless you ***never*** put your computer on the internet, you need to keep your operating system and software programs up-to-date.

Why?

Because your computer is likely to contain all kinds of personal information, and black-hat hackers want that data to make money. An out-of-date computer is just what these malefactors want, as they can more easily break into it.

Windows Operating System

Main Screen

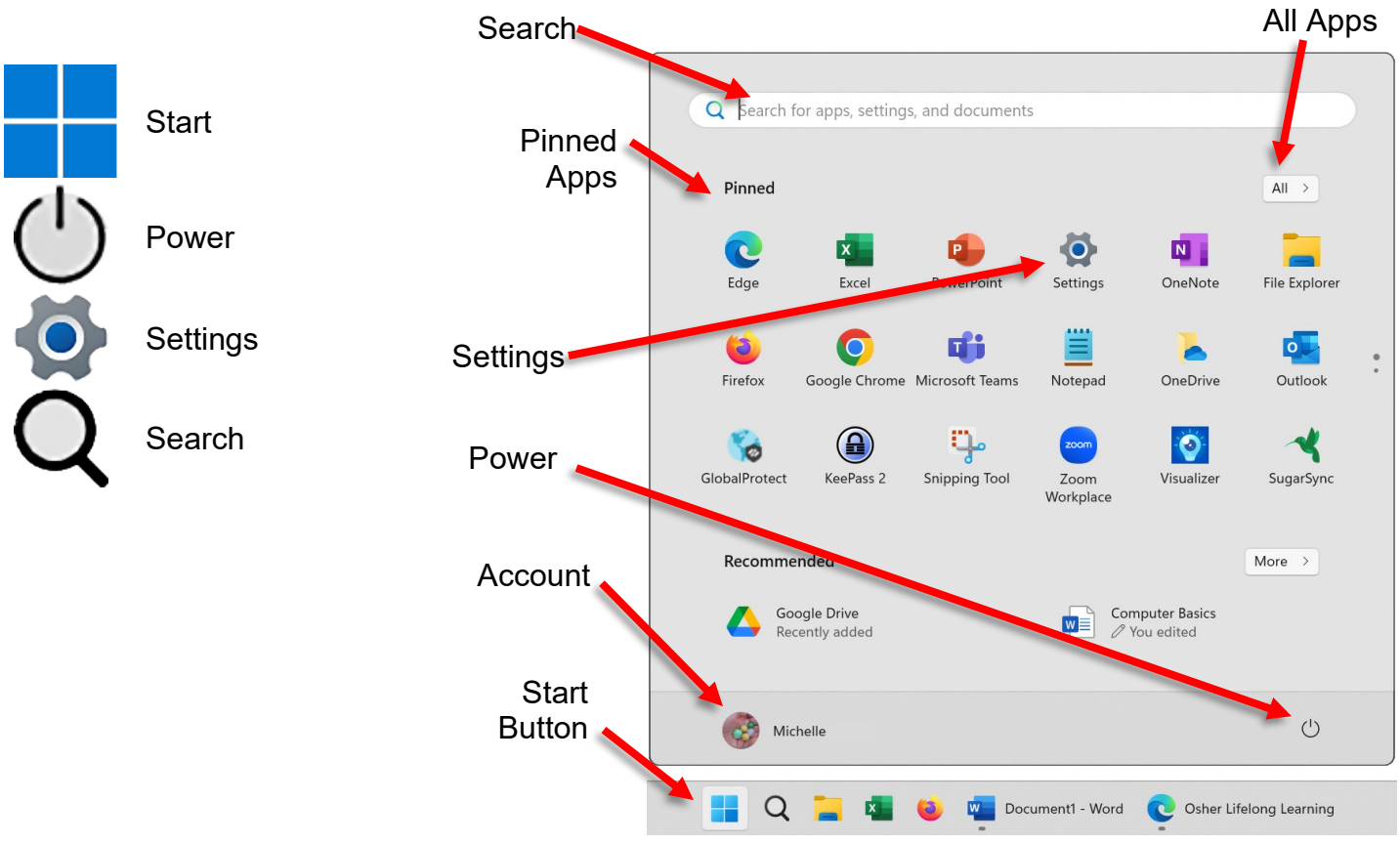


As with all things, it is useful to know the names of the different parts of the operating system, since that lets you search for help more effectively. You don't need to know the specific names for things, but using those names makes it easier to use help documents or search for more information.

In other words, "the thingy at the bottom" is not going to provide useful answers, but "the windows taskbar" may.

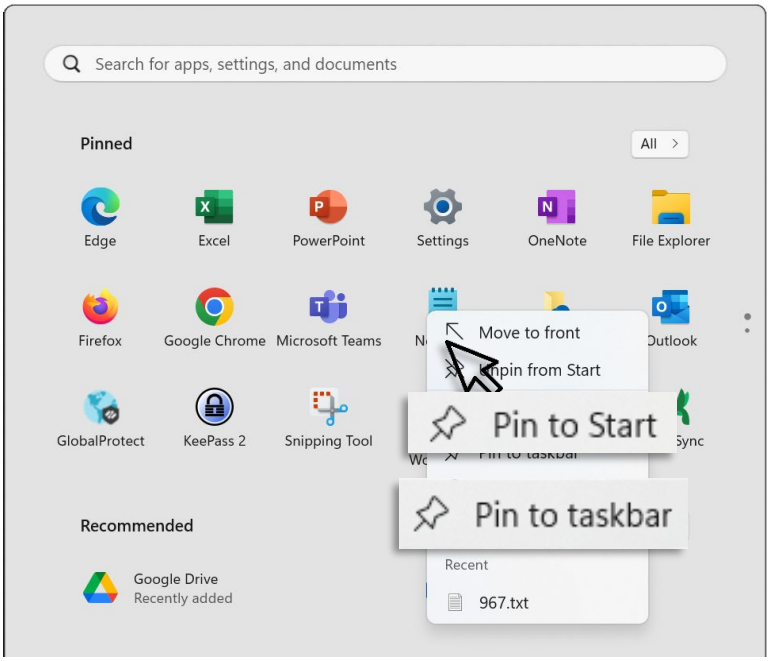
Start Menu

The Start Menu can be accessed in two ways: You can click on the **Start** or **Windows** icon on the taskbar, using your mouse, or you can tap the **Windows key** on your keyboard.



Pin a Program to the Start Menu

1. Open the Start Menu.
2. Scroll through the list of programs.
3. **Right click** on the desired program.
4. From the menu select **Pin to Start** (or Pin to taskbar).



Pin a Program to the Taskbar

1. Open the program.
2. On the taskbar, **right click** on the program icon.
3. From the menu select **Pin to taskbar**.

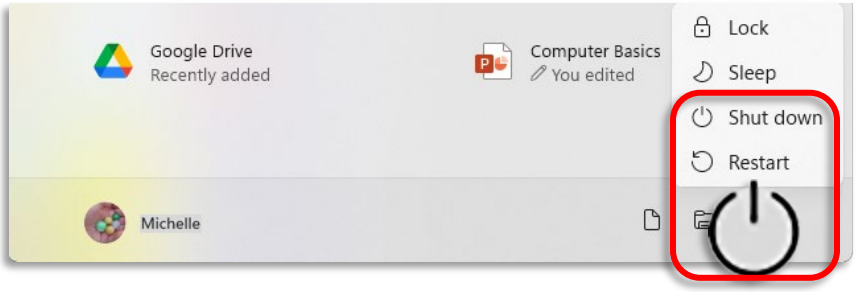
You unpin (remove) items from the Taskbar and Start menu the same way, just select **Unpin**.

Shut Down / Restart Computer

1. Click the **Windows** button or key.
2. Click the **Power** button.
3. Select **Restart** or **Shut Down**.

OR

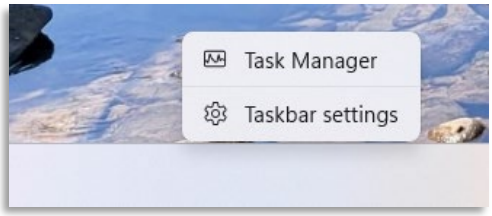
1. Use the keys **Ctrl + Alt + Del.**
2. Use the **Tab** key to select the **Power icon**.
3. Use the arrow keys to select **OK**.



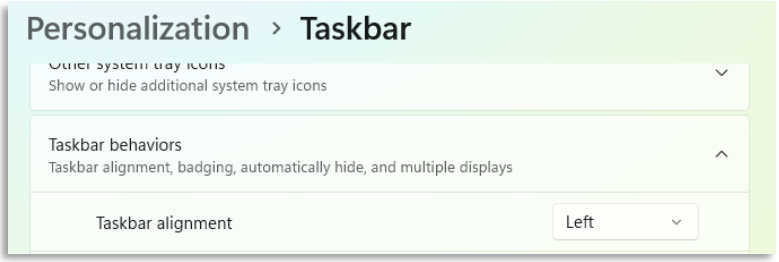
Start Button Location

If you don't like the start button in the center of the task bar, you can return it to the left side of the taskbar.

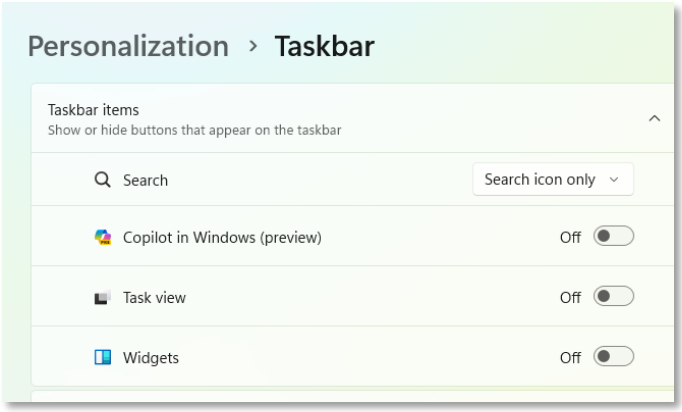
1. **Right click** on the taskbar.
2. Click **Taskbar settings**.



3. Scroll down and click **Taskbar behaviors**.
4. Beside **Taskbar alignment** click **Left**.



5. From this screen you can also remove clutter from the taskbar.

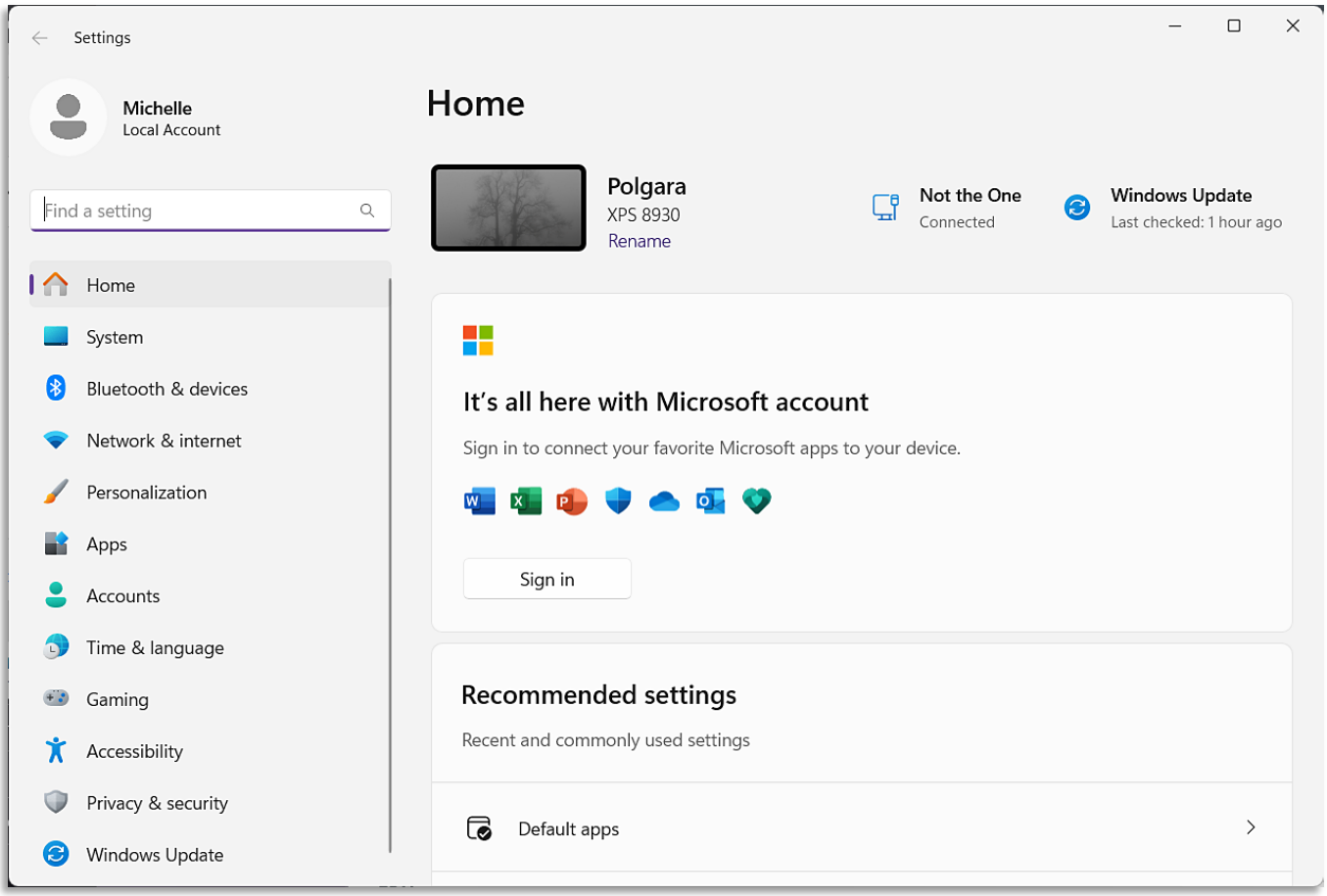


Settings

Settings is where you can personalize your computer, change how things work, and otherwise modify the operating system.

Accessing Settings

1. Click the **Windows** button or tap the Start key on your keyboard.
2. Along the left side of the start menu, click the **gear** button to open settings.



OR

1. Use the keyboard combination **Windows** key + **I**.

In settings, there are two primary ways to view and modify settings: You can select an option from the left pane and find the setting you want from there or use the search box to find a specific setting.

System: Display, sound, power, notifications

Bluetooth & devices: Camera, mouse, Bluetooth

Network & internet: Wireless

Personalization: Background, themes, lock screen, taskbar, start menu

Apps: Uninstall, default

Accounts: Users

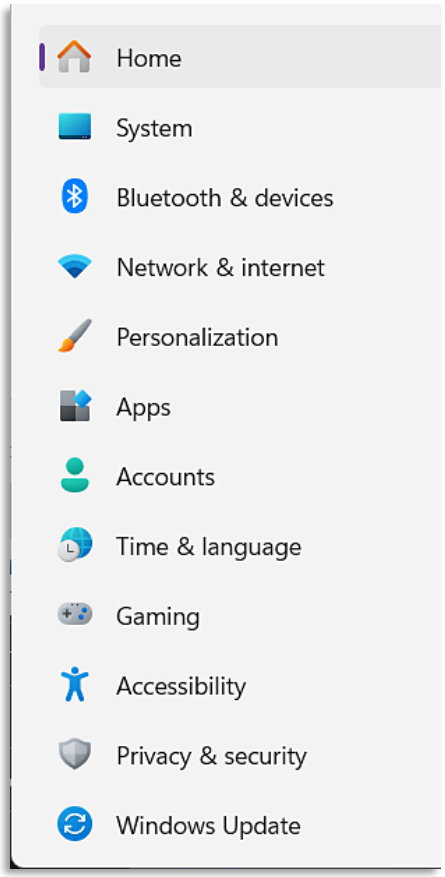
Time & language: Time zone, language

Gaming

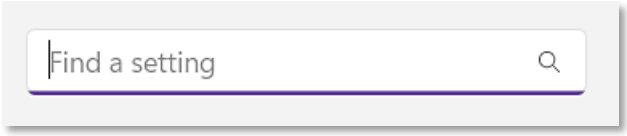
Accessibility: Vision, hearing, interaction

Privacy & security: Permissions, privacy, security settings

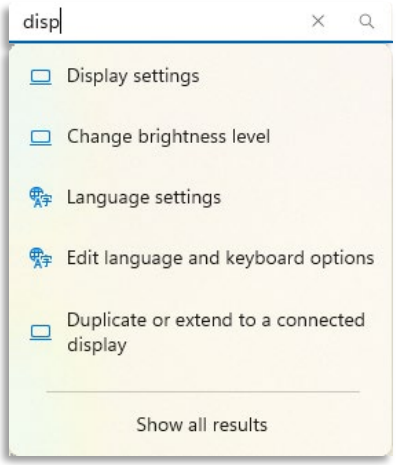
Windows Update: Make sure the operating system is up-to-date.



To quickly find a specific setting, click in the **Find a setting** box (top left corner) and start to type in the item for which you are looking.



A list of options that might match what you are typing appears. Click with the mouse (or use the arrow key) to choose a result.



Apps

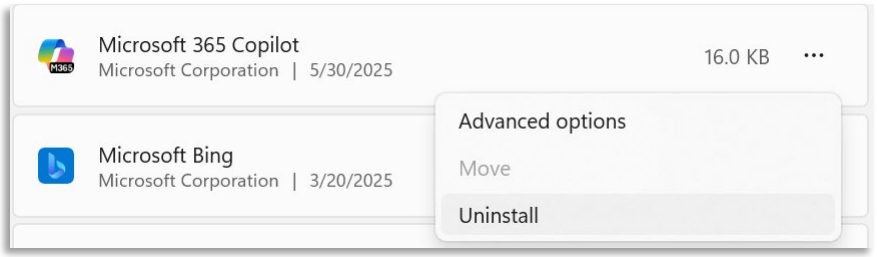
Apps are the programs installed on your hard drive that allow you to do things like write a list, listen to music, or edit a picture.

Uninstall

Uninstall removes a program completely from your system. Removing an icon from the desktop of your computer does **not** uninstall that computer, it just removes it from sight.

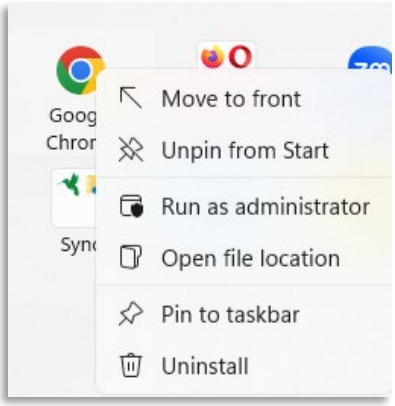
Uninstall a Program

1. Open **Settings**.
2. In the left pane, click on **Apps**.
3. Click on **Installed apps**.
4. Scroll through the list to find the program and click to select it.
5. Click the ellipse (three dots) on the far right.
6. Click **Uninstall**.



OR

1. Click the **Windows** button or key.
2. Find the program you want to remove and **right click**.
3. From the pop-up menu select **Uninstall**.



Default Apps

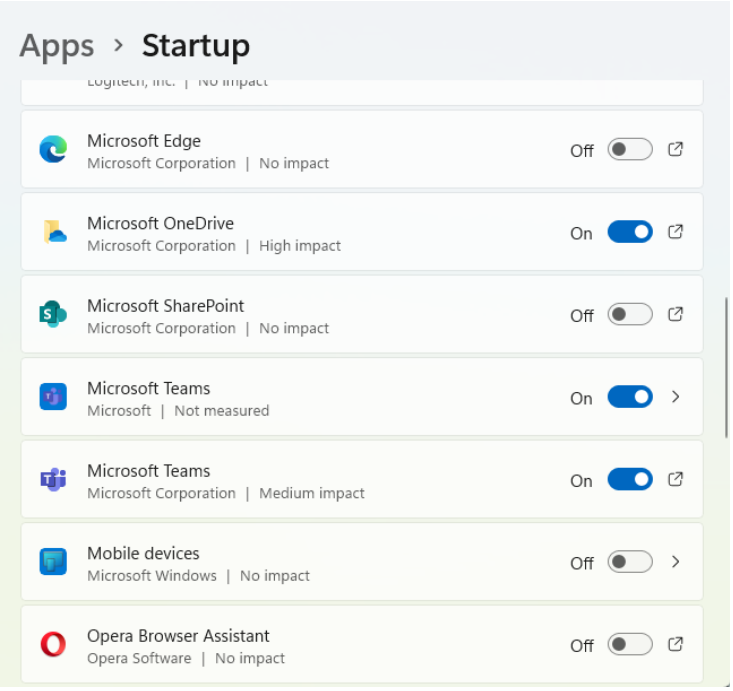
Default apps are the programs that open when you click on a specific file type. For example, what web browser opens when you click on a hyperlink, or what program is used to open PDFs.

Startup Apps

Startup apps are just what they sound like—programs that start automatically when you boot your computer. They do this so the individual programs will open immediately when you click on them. Unfortunately, having lots of programs start automatically will slow down how quickly Windows boots when you first turn it on.

Removing a program from Startup does NOT uninstall that program, it just doesn't let it start in the background. If you use a program all the time, you may be able to add that to start up, to speed up things when you first open your computer.

1. Open **Settings**, and search for **Startup**.
2. Scroll through the list and click to toggle programs on or off.

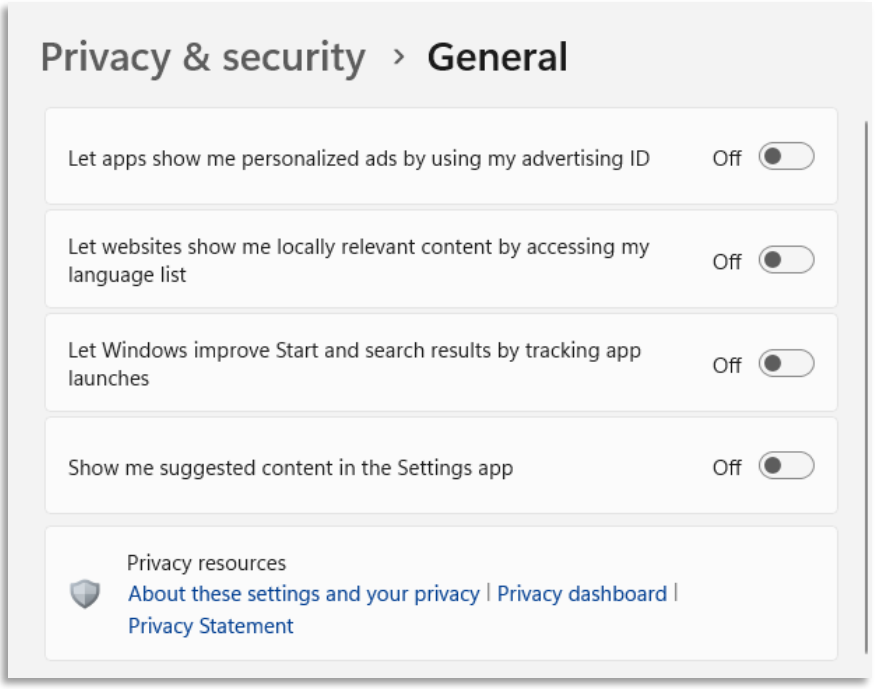


Privacy & Security

Like every other company, Microsoft wants to collect data about you and show you advertisements, etc. You can control some of this in your privacy settings.

Privacy Settings

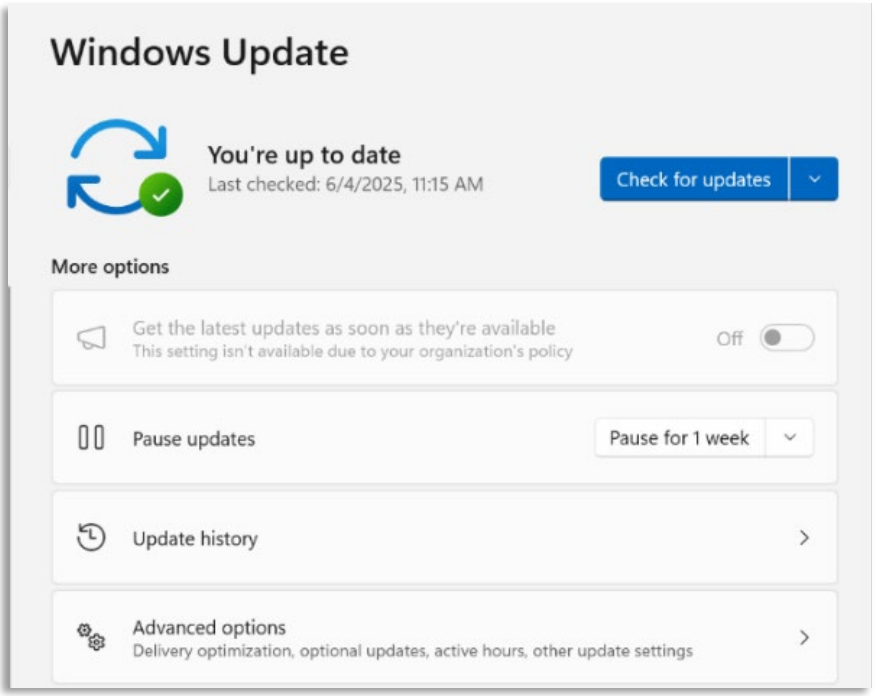
1. Open **Settings**.
2. In the left pane select **Privacy & Security** or search for privacy.
3. Toggle settings as desired.



Updates

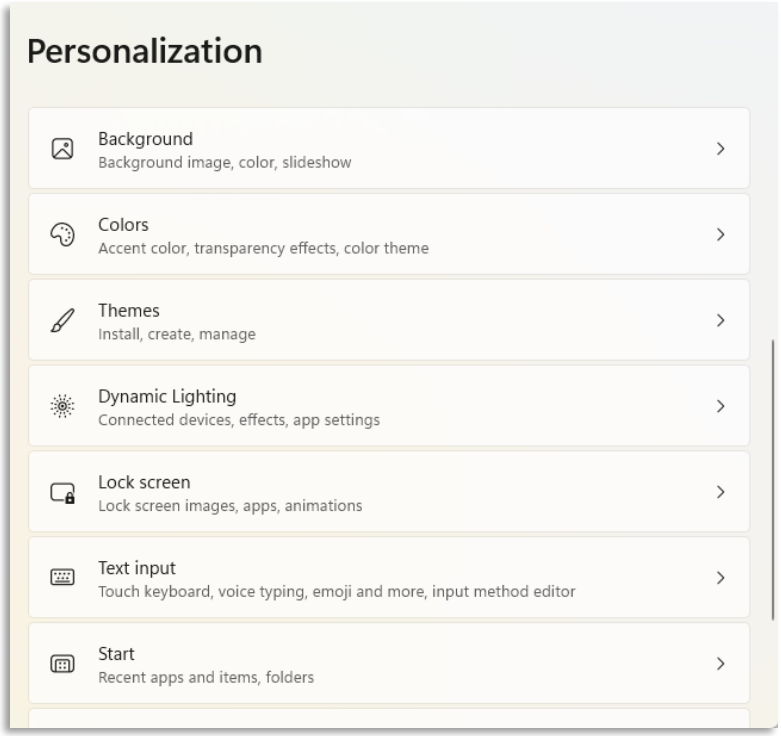
It is extremely important to keep your computer up-to date. Windows updates provide not just bug fixes and security enhancements but can also help your computer and attached devices work better (and faster).

The ***only*** computer that does not need updates is one that is ***NEVER*** connected to the internet.



Personalization

Allows you to modify some aspects of how your computer displays or works.



Background: Your computer wallpaper. You can use Windows spotlight, your own pictures, or a solid color.

Lock screen: You can change what pictures are displayed when your computer is locked, and also set what (if any) notifications appear on the lock screen.

Start menu: Set what type of recommendations and notification you see on this menu.

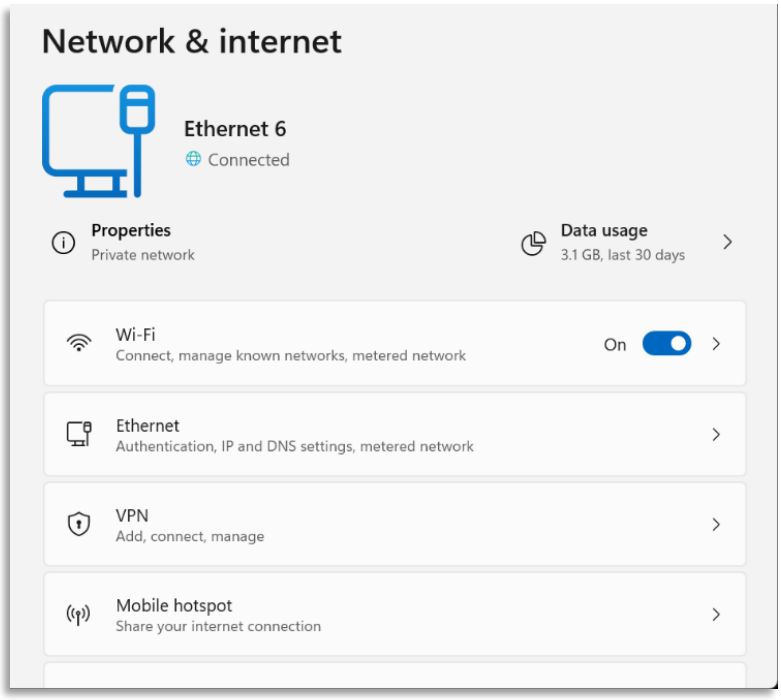
Themes: In addition to setting what pictures you want to see, you can also choose your own dominant color scheme and what icons appear by default on your desktop.

Network & Internet

This is where you control how your computer connects to the Internet so you can do things like surf the web.

Managing Wi-fi Networks.

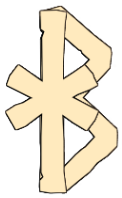
1. Open **Settings**.
2. Open **Network & Internet**.
3. Click **Wi-Fi**.
4. Click **Manage known networks**.
5. Click **Forget** beside the network you want to remove.



Bluetooth

Bluetooth is a wireless technology that allows data to be shared over short distances using short-wave UHF radio signal.

The name comes from Harald "Bluetooth" Gormsson, king of Denmark and Norway, who united the Scandinavians.

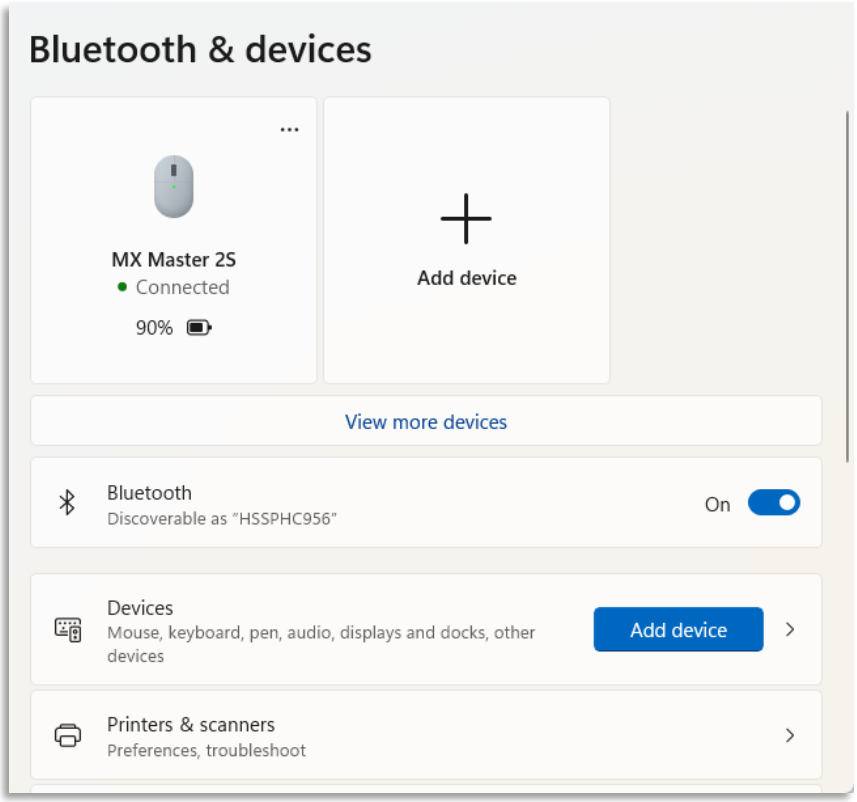


Bluetooth devices are very common, as the technology connects not just mice, headphones, keyboards, but also smart watches and wireless speakers.

To connect a Bluetooth device to your computer, you will likely need to put the device into “pairing mode”. Search online for the name of your device and the term “Bluetooth pairing”.

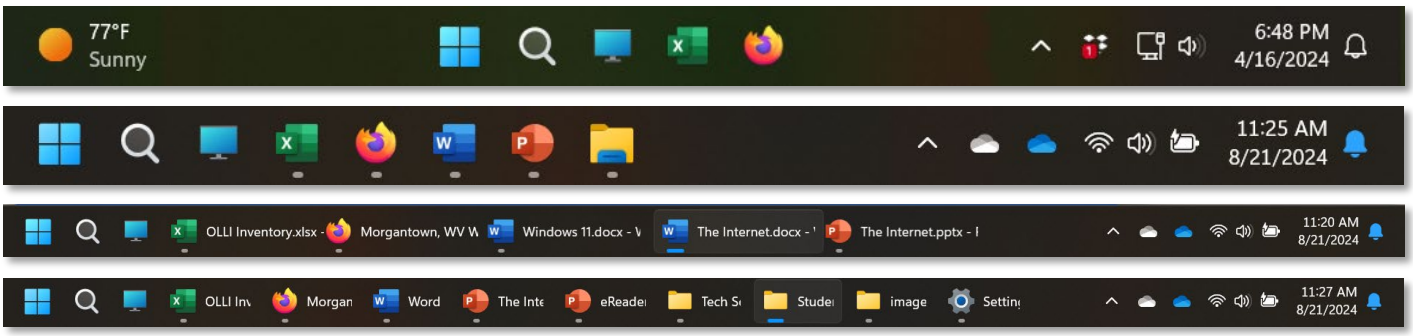
Connecting Bluetooth Devices

1. Open **Settings**.
2. Open **Bluetooth & devices**.
3. Click **Add a Device**.
4. Click **Bluetooth**.
5. Wait for the device you want to pair appears. Click that device. If the device does not appear, make sure it is in “pairing mode”.
6. Click **Connect**.



Taskbar

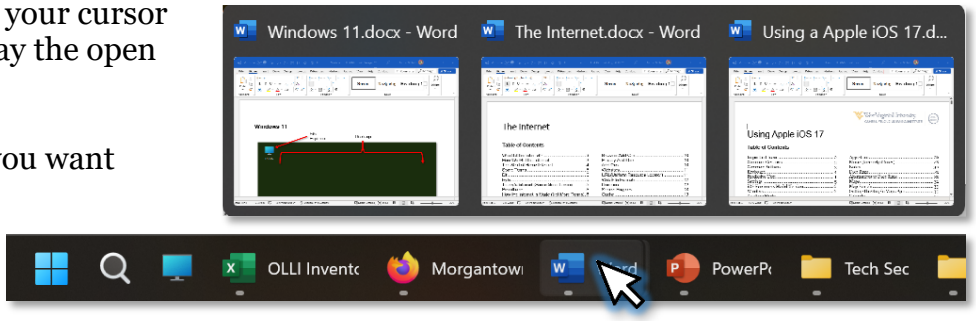
The Windows Taskbar, which runs along the bottom of the window, provides access to open programs, frequently used programs you have "pinned", the system tray, the start button, the notification area, and the time and date; it is your computer at a glance.



Labels, or the program or file name, can be shown or hidden according to your preferences: **Always**, **Never**, or **When taskbar is full**. You control this through **Settings**.

When labels are hidden, placing your cursor over the program icon will display the open windows.

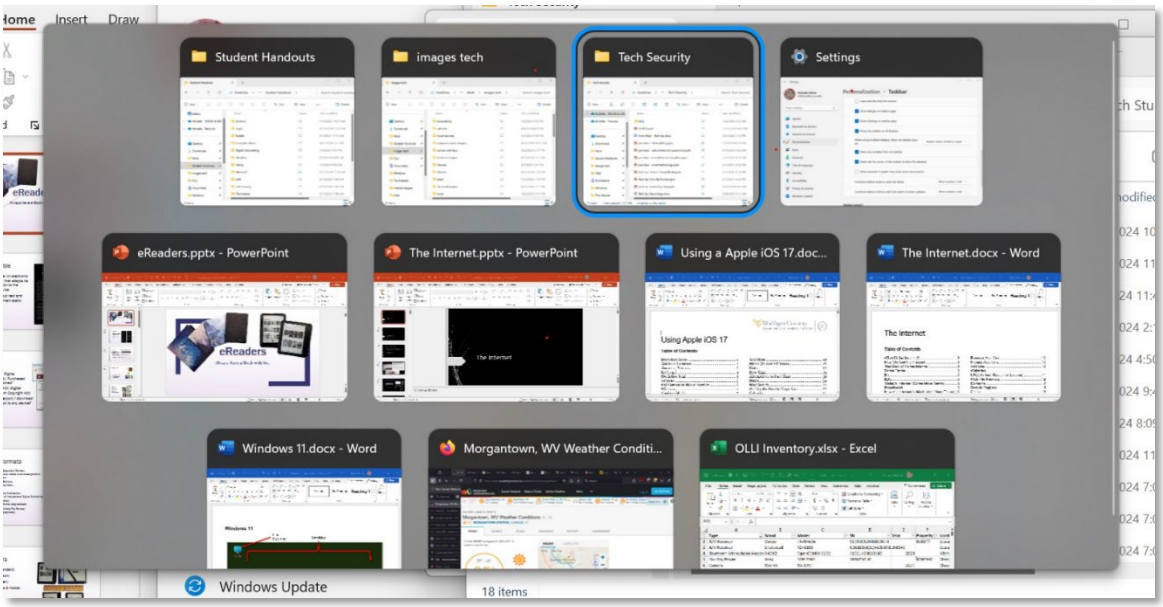
Clicking on the program or file you want brings it to the front.



You can also use your keyboard to bring an open file or program to the front.

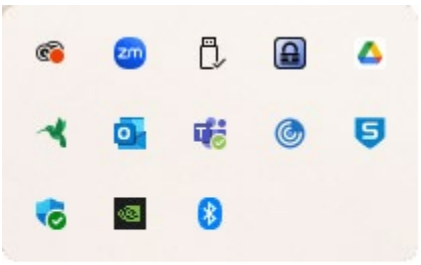
1. Press and hold the **Alt** key on your keyboard.
2. Tap the **Tab** key on your keyboard; a list of open windows is displayed.

3. Tap the **Tab** key to scroll through the list. Release the **Alt** key to bring the highlighted window to the front.



Notification Area / System Tray

The notification area (sometimes called the system tray) is on the far-right side of the task bar.



Click the ^ (carat) to see more apps.

show / hide

network

wireless network

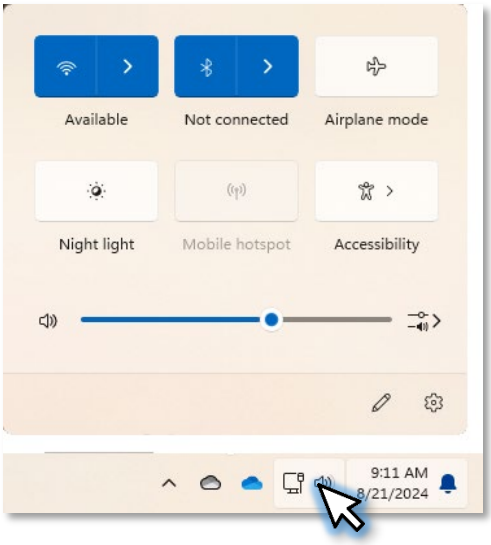
sound

battery

notification center

Clicking an icon will provide options and information.

Clicking the network, sound, and power icons will open the Quick Settings panel where you can adjust the available settings.



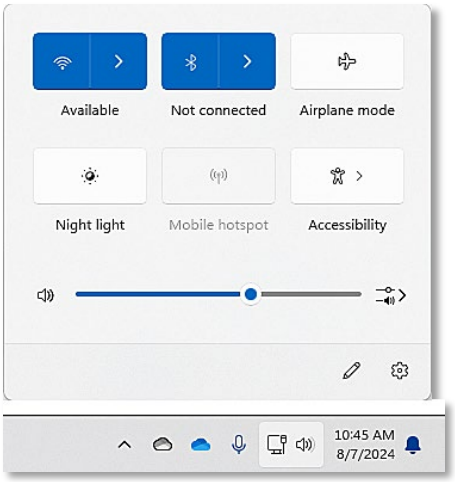
Clicking the pencil (edit) icon allows you to change what settings appear in the Quick Settings panel.

Clicking the gear (settings) icon opens up Windows settings.

Wireless

In the Notification Area, click the Wireless Icon.

1. From the menu, select the network you want to use.
2. If required, enter the passcode for the network.



Jump Lists

Jump Lists allow you to quickly open recently used files. They are accessed by right clicking on a program in the task bar or start menu, where the last several files related to that specific program are listed.

You also have the ability to "pin" a file to the top of a jump list so it remains accessible even if you have opened other files more recently.

Using a Jump List

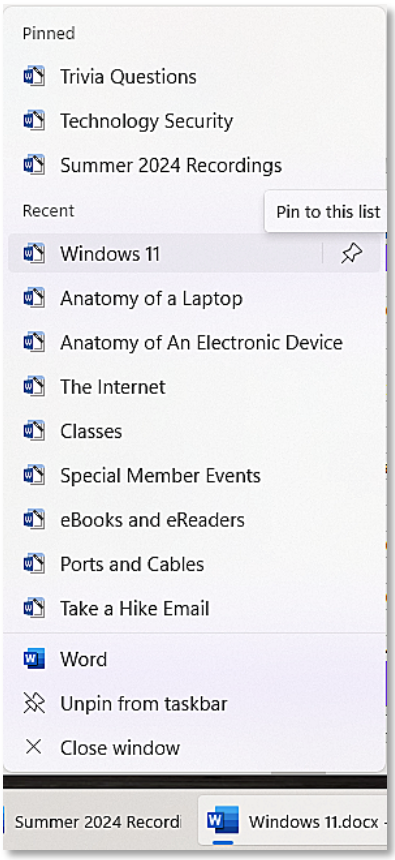
1. **Right click** on open program on the task bar.

   OR

   Right click on a program icon from the Start Menu.
2. A list of recently opened files is displayed. Select the desired file.

Pinning a File to a Jump List

1. **Right click** on an open program on the bar.
2. A list of recently opened files is displayed. Hold your cursor over a file, and the text "Pin to this list" appears.
3. Click on the icon to pin that file to the jump list.



Files & Folders

Folders are the organization system for your computer. Files are the documents or pictures you create and also code for programs and the operating system.

Files

Files are the documents and images and other things you view, create, and use within the various software programs (applications), as well as the code and other types of files that run the software and operating system.

By default, system files are hidden by Windows, so you do not accidentally delete a file that is required for your computer to work properly.

File Types

There are four common file types: documents, images, audio, video

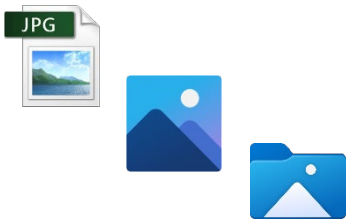
The file extension is the bit of the file name that comes after the period. On most computers known file extensions are hidden, but it's helpful to know what these file types are.

Document File Extensions

.txt	plain text
.rtf	rich text format
.csv	comma separated values
.docx	MS Word
.xlsx	MS Excel

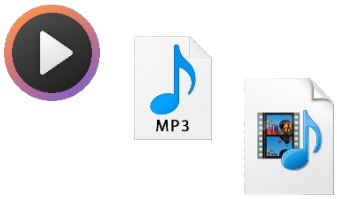
Images File Extensions

.jpg	Joint Photographic Experts Group
.gif	Graphics Interchange Format
.png	Portable Network Graphic
.tiff	Tag Image File Format
.bmp	bitmap



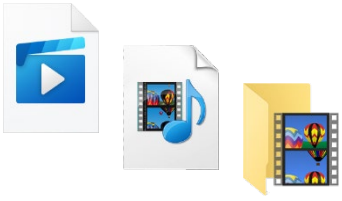
Audio File Extensions

.mp3	MPEG (Motion Pictures Experts Group) I layer 3
.wav	Waveform Audio File Format
.flac	Free Lossless Audio Codec
.acc	Graphic Accounts file



Video File Extensions

.mp4	MPEG (Motion Pictures Experts Group)-4 Part 14
.avi	Audio Video Interleave
.mov	QuickTime file
.wmv	Windows Media Video



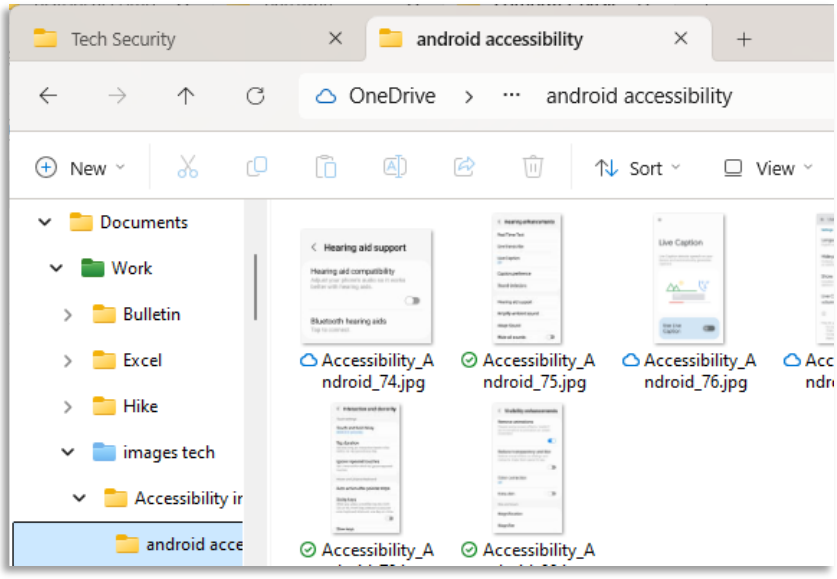
File Naming

One of the best things you can do is to name your files in a way that lets you know what that file is. You can search by contents, but in the long run it will be easier if your files have helpful names like: “2024 tax info” or “2025-06 resume” or “Family history 2020 update”.

Folders

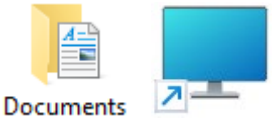
Folders are the computers organization system. Think of your folders as the filing cabinet of the operating system.

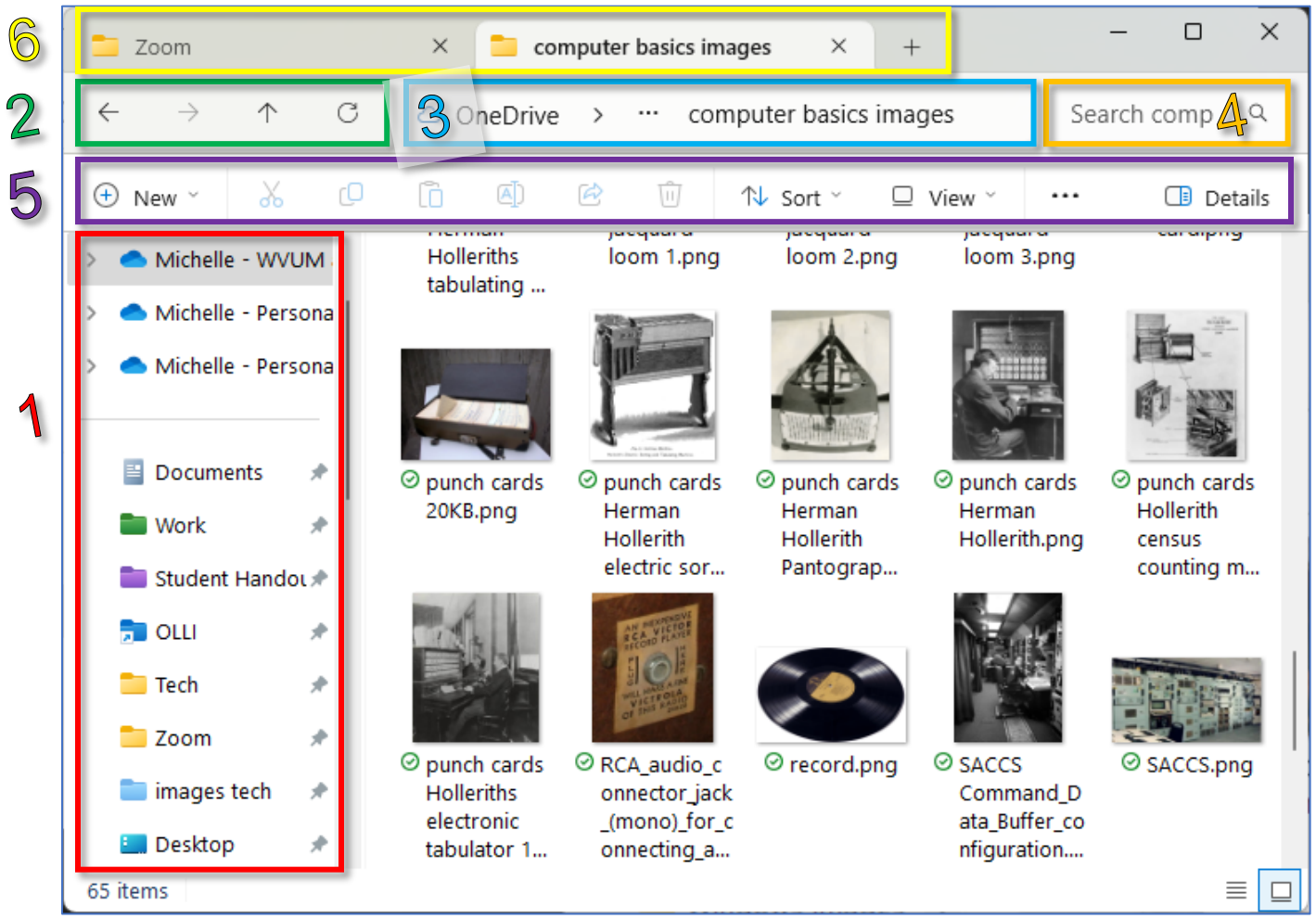
You can place folders within folders, to create an organization structure so you don’t have every single file in a single folder (or on the desktop) and that allows you to find things.



File Explorer

File Explorer (also called Windows Explorer) is the window that opens to show you places and folders on your computer. Using it is akin to walking around the house and opening a drawer or cupboard to grab something.



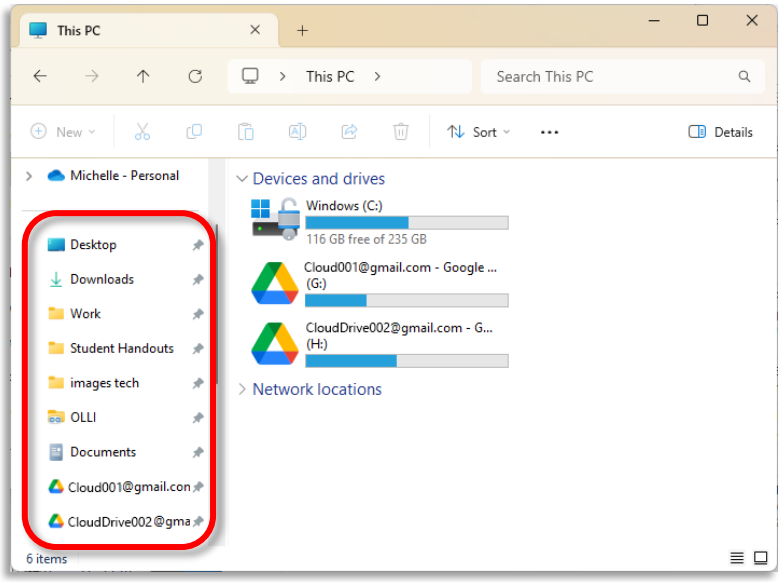


1. **Navigation Pane** – Allows you to view the folder structure of your computer, and quickly access files and folders. You can "pin" frequently used folders to the **Quick Access** area of the navigation pane.
2. **Navigation Buttons** – These are the same as your **Back** and **Forward** buttons on your web browser. Additionally, if you have a "back" button on your mouse that you use for web browsing, this button also works in File Explorer.
3. **Address / Location Bar** – This answers the question, "where am I?" If you've clicked around so much you no longer have any idea where you are, this bar will tell you.
4. **Search Box** – Type into this book to search for a file by name, type, date created, etc. Search is akin to yelling to someone in your house, "Have you see / do you remember where X is?" Except a lot faster, and quieter as well.
5. **Ribbon** – This is where you find your "menu" options. The View tab of the File Explorer window allows you to change how files are displayed, as well as to change sorting, grouping, and display columns.
6. **Tabs** – In Windows 11 you can have multiple tabs in the same Explorer window. These work the same as tabs in a web browser.

Quick Access

Quick Access is an area of File Explorer where you can "pin" folders you frequently access.

By default, Documents and Desktop and other default folders are part of the quick access list, but you can add or remove items as you please.

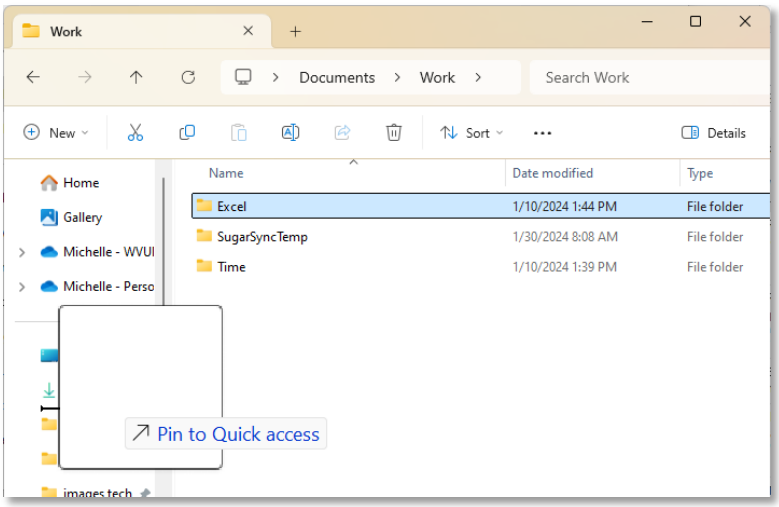


Add a Location to the Quick Access List

1. Open **File Explorer**.
2. Browse to folder you frequently use.
3. Right click on the folder and select **Pin to Quick Access**.

   OR

   Click and **drag** the folder into the Quick Access area.



Search

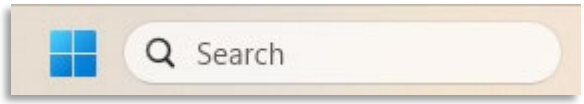
There are multiple ways to search in Windows.

You can open the start menu and use the search box at the top of the window (as you start typing the cursor moves to the search box) or you can click the **Search** icon on the taskbar.

Two good places to start are search: **File Explorer** and the **Taskbar**.

Search from the Task Bar

You can search from the Search box or search icon. This will typically search your entire system.

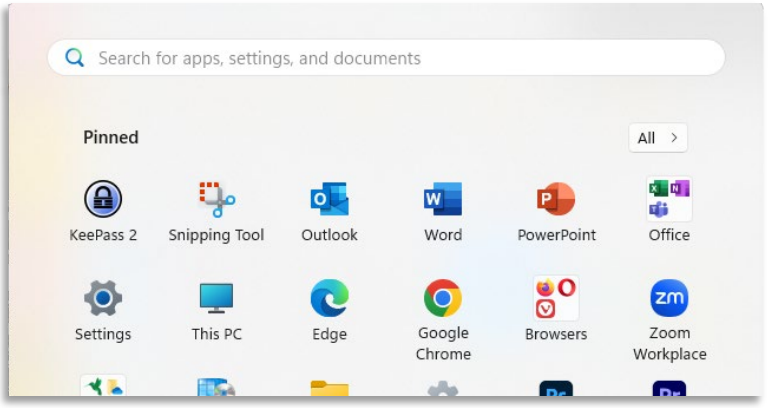


Click on the magnifying glass icon or in the search box and type in your search term.

Search from the Start Menu

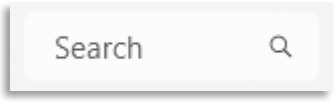
There is a Search box at the top of the Start Menu.

Click the window icon, then begin typing your search term in the box.



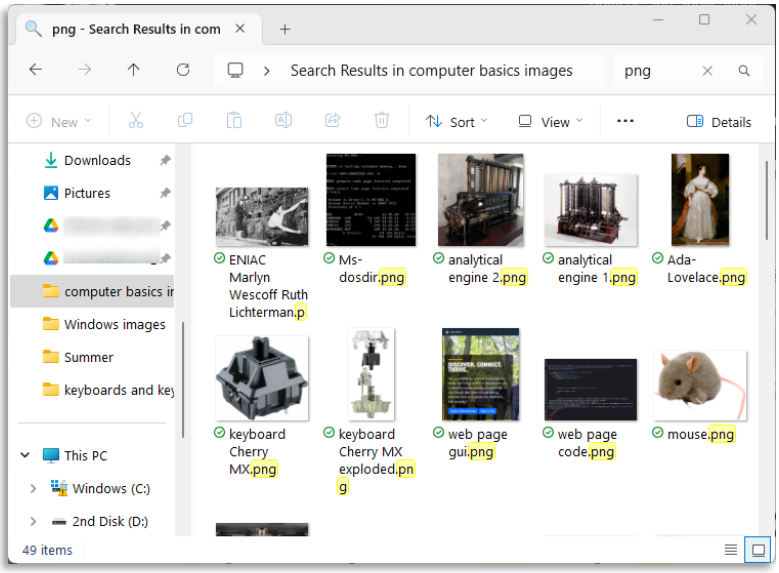
Search from File Explorer

If you are in File Explorer, the simplest search is to type the term you're looking for into the *search box*. This will search the *current* folder and all *subfolders*, which can be faster than searching your entire computer.

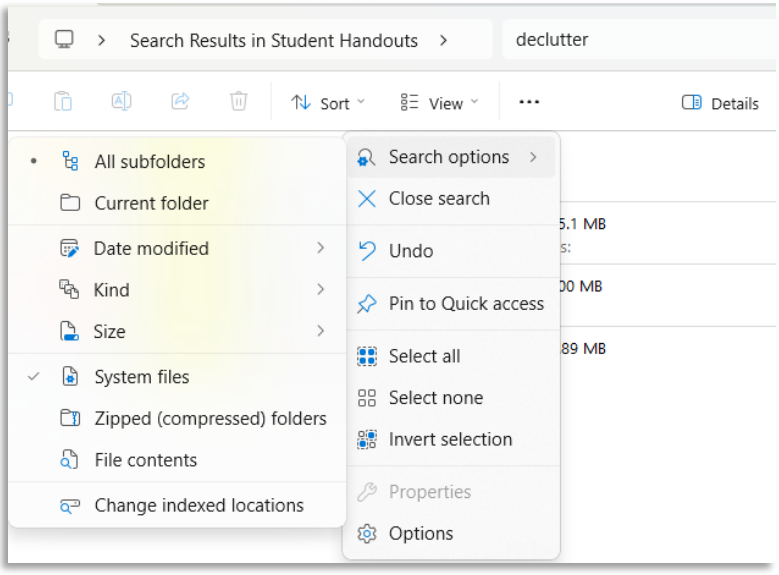


In the top right corner, click in the Search box, then start to type in the term for which you are searching.

The results will be displayed in the main window.



Once you have started your search, you can click the ellipse and choose from the **Search options**.



File Extensions

You can use extensions to narrow down the *kind* of file you are searching for.

Audio	.mp3 .wav .wma
Image	.jpg .gif .png .tif
Portable Document Format	.pdf
Video	.avi .mpg .wmv
Word	.doc .docx

Date Values

These are important because you can sometimes remember *when* you worked on a file, but maybe not what you named it. You can give an exact date or a general date.

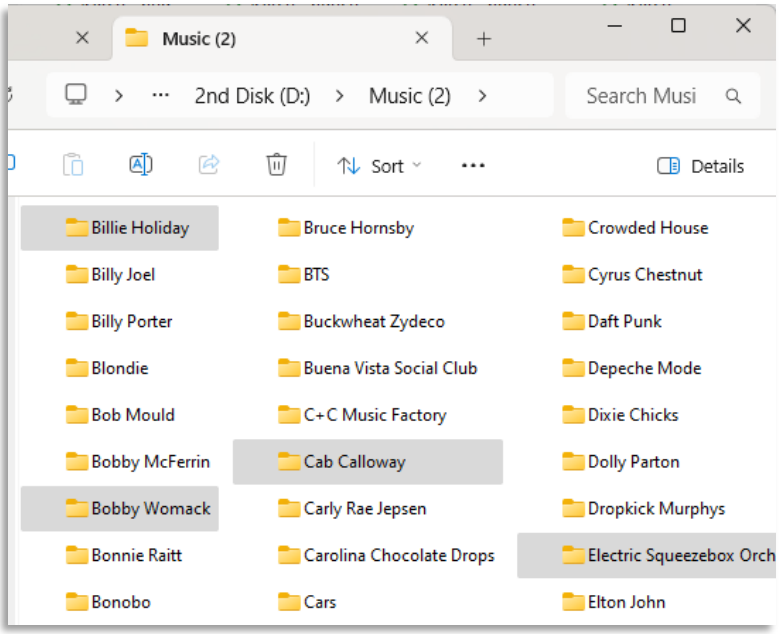
today, yesterday, last week, past month, past year, 3/15/2020

Selecting Files & Folders

You can select a single file, a row of files that are in a line, multiple non-contiguous files, or all the files and folders in a location.

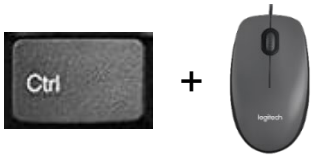
Selecting Contiguous Files/Folders

1. To select files/folders that are together, **left click** to select an item.
2. Press and hold the **Shift** key on your keyboard and **left click** on another item. All items between are selected.



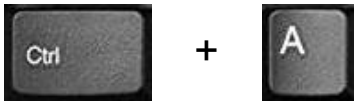
Select Non-Contiguous Files/Folders

1. To select non-contiguous files/folders, press and hold the **Ctrl** key on your keyboard.
2. **Left click** on every file/folder you want to select.



Selecting All Items in a Folder

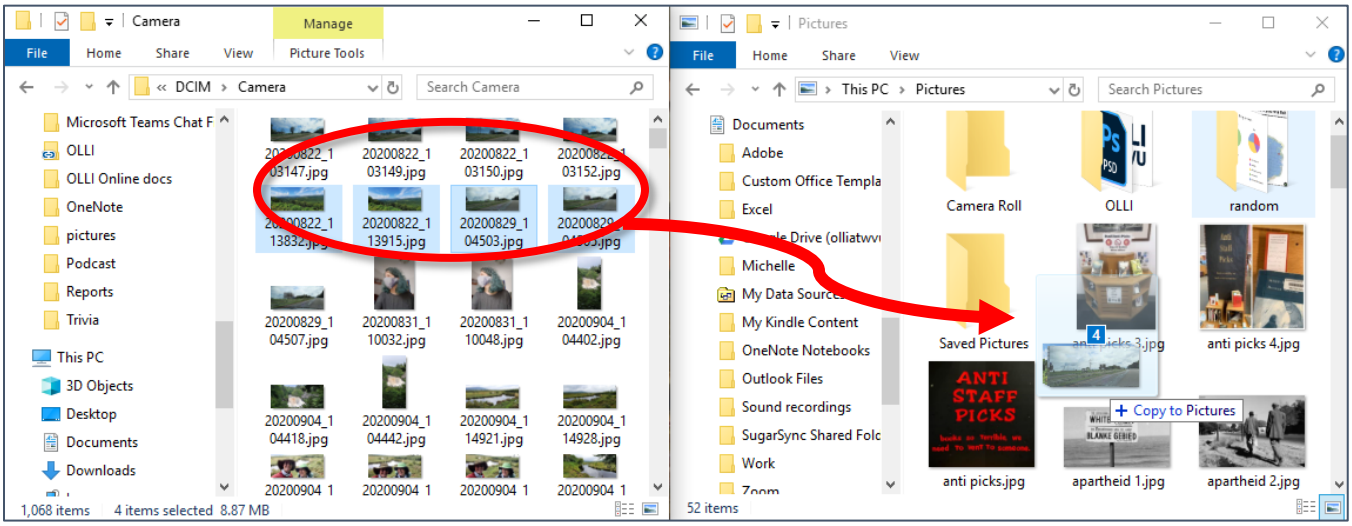
1. To select all the files in a folder, use the keyboard command **Ctrl + A**.



Moving Files & Folders

Once you save a file, it is not stuck in its location forever, you can easily move files from one folder to another, as well as copy them from your hard drive to a cloud drive or removable storage.

1. Open two file explorer windows side-by-side: The location where the items are now and the location where the items should go to.
2. **Select** the items to be moved.
3. **Drag** the items from one window to the other.



OR

1. Open a file explorer window.
2. Select the items to be moved.
3. **Cut** the items (**right click** and select **Cut** or use the keyboard command **Ctrl + X**)
4. Open the window where you want the items to be moved to.
5. **Paste** the items in the new folder (**right click** and select **Paste** or **Ctrl + V** with the keyboard.)

Software / Programs / Applications

Once you have your hardware and an OS, you need software to do stuff. That's where programs / applications come in. If you want to write a novel, you need a word processing program like notepad or Microsoft Word. If you want to play a game, you need a program like Solitaire or Minecraft. If you want to surf the Internet, you need a web browser like Edge or Safari.

All these programs reside permanently on your device, and you can typically use them even when you don't have an internet connection, unless the program states otherwise.

Company, OS & Software

One big problem is that multiple companies are involved in multiple areas of computing, so if you refer to a company name, you could be talking about any number or products, and if the company name is listed with the product, it's easy to be confused as to the name of that product.

Here's a look at three of the biggest companies.

	Microsoft	**Google / Alphabet**	**Apple**
Operating System	Windows 11	Chrome OS	macOS
Software Suite (program)	Office (Word)	Google docs	iMovie, Facetime
Web Browser (program)	Edge / IE	Google Chrome	Safari
Search Engine	Bing	Google (website)	
Hardware	Surface		iMac / MacBook

If you say "Microsoft" you could be referring to any one of five different things: an operating system, a software suite, a web browser, a computer, or a search engine. Google is even more confusing as it has a Chrome operating system ***and*** a Chrome web browser. This is why it helps to be specific about what you are talking about.

It can be helpful to learn the icons for various software programs. Unfortunately, companies regularly change their logos and icons, so it's not a perfect solution, but it can help.


Chrome


Edge


Firefox

Word


iCloud


Adobe Reader

Web Browsers

Web browsers are programs that allow you to surf the Internet. Websites are the various places you visit on the internet, like facebook.com, OLLIatWVU.org, wikipedia.org, google.com, cdc.gov, and etsy.com.

Apple devices come pre-installed with Safari, Microsoft devices come pre-installed with Edge, but you can install other web browsers on your computer –and you can use multiple web browsers at once. Some other common web browsers: Chrome, Firefox, Vivaldi, and Opera.

Within a web browser you can open multiple tabs—visit multiple websites—at one time.

Pre-Installed Software

Windows comes with several basic programs installed, many of which are free.

Calculator

Windows Calculator has four modes: standard, scientific, programmer, and a graphing mode.

Notepad

Notepad allows you to write, view, edit, and search plain text documents. (.txt)

Photos

Photos allows you to view, organize, edit, and share photos. Please note only very basic editing is available in this program.

Productivity Software

Productivity suites contain programs for word processing, spreadsheets, and presentations.

LibreOffice

LibreOffice is a private, free and open source office suite that is compatible with Microsoft Office/365 files (.doc, .docx, .xls, .xlsx, .ppt, .pptx) and is backed by a non-profit.

Microsoft Office 365 Online

If you do not want to purchase an Office 365 subscription, you can access the office suite online with a Microsoft account. If you have a Microsoft email address (ending in @live, @hotmail, @outlook.com), then you already have a Microsoft account.

These apps are only available online, and are somewhat stripped-down version of the programs, but for most users, will provide everything needed to create and edit Microsoft Office files. Go to https://www.office.com and log in with your Microsoft account. If you don't have one, you can create one for free.

You can find the handouts for the Microsoft Office Classes, including Office Basics, on the OLLI website.

OpenOffice

Apache OpenOffice is an open-source office software suite for word processing, spreadsheets, presentations, graphics, databases etc. It stores data in an international open standard format and can also read and write files from other common office software packages. It can be downloaded and used completely free of charge for any purpose.

Communication Software

Communication software allows you to make video calls via your computer. Please note that some programs require you to have the app installed on your cell phone and linked to your computer.

Signal

An independent phone application with a desktop component that allows audio and video communications. Once you have installed the Signal app on your smart phone, you can then install that app on your computer.

WhatsApp

A phone application owned by Meta (the parent company of Facebook) with a desktop component that allows audio and video communications. Once you have installed WhatsApp on your smart phone, you can then install that app on your computer.

Zoom

A computer and phone communication application with audio, video, and screen sharing abilities used for classes, meetings, and socialization. The Zoom computer program can be installed on any device and does not require a log in.

Backups

Backups are where you can get into trouble. We want to make sure that if our computer dies, our important files are saved. But what is the best way to do this? And what is "important"?

If my computer crashes, how do I keep from losing everything?

The latter question is subjective, but you might want to consider "important" files those that only you have access to, and that other people might want. For example, photos and genealogy documents are probably files that are irreplaceable (or at least not easily replaceable) and others may want.

For these types of files, you want a backup that is *not in your house*. For more, see the Digital Decluttering handout.

Cloud Storage

USB drives are slowly being replaced by cloud storage. Cloud storage uses network access to access your files from anywhere. A copy of your file is saved on a server, and when you work on your documents, your changes are pushed down to all your devices, so you always have the most up-to-date version of your files.

Cloud storage has replaced much of the need for backups, and all but eliminated needing to email files back and forth.

Anti-Virus

A virus is a piece of malicious software that attempts to insert itself into your system for evil purposes. Viruses can be written to do anything from completely crash your computer to secretly take over your device to turn it into a zombie that attacks other systems.

Many new computers come with anti-virus pre-installed. This means the only thing you need to do is check and make sure your anti-virus software is running and up to date. If you choose to select your own anti-virus program, you can get additional bells and whistles to help further protect you, such as a firewall, browser security, junk mail filters, and more.

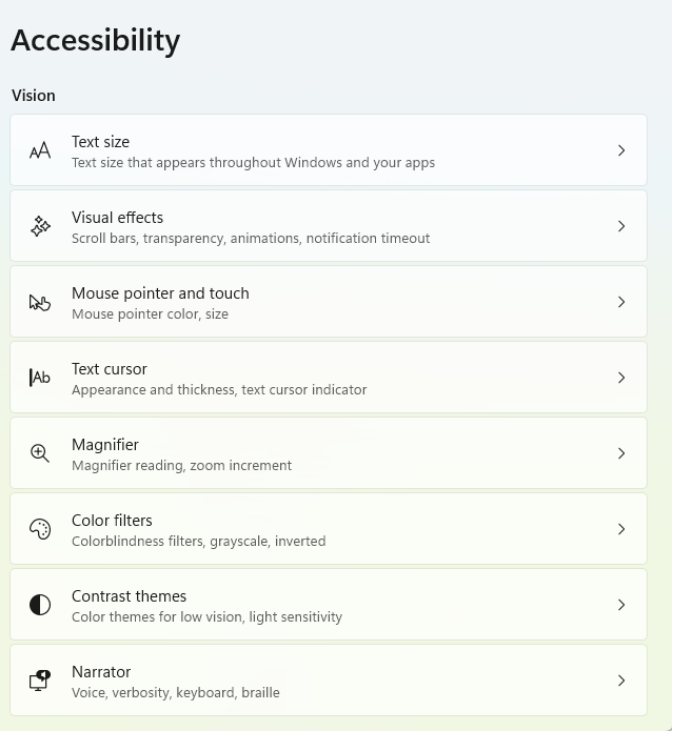
Anti-virus programs are the exception to the rule about always paying for something—there are several very good anti-virus programs that provide basic anti-virus protection for free. But you should consider paying for a more comprehensive security suite if you regularly spend time online or have a wireless network.

Accessibility

An important thing about modern technology is how devices can be made accessible. The internet can be a fascinating leveler, in that you know nothing about someone posting online other than what they have typed.

This of course has its downside (some of which are major) but an upside is accessibility technology allows people with disabilities to be judged on what they write rather than how they present. Here are a few of the more commonly used features.

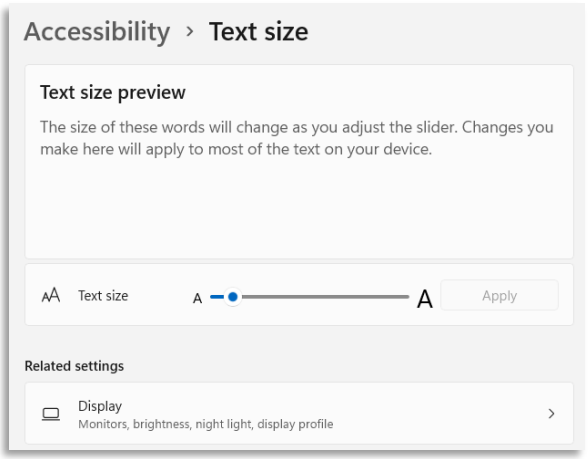
Most accessibility settings are available under **Accessibility**.

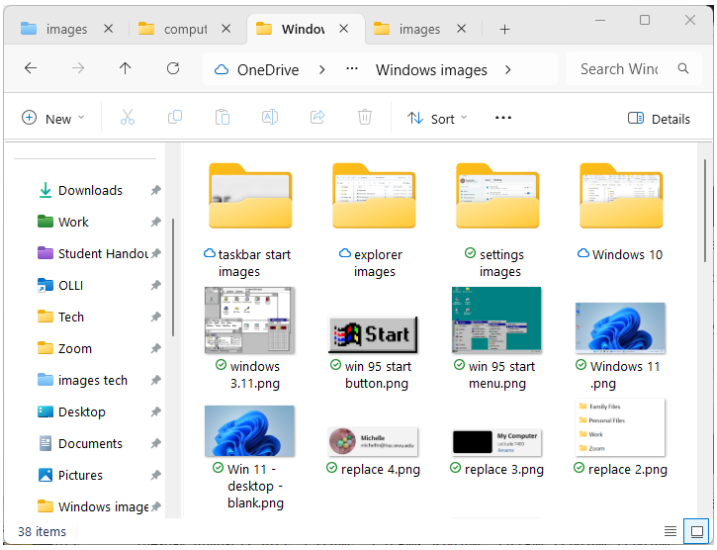


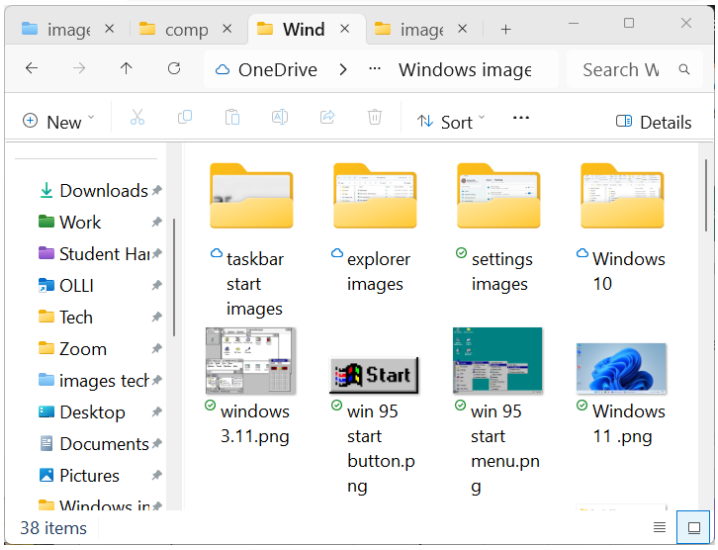
Text Size

Text size will make much—but not all—of the text on your computer larger.

The images below have text size at 110% and 150%.





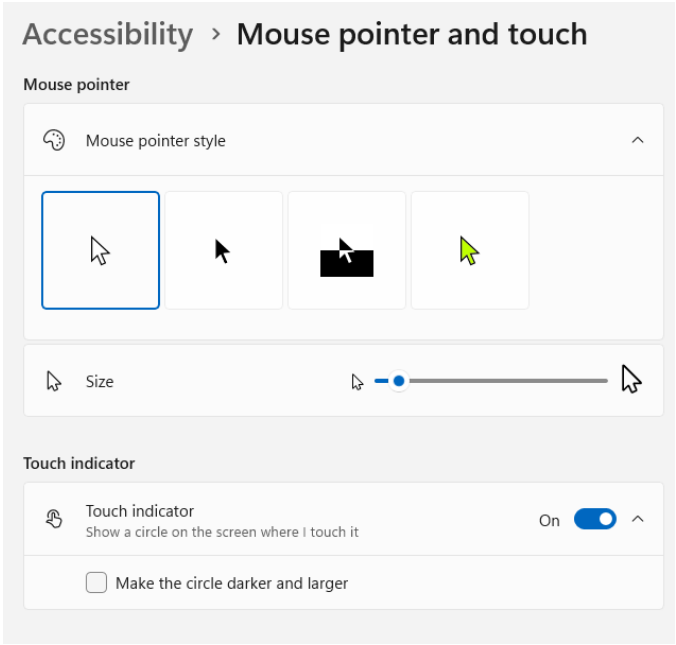


Mouse Pointer

The mouse pointer is different from the cursor. The cursor is an I bar shows where text will appear when you start typing, in text editing programs.

The mouse pointer is usually an arrow and shows where you are pointing as you move the mouse or track point around, and what will be affected when you click the mouse.

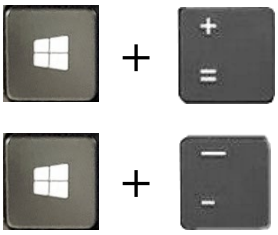
You can change both the size and the color of the mouse pointer.

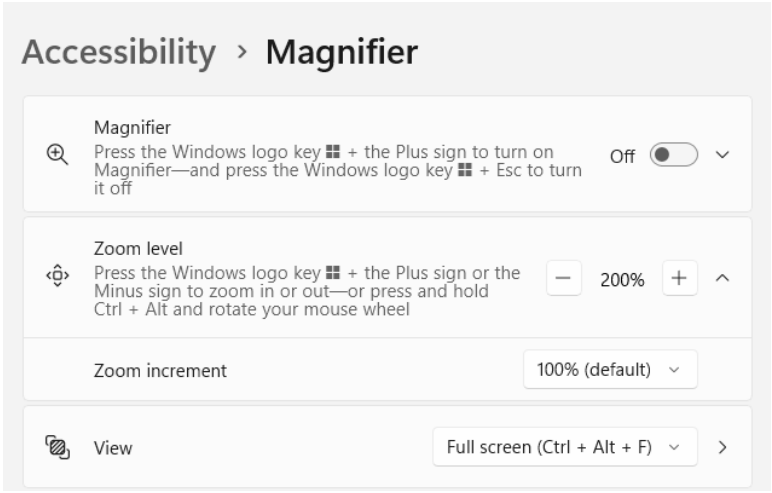


Magnifier

The magnifier changes the size of items in on the screen.

You can press the Windows key and the plus sign to enlarge things, and the Windows key and the minus sign to zoom back out.





Visual Effects

There are several things you can change under visual effects.

Animation

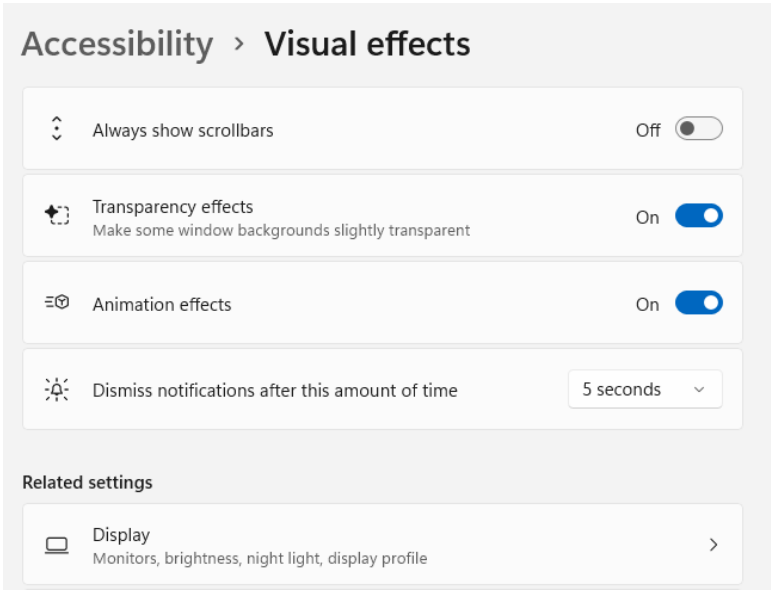
Animations are the movements items make when you interact with them. This can be distracting for some users.

Notification display time

Windows notifications last for 5 seconds, but you can change this length.

Always show scroll bars

If you are used to using scroll bars to move through a page, you can make sure they are always available.



Display

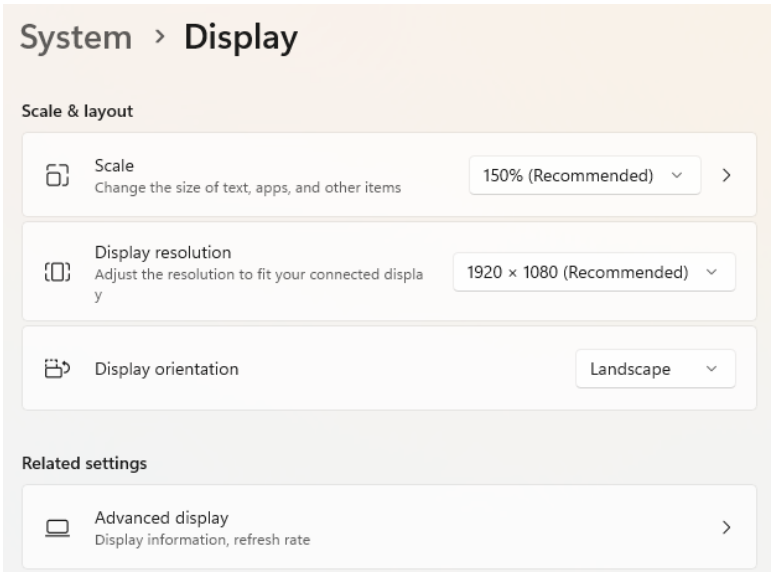
The higher the monitor resolution, the smaller the text becomes.

Scale

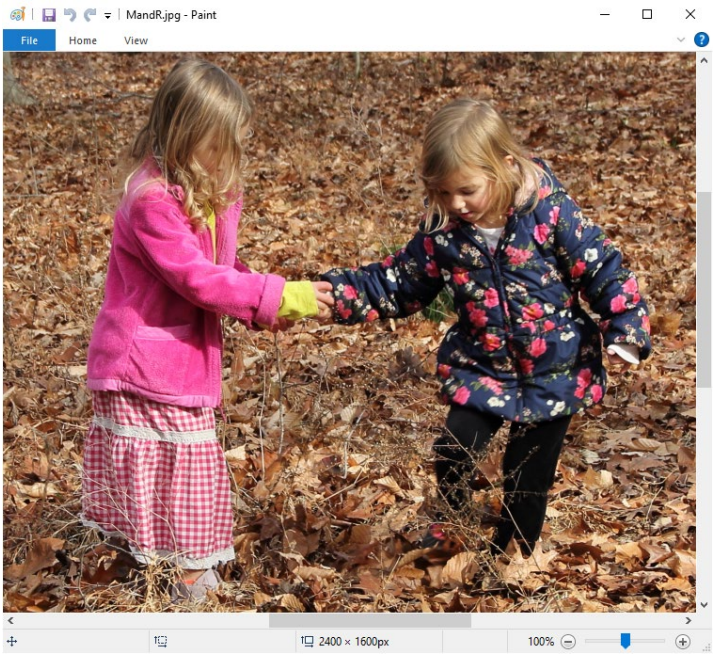
Changing the scale increases the size of text and other items. When you get a new computer with a high-resolution monitor, you can change the scale to a size large enough to easily read.

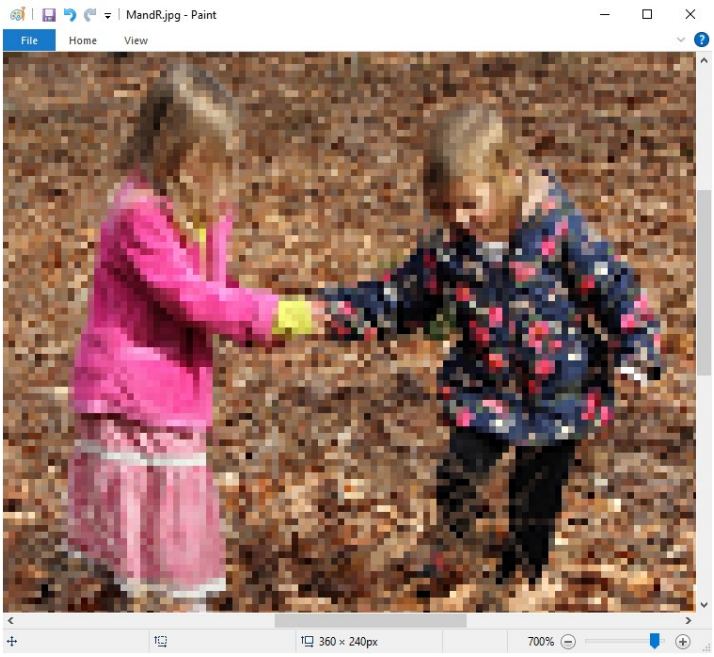
Resolution

Resolution has to do with the quality of the monitor and is given in ppi (pixels per inch). Pixels are the smallest display elements on a screen. The more pixels you have the higher the resolution.



Below is a picture saved at two different resolutions but scaled to the same size on the screen.





2400 x 1600 360 x 240

You can see that the lower resolution image is boxy and out of focus looking, while the higher resolution image is crisp and clear. That boxy look is called pixelation and is why you can't create large prints from low resolution images.

Here are some current monitor resolutions you might come across when looking at new monitors and televisions:

CRT with VGA	640×480	
Standard HD	1280 x 720	720p Resolution
Full HD	1920 x 1080	1080p Resolution
Ultra HD	3840 x 2160	4K Resolution

Cables

Electronic devices come with cables—you likely have a box or drawer of cables and no idea what they go to, but are afraid to throw them away in case they're important.

Below I've provided images of cables as well as a description of what they are used for. There is also a table with pictures and names that will help you match your cables to the ports on your devices.

Video Cables

Video cables connect your computer monitor to your computer (or laptop). Many may also be used to connect your TV to your DVD or BluRay player.

VGA

VGA (Video Graphics Array) was first introduced on the market with the early IBM (International Business Machine) computers in 1978 and was the standard for years. VGA connectors carry analog RGBHV (red, green, blue, horizontal sync, vertical sync) video signals.

DVI

DVI (Digital Visual Interface) was developed by the Digital Display Working Group (DDWG) and came onto the market in 1999. It was designed to create an industry standard for the transfer of uncompressed digital video content.

Cable length is generally limited to 15 feet for higher resolution display.

HDMI

HDMI (High-Definition Multimedia Interface) is a proprietary interface for transferring uncompressed digital video content as well as audio. HDMI was developed in 2002 and went onto the market in 2003. Cables can be up to 15 meters without signal degradation.

The biggest advantage of HDMI is that you don't need multiple cables since it carries both audio and video.

Mini-HDMI

There are also mini-HDMI ports and cables. These are (as expected) smaller than HDMI, and are used most often for portable devices, such as DSLR cameras and portable monitors.

DisplayPort

DisplayPort (DP) is s a digital display interface developed by a consortium of manufacturers and standardized by the Video Electronics Standards Association (VESA). It can carry video, audio, USB and other signal types. DisplayPort cables can be up to 2 meters in length without any signal degradation.

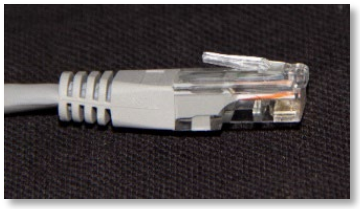
Mini-DisplayPort

There is also mini-DisplayPort, which was developed by Apple and went into production in 2008. You will find mini-DisplayPort on Apple products and some older laptops.

Thunderbolt

Thunderbolt looks like USB-C, but can carry more data (and carry that data faster) than a "plain" USB-C cable, while also carrying audio and video signal.

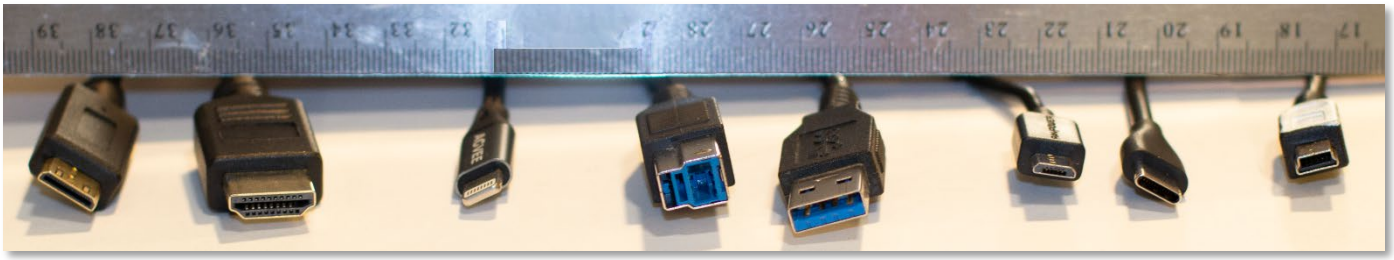
Network



A network cable is used to connect your computer to your modem and looks like an extra-wide phone cable.

Cable Size Comparison

Here are several different types of cables side by side, with a ruler, to help you figure out which specific cable you have.



Mini-HDMI | HDMI | Lightning | USB-B and -A | micro-USB | USB-C | mini-USB

References & Resources

Apollo Missions

Apollo Guidance Computer: Dipstiks and reverse engineering the core rope simulator (Ken Shirriff)
Apollo program (Smithsonian)
Restoring The Apollo Guidance Computer
The Apollo Flight Journal: The Apollo On-board Computers (NASA)
The Apollo Guidance Computer (IEEE Computer Society)

Luddites

Vagrancy Act 1824 (Legislation.UK.gov)
What the Luddites Really Fought Against (Smithsonian Magazine)
What's a Luddite? An expert on technology and society explains (The Conversation)
Who Were the Luddites? (History.com)

Other History

Baudot (British Telephones)
Celebrating Penn Engineering History: ENIAC
Origin of the name (Bluetooth)
The Brief History of the ENIAC Computer (Smithsonian Magazine)
UNIVAC, the first commercially produced digital computer in the U.S, is dedicated (History.com)
US nuclear forces' … messaging system finally got rid of its floppy disks (Defense News)

Punch Cards & Core Rope Memory

Core Rope Memory (Hack the Moon)
Herman Hollerith's Tabulating Machine (Smithsonian Magazine)
Hollerith Machine (US Census Bureau)
Jacquard Loom (National Museum of American History)
Making Core Memory – An experiment in troubling computing histories (Technology Stories)
punched card tabulator (IBM)
Your Own Core Rope Memory (Hackaday)

Women in Computing

Ada Lovelace (Biography.com)
Ada Lovelace: the visionary who imagined computers composing music two centuries ahead of her time (BBC Music)
Ada Lovelace: The World's First Computer Programmer Who Predicted Artificial Intelligence (NIST)
Admiral Grace Murray Hopper: When Women Were Computers (National WWII Museum)
Enchantress of Numbers: A Novel of Ada Lovelace (2017) by Jennifer Chiaverini
ENIAC (National Museum of the United States Army)
Grace Hopper: The Navy and Computers (Smithsonian)
Margaret Hamilton (NASA)
Margaret Hamilton Led the NASA … Team That Landed Astronauts on the Moon (Smithsonian 2019)
Rear Admiral Grace Hopper (Navy.mil)
The "Rope Mother" Margaret Hamilton (Smithsonian)

WWII

6 facts about the Bombe (Bletchley Park)
Alan Turing (History.com)
Alan Turing (New Scientist)
Bombe: Breaking the Enigma cipher (Crypto Museum)
Colossus (National Museum of Computing)
Colossus, the first large-scale electronic computer (Colossus)
Colossus: Birth of the digital computerv (Crypto Museum)
Flaw in the Enigma Code – Numberphile (YouTube Video)
Navy WAVES Building Decryption Bombes in Dayton, Ohio (NPS)
Solving the Enigma: History of the Cryptanalytic Bombe by Jennifer Wilcox (2024) US Defense Department
The Turing Digital Archive (Cambridge)
Turing-Welchman Bombe (National Museum of Computing)
US Navy Cryptanalytic Bombe (Dayton Codebreakers)

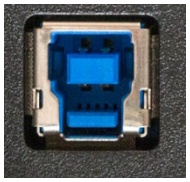
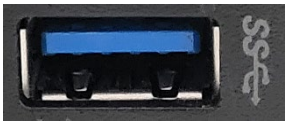
Windows & Modern Computers

How to Use Keyboard Shortcuts Like a Pro: The Complete Guide (Wiki How)
Keyboard shortcuts in Windows (Microsoft)
LED vs LCD Monitors: Key Differences Explained (HP)
The QWERTY Effect: How typing shapes word meanings and baby names. Casasanto, D., Jasmin, K., Brookshire, G. & Gijssels, T. (2014). Proceedings of the 36th Annual Conference of the Cognitive Science Society (pp. 296-301).
The Wubi Effect (Radiolab)
What is a Video Card? (Lenovo)
What Is Monitor Resolution? Resolutions and Aspect Ratios Explained (ViewSonic)
Windows Keyboard Shortcuts (Boston University)

Childrens' Books

Ada Byron Lovelace & the Thinking Machine (2015) Laurie Wallmark
Ada Lovelace (2018) by Maria Isabel Sanchez Vegara & illustrated by Zafouko Yamamoto
Ada Lovelace Cracks the Code (2019) by Rebel Girls and Corinne Purtill
Ada Lovelace: Poet of Science (2016) by Diane Stanley & illustrated by Jessie Hartland
Grace Hopper: Queen of Computer Code (2017) by Laurie Wallmark and illustrated by Katy Wu
Hedy and her Amazing Invention (2019) by Jan Wahl and illustrated by Morgana Wallace
Hedy Lamarr's Double Life: Hollywood Legend and Brilliant Inventor (2019) by Laurie Wallmark and Illustrated by Katy Wu
Margaret and the Moon (2017) by Dean Robbins, & illustrated by Lucy Knisley
The Thrilling Adventures of Lovelace and Babbage (2015) Sydney Padua

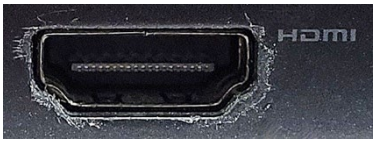
Common Ports and Cables

USB A			
USB B 3.0			
USB-A 3.0			
Mini USB			
Micro USB			
Lightning			
USB C			
SuperSpeed USB			
SuperSpeed with Power			
USB DisplayPort Alt Mode			
Thunderbolt			

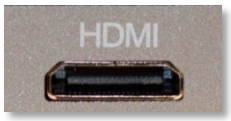
VGA

DVI

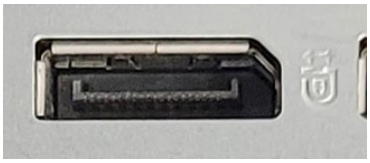
HDMI



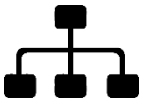
Mini-HDMI

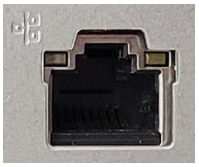


Display Port



Network





Anti-Virus and Security Suites

Avast	Free AV option	https://www.avast.com
AVG	Free AV option	https://www.avg.com
BitDefender	Free AV option	https://www.bitdefender.com
Malwarebytes	Free AV option	https://www.malwarebytes.com
F-Secure	No free option	https://www.f-secure.com
McAffee	No free option	https://www.mcafee.com
Norton	No free option	https://us.norton.com/antivirus
Sophos	No free option	https://www.sophos.com
Webroot	No free option	https://www.webroot.com
Trend	No free option	https://www.trendmicro.com

Keyboard Commands

⊞	Start Menu
⊞ + **I**	Open Settings
⊞ + **Shift** + →	Move selected window to right monitor
⊞ + **Shift** + ←	Move selected window to left monitor
⊞ + **Shift** + **S**	Snipping Tool
⊞ + **D**	Show Desktop
⊞ + **E**	Open File Explorer
⊞ + **L**	Lock Computer
⊞ + **M**	Minimize All Open Windows
⊞ + **S**	Search / Find
Alt + Tab	Switch between open windows
Alt + Esc	Cycle through open windows
Alt + F4	Close active window
Alt + F8	Reveal password at sign-in screen
Ctrl + A	Select All
Ctrl + Alt + Del	Task Manager
Ctrl + C	Copy
Ctrl + P	Print
Ctrl + V	Paste
Ctrl + X	Cut
F3	Find
F5	Refresh

Technology Glossary

2FA

Two-Factor Authentication. Electronic authentication method that creates and extra layer of security of computer logins and access.

5G

The fifth-generation technology standard for cellular networks. It can support up to 10,000 devices per cell and have download rates up to 10 gigabits per second.

Add-on

An accessory piece of software designed to increase the capability of the software to which it is appended.

Address Bar

In a web browser or windows explorer, it is a rectangle, usually towards the top of the window, that shows you the current location or address of your web page or file.

Address Book

See Contacts

Adobe Digital Editions (ADE)

Adobe proprietary format for eBooks.

Alexa

Amazon's virtual assistant.

Algorithm

A set-of rules to be followed in calculations or problem-solving operations. Algorithms are frequently used to manipulate data sets.

Android

Googles mobile operating system, built on open-source software.

Anti-Virus

A program that protects you from malicious software. Most anti-virus programs have options for purchasing additional security measures such as firewalls, email scanning, etc.

App

Short for Application.

Apple ID

This is the username and password that you create with Apple to link a specific device to your Apple account. If you have an iPad and an iPhone, you use the same Apple ID with both of those devices.

Apple

Technology company that designs and develops hardware and software.

Application

An application is a piece of software that lets your device do something, like play music or give directions. An application is the same thing is a program.

ARPANET

Advanced Research Projects Agency NETwork. The first true internet, it connected military installations, a handful of universities, and some third-party contractors together.

Autocorrect

Auto correct is when your phone automatically changes what you were typing to what *it thought* you wanted to type.

Autoplay

When you visit a website and music or video starts playing without asking.

AVI

Audio Video Interleave. A multimedia format for audio and video files.

AZW / AZW3

Amazon proprietary eBook format.

Backbone

Long-distance networks that carry data between data centers and consumers

Backup

A copy of computer data that is taken and stored somewhere else, to be used in the event of data loss.

Bandwidth

The amount of data that can be transmitted at one time. It is measured in bits per second.

BCC

Blind carbon copy. Covertly send a copy of the message to a third party. The primary recipient cannot see the person was added.

Biometric

Unique physical characteristics that are be used for recognition. The most common types of biometric identifiers are fingerprints, voice, face, iris, and palm/finger veins.

Bit

A single binary number. Computer data is stored in 0s and 1s and that single binary is called a bit.

Blockchain

Also Block Chain. A list of records (blocks) linked using cryptography. These records are a cryptographic hash of the previous block, a timestamp, and transaction data. Blockchains are generally used on a peer-to-peer network. Data in one block cannot be altered without changing all other blocks.

Bluetooth

A wireless technology that allows data to be shared over short distances using short-wave UHF radio signal. The name comes from Harald "Bluetooth" Gormsson, king of Denmark and Norway, who united the Scandinavians.

Boolean

A system of logical propositions. Common Boolean operators: AND, OR, NOT, “ “, ( ) . Based on the work of George Boole.

Broadband

A fast, reliable, always-on connection to the internet.

Browser Add-on

See Browser Extension.

Browser Extension

A small software module that is used to customize a web browser.

Browser Hijack

Where a malicious piece of software modifies a web browser's settings without your permission.

Browser

Short for Web Browser.

Brute Force Attack

Where a hacker tries many passwords for passphrases in an attempt to break into an account. The longer the password (or passphrase) the harder it is for someone to succeed with this type of attack.

Byte

A unit of digital information that consists of eight bits. A byte is the number of bits used to encode a single character of text.

Cache

Temporary storage space that allows your computer to quickly bring up information, such as previously viewed web pages.

Cambridge Analytica

A British political consulting firm that used misappropriated digital assets, data mining, and other processes to influence political elections around the world.

Causation

Relation that holds between two temporally simultaneous or successive events when the first event (the cause) brings about the other (the effect). **NOT** the same as correlation.

CC

Carbon copy. Send a copy of the message to someone else. The primary recipient can see this person received the message.

CD

Compact Disk

Cellular Data

The connection a cell phone makes to a cell tower that allows you to do things like surf the internet, download emails, and send MMS messages.

Circuit Board

Electrical connections made with thin lines of metal affixed to a surface.

Cloud

Storage that is physically somewhere other than where you are. Cloud storage is generally accessible from multiple devices, because those files are stored on a hard drive that belongs to a company that

hosts the cloud service. Cloud storage is like a self-storage unit for your electronic files, except you can access your stuff from anywhere.

Cloud Service

A service provided by a third party or company that allows you to provide access to files and applications remotely.

Codec

A device or program that encodes/decodes a data stream, such as an audio file, for storage.

Contacts / Contact List

A collection of screen names and the various data associated with them, such as email addresses and telephone numbers.

Cookie

A piece of data that a website saves on your computer. Cookies were designed to save user information such as preferences or logins but can sometimes be read by third parties. Cookies are also used to collect browsing data long-term.

Correlation

A mutual relationship or connection between two or more things. See also Causation.

Cortana

Microsoft's virtual assistant.

CPU

Central Processing Unit. The bit of a computer or electronic device that processes information.

CRT

Cathode-Ray Tube

Cryptocurrency

A digital asset that uses strong cryptography and is designed to work as a form of money. They used decentralized control, or a public financial database to keep track of who owns what.

Cryptography

Greek for "hidden writing", it is the study of secure communication—creating protocols to keep third parties from reading private messages.

Data Breach

The release of secure or private information. A data breach can be accidental or malicious, such as when an individual hacks into a system to steal information.

Database

An organized collection of information. Complicated databases link information between multiple tables allowing for analysis of the contained information. An address book is a basic database.

Data Center

Room(s) full of servers that store user data and host online apps and content.

Denial of Service Attack (DOS)

A cyber-attack where the malefactor seeks to make a network resource (such as a website) unavailable by flooding the target with requests or visits.

Dial-up

An early way to connect a home computer to the internet. A phone line was used to connect a personal computer to the Internet Service Provider.

Directory

A system that catalogs / organizes computer files.

DisplayPort

A high-quality audio-visual cable capable of transmitting HD and 4k.

DMCA

Digital Millennium Copyright Act. The 1998 United States copyright law that criminalizes production and dissemination of technology, devices, or services that circumvent measures to control access to copyrighted works (DRM).

DNS

Domain Name System. The phonebook of the Internet.

DNS Hijacking

Where a malefactor redirects visitors from a valid website to a different destination—often one that exists to steal data.

Docking Station

A device, typically connected to a laptop via a Thunderbolt port, that gives a quick and easy connection to multiple peripherals.

Domain Name

The string of text that identifies a place on the Web. A basic domain name is a word or abbreviation followed by a period followed by the domain extension**:** wvu.edu

Domain

The sometimes arbitrary grouping that designates what a website does or where it is based. The most common domains are .com .net .edu and .org. The domain is what you should check first when you want to verify the authenticity of a website.

Download

To move data and files from the internet or a server to your computer or mobile device.

DRM

Digital Rights Management. A format that protects electronic media from being illegally copied.

DVD

Digital Video Disc / Digital Versatile Disc. A digital optical disc data storage system.

DSL

Digital Subscriber Line. A fixed connection to the internet that runs through copper phone lines.

DSLR

Digital Single-Lens Reflex. A camera type that has both a physical lens component and digital storage.

DVI

Digital Video Interface. A video display interface that connects your computer to your monitor.

Dvorak

More efficient layout alternative to the QWERTY keyboard

eBook

An electronic file formatted (for the most part) to be read on a small handheld device, or on a computer screen in an eReader program / app.

eInk

A brand of electronic paper (e-paper) display technology from the E Ink Corporation (1997)

Email Header

The portion of an email message that contains the routing information. The header can be used to help determine if a message is fraudulent.

Email

Email is an electronic letter sent from one email address to another email address. Email addresses always have an @ (at sign) in them. Sending an email on your phone requires the use of cellular data. Each email address is unique, and email addresses are often used as unique identifiers or login credentials by databases.

Emoji

Small images used to represent emotions, ideas, or expressions. 

Emoticons

Representations of facial expressions using keyboard characters. These are used to portray moods or feelings. For example, a smiling face could be :) or ☺

Encryption

The encoding of data so that only authorized persons or devices can read/view the information. The stronger the encryption, the more unlikely it is that a malfeasant could decode the intercepted data through a brute force attack.

EPUB

Electronic Publication. A digital book format that allows you to read your eBook on any electronic device. EPUB files are reflowable.

eReader

eBook device that uses eInk screens which have a similar reading experience to physical books.

Ethernet

Wired networking technology that allows multiple computers to talk to one another via a protocol (set of rules). Ethernet is used when speed, stability, and security are needed.

EULA

End-User License Agreement. The legal contract between a software vendor and the user of that software. It specifies the rights and restrictions which apply to the use of the software.

External Storage

Devices that store data outside of a computer or other electronic device. They are often removable, such as USB thumb drives.

Facebook

An online media and networking company.

Facial Recognition

Technology capable of identifying or verifying a person from a digital image. Facial recognition can be used to unlock an electronic device.

Fiber Optic

A flexible glass or plastic fiber that can transmit light signals with very little loss of strength.

File Extension

Also called a filename extension or file type, is the identifier suffix for a computer file name, and tells you the kind of program needed to open the file. By default, these extensions are hidden, but can still be used in search. If you change a file extension, that file will most often break.

Firewall

A security system that monitors incoming and outgoing network traffic to prevent unauthorized access to a system.

Fixed-layout

Content remains locked in a specific place, when the document is enlarged you often have to scroll around to read the entire thing. A pdf is a fixed-layout document.

Folder

See Directory.

Follow

Choose to see another user's posts in their content feed.

Force Stop

A way to completely stop an app that is running in the background. An app that has been closed may still have bits active and collecting data.

GB

Gigabyte. A computer memory unit equal to 1000 megabytes. The prefix giga means 10^9.

GIF

Graphics Interchange Format. An image format that is often used in logos and animated pictures.

Google

A technology company that specializes in services and products related to the internet.

GPS

Global Positioning System is a piece of hardware that allows a device to contact a satellite to determine the location of the device in latitude and longitude. On most devices, software makes these data points usable to the end user by placing them on a map.

GPU

Graphics Processing Unit. Also: Video card. Part of the motherboard that processes digital images and accelerates computer graphics.

GUI

Graphical User Interface (pronounced gooey). The windows, icons, menus, and pictures that allow you to interact with your computer using your mouse. Windows 10 and Mac OS (Big Sur) are operating system GUIs.

Hard Drive

A data storage device that stores and retrieves digital data. In your computer, this is where all your programs are installed and files saved.

Hardware

The electronic components of a device; the bits you can touch. A cell phone, a keyboard, and a CPU are all hardware.

HD

High Definition. Generally a higher resolution and quality than standard definition video.

HDD

Hard Disk Drive.

HDMI

High-Definition Multimedia Interface. Audio/video interface for transmitting uncompressed data. Cable that connects your computer to your monitor, or your DVD player to your TV.

HDR

High Dynamic Range. A photographic process where a camera takes multiple pictures at different exposures and combines them into a single image—this allows all areas of your image to be well-exposed, but can also look unreal if used too much.

Heat Map

A heat map is a visual representation of data that allows you to see phenomenon as clusters or over space.

Home Screen

The main screen of a computer or mobile device. Home screens are typically personalized by the user so that no two home screens will look alike.

Hotspot

A type of Wireless Access Point. A device that allows you access the internet from a public place. Hotspots are generally open and unsecured and you should assume any data you submit is visible to people with ill-intent.

Hover text

When you hold your cursor over a hyperlink, the document should display the URL for that link. This allows you to verify links.

http

Hypertext Transfer Protocol is how data is moved between a website and an end user.

https

Hypertext Transfer Protocol (Secure) is an encrypted form of http. This protects against interference or snooping by third parties.

iCloud
Apple's cloud service.

Icon
A graphic representation of a program, file, or function.

Information Security
The protection of data and the mitigation of risks, generally on computer networks.

Install
A process that writes the code used to run the program (application) onto the hard drive of your device. Installing a piece of software embeds it into the device and allows it to work.

Internet
A system of inter-connected computer networks.

iOS
Apple's mobile operating system.

iPad
Apple's tablet computer, running iOS.

iPhone
Apple's cellular phone, running iOS.

iPod
Apple's music player. The iPod is generally similar to an iPhone, only without cellular service.

ISBN
International Standard Book Number. A numeric commercial book identifier that is unique for every edition and variation of a book.

ISP
Internet Service Provider. Company you pay so you can have internet at home.

iTunes
Apple's music service.

JPG / JPEG
Joint Photographic Experts Group. A lossy compression format for digital images.

Keyboard
Input device for computers. Physical keyboards are generally membrane or mechanical.

Keylogger
Keystroke logger (also keyboard capture). A piece of hardware or a software program that can record every key struck on the keyboard.

LAN
Local Area Network. A group of computers / devices that share a common communications line.

Last Mile
The service from your local provider to your home.

Latency
The time delay between the sending and receiving computer.

LCD
Liquid-Crystal Display

LED
Light-Emitting Diode

Location Bar
See address bar.

Location Services
Information from GPS, wireless access points, cell towers, and Bluetooth devices that helps your phone know where you are.

Lock Screen
The opening screen or interface of an operating system. A lock screen keeps unauthorized users from accessing the data and information on a device.

Lossless Compression
A form of data encoding that maintains the original quality of the file but at the cost of having a large file size.

Lossy Compression
A form of data encoding used to reduce file size at the cost of data quality.

LTE
Long-Term Evolution, A technology for mobile wireless broadband communication.

Malware
Software is specifically designed to disrupt, damage, or gain unauthorized access to a computer system.

Mbps
Megabits Per Second. The speed of your internet service.

Messenger
An app that allows users to send text messages and images to other users in a system.

Metadata
A data set that gives you information about other data. A card catalog contains metadata.

MFA
Multi-Factor Authentication

Micro-SD
Micro-Secure Digital Card. Smaller size SD card, used in phones and lightweight devices. Comes with an adapter that allows for the transfer for files from a portable device to a computer.

MMS
Multimedia Messaging Service is a kind of text messaging that allows you to send text messages that contain pictures or audio, as well as messages longer than 160 characters or to multiple people.

MOBI

Mobipocket. The proprietary ebook format for the Amazon Kindle. MOBI files are reflowable.

Mobile Carrier

A wireless service provider that allows users to connect portable devices (such as phones) to the internet through a cellular service.

Mobile Data

Wireless internet access through a cellular data connection.

Modem

Modulator-demodulator. A device that converts data from a digital format to a format for analog transmission.

Motherboard

Printed circuit board that holds and connects different electronic parts.

Mouse

A small hand device that allows users to use a GUI (Graphical User Interface) by moving the device and then clicking a button to control the computer.

MP3

Moving Pictures Experts Group Layer-3. A coding format for digital audio.

MP4 / MPEG4

Moving Pictures Experts Group Layer-4. A coding format for digital multi-media, commonly video.

MPEG

Motion Picture Experts Group. A standard for encoding and compressing video.

NDA

Non-Disclosure Agreement. A legally binding contract where parties agree not to share sensitive or confidential information.

Near Field Communication (NFC)

a wireless personal area network (PAN) technology that connects two compatible devices in very close proximity to each other, in order to enable slow but reliable data transfer. It is based on RFID and uses induction coupling to enable communication between two compatible devices that are close.

Network

A group of computers connected for the purpose of sharing resources. A network can be as small as two computers or as vast as the Internet.

News Feed

The main page of Facebook, where you see content posted by users you have chosen to follow. This content can be text or images.

NIC

Network Interface Card / Controller.

Notification

A message displayed by an electronic device to provide an alert, reminder, or other communication.

Online Chat

Real time communication over the internet through (generally short) text messages.

Operating System

The base upon which software and apps are added. An Apple device generally uses iOS (iPhones) or macOS (laptop computers). PCs typically used the Windows OS, but there are other operating systems, such as Linux that can be installed. Non-Apple cell phones frequently use some form of the Android OS. How your device looks and works is dependent upon the operating system installed.

OS

Operating System.

P2P

Peer-to-Peer

Passcode

This is the secret code to get into a specific device. If you have an iPhone and an iPad, they can have different passcodes. You can sometimes use a fingerprint instead of a passcode to get into a device.

Password Manager

A program that stores electronic passwords.

Password

The secret code to access a restricted resource. Passwords are usually required to use a minimum of eight characters, and contain special characters, such as numbers or upper-case letters.

PayPal

A method of online money transfer and payments.

PCIe

Peripheral Component Interconnect Express. A high-speed standard to connect computer components.

PDF

Portable Document Format. Once an Adobe proprietary format, now one of the most common formats for sharing digital documents.

Peer-to-Peer

A distributed that shares tasks or work between devices of the same level.

Peripheral

A hardware component that is accessible to a computer but is not an integrated part of the computer. Mice, printers, and speakers are examples of peripherals.

Phishing

A fraudulent attempt to gain personal or sensitive information, by sending an email or creating a website that pretends to be from a real company or person, but is not.

Phreaking

An attack on the telephone system

PIN

Personal Identification Number.

Play Store
Goggle's app store, where users can download or purchase programs to run on their Android devices.

PNG
Portable Network Graphics. A lossless compression type for digital images.

Podcast
A digital audio file made available on the Internet for downloading to a computer or mobile device, typically available as a series, new installments of which can be received by subscribers automatically.

Post
A message, comment, image, or other item that is placed on the internet, generally on a website.

Predictive Text
An input technology that guesses what you want to type both from what you are currently typing and, if you have allowed the software to learn, from what you have typed in the past. Predictive text makes typing faster and easier if you have good software on the back end.

Privacy
The information that is shared between your device and the external resources to which it is connected, as well as how that information is used, and with whom that information is shared.

Program
A program is a piece of software that lets your device do something like send a text message or video chat. A program is the same thing as an application.

PSU
Power Supply Unit.

Public Network
An electronic connection where the traffic between devices is visible to anyone.

QWERTY
Standard layout on English language keyboards. Those are the first letters on the top row.

RAM
Random Access Memory. A computer's working memory and temporary storage.

Reflowable
An ebook format that changes layout depending upon the output device. MOBI and EPUB are reflowable formats, which means the number of words on the page change, depending upon the page / text size.

Repeater
A device that extends the range of Wi-Fi signal.

Reply All
A response to an electronic message that is returned to ALL recipients of the original message.

Reply
A response to an electronic message.

RFID

Radio Frequency Identification. A wireless, non-contact transfer of data used to identify objects, animals, or humans.

Ripping

Extracting digital content from a container, such as a CD or DVD. Ripping a CD means that the music is copied without loss from the CD to your computer.

ROT-13

One of the most basic forms of encryption; a substitution encryption where characters are rotated 13 places.

Router

A networking device that forwards data between networks.

RTFM

Read The *Fantastic* Manual.

Scraping

Web scraping, web harvesting, web data extraction is extracting data from websites—gathering up information available on a public website.

SD

Standard Definition. The lowest quality rating for digital streaming.

SD Card

Secure Digital Card. Removable memory that is used in devices like cameras, because it can be easily switched out when full. Allows for easy transfer of files from device to computer without a cable.

Search

A computer command that allows you to find specific files on your computer that meet a designated category, such as file type, or date modified.

Search Engine

A software system designed to find information on the web. The results from a search engine can be webpages, files, or images. Generally, behind the scenes a program runs an algorithm that crawls through the web cataloging everything it sees. This catalog is then organized by a different program where pages are associated with various terms.

Security

Protecting electronic systems from theft or damage. This can be protection from physical theft, but often refers to electronic damage, where systems can be disrupted or data stolen.

Server

A device (or program) that allows you to access something not on the device you are physically touching. A mail server stores your email and drops it to your device upon request. A web server allows you to connect to the internet.

Settings

An app that allows you to customize your computer, device, or program.

Siri
Apple's personal assistant.

Smart Device
An electronic device that connects to other devices or the internet through a wireless protocol such as Bluetooth or Wi-Fi.

Smart TV
A television with a network port to allow you to watch streaming services (and other internet content) without having to use an additional device.

SMS
Short Messaging Service. A brief message that is sent from one phone number to another phone number. SMS does not use cellular data.

Snooping
Unauthorized listening in to data transmission.

Snopes
One of the first internet fact-checking resources, Snopes started as a site to debunk urban legends, but expanded into general fact-checking. (https://www.snopes.com/)

Social Media
Interactive computer technologies and websites that allow for the sharing of information. Facebook is the most famous social media site, and allows friends to connect automatically, but LinkedIn is another type of social networking site, that focuses on career and job networking.

Software
The programs that run on your computer or phone. Can also be called an application.

Solid State Drive
Hard drive with integrated circuit board instead of spinning disks and moving heads.

Sort
To organize information in a prescribed sequence, such as alphabetically, or oldest to newest.

Spam
Unsolicited electronic messages (especially advertising).

Speed
Download speed is how quickly you can pull down data from the internet. Upload is how quickly you can send data out to the Internet.

Spoofing
When a person or program pretends to be someone else, by falsifying data, to gain access to your account or data.

Spyware
A piece of malicious software that secretly installs itself to gather information about the user or device.

SRAM
Static Random-Access Memory. A more powerful and energy efficient memory chip.

SSD

Solid State Drive. A storage device for your computer that saves data on chips instead of a mechanical platters.

Status Bar

A graphical element, usually at the top or bottom of a device's screen, that displays information about the state of the device. Some settings commonly found on the status bar are sound/volume, time, and battery life.

Streaming Device

An object, such as Roku stick or Fire stick, you purchase that plugs into your existing TV so you watch video through the device on your existing television.

Streaming Service

An online provider of entertainment (music, movies, etc.) that delivers the content via an Internet connection to the subscriber's computer.

SuperSpeed USB

Also: USB 3.0 A faster iteration of USB.

Switch

A device that connects to a router and provides multiple ports for wired connections.

Sync

See synchronize.

Synchronize

When a file is synced, changes to that file are saved are pushed from one device to all other devices with access to that file, via a remote server.

Tag / Tagging

A keyword or term added to the metadata of a piece of information. In social media, when someone is tagged, they are alerted to a post made by another user.

Taskbar

A graphical user interface (GUI) that is typically along the bottom of your window, and usually shows you what programs are actively running as well as important information about the operating system.

TB

Terabyte. A measure of computer storage equal to 1000 gigabytes or trillion bytes. The prefix tera means 10^{12}.

TCP

Transmission Control Protocol. The main protocol used on the internet that allows computers to send and receive data.

TCP/IP

Transmission Control Protocol/Internet Protocol

Terms of Service

The rules you agree to abide by when you sign up use an online service.

Text Message

A brief message that is sent from one phone number to another phone number via a protocol called SMS. Text messages are generally limited to 160 characters, and messages with more characters than that will be broken down into multiple messages when sent. Text messages are asynchronous**:** a message sent to someone whose phone is off is delivered when their phone is turned back on. Text messages generally do not require cellular data but do require a cellular connection.

Thumb Drive

USB Flash Drive

Thunderbolt

Interface reconfigured to be compatible with USB-C that carries data, video (PCIe and DisplayPort), sound, and power over a single cable.

TIFF / TIF

Tag Image File Format. Lossless digital image format that was developed originally for scanners as an alternative to multiple proprietary formats.

Timeline

A display of items in chronological order. Twitter has a timeline; Facebook has a news feed.

TL;DR

Too Long, Didn't Read

TOS

Terms of Service

Trojans

A type of malicious computer virus that presents itself as a useful item, such as a document.

Two-Factor Authentication

This is a way to make both your device and your account more secure. When you log into your Apple ID on a new iPad (or iPhone) for the first time OR you log into iCloud from a computer you have never used before, Apple wants you to verify that YOU are the person attempting to access your account.

TXT

Text message.

Unfollow

To stop seeing a user's posts in your timeline or news feed. On Facebook, you can unfollow someone but still remain friends with them.

Uninstall

The removal or a software program or application from the operating system of a device. Although uninstall removes the visible aspects of a program, there are often bits and pieces of the program left behind.

Unique Identifier

A piece of data that is unique to a record. Telephone numbers and email addresses are often used as unique identifiers, because no two individuals have the same ones. Unique identifiers allow data records to be linked across databases.

Upload

To move files from your computer to a cloud service or network.

URL

Uniform Resource Locator is the address of a space on the web. Every website has a unique address, and that address can often tell you something about the web page you are visiting.

URL Bar

See address bar.

USB

Universal Serial Bus. This is the industry standard for cables that connect devices and their peripherals through a wire. This connection can be used for both communication and power. There are several types of USB connections: USB-A, USB-A 3.0, mini-USB, micro-USB, USB-C, and Thunderbolt.

USB Flash Drive

Also called a thumb drive or key drive. A small USB data storage device that is removable, rewritable, and can be easily carried in a pocket.

User Data

Any type of data generated by people interacting with software programs. User data includes**:** Explicit Data, which is given by a user directly such as name, address, email, and phone number; Implicit Data, which is not provided by the user directly but gleaned through analysis of user interactions, such as pages visited, session duration, or type of device; and finally External Data which has been gathered from third parties with whom an organization has a relationship.

Username

Also called account name, login ID, user ID. The credentials you use to access an electronic resource, such as your computer or a website. Every account on a website or device must be unique to that service, so as to keep account information separate.

VGA

Video Graphics Array. A connector that takes video signal from a computer and takes it to the monitor (or projector).

Video Card

Also: Graphics Processing Unit. Part of the motherboard that processes digital images and accelerates computer graphics.

Virtual Personal Assistant

A software program that preforms tasks or services based upon verbal commands. Some of the most well-known services are Siri and Alexa.

Viruses

A piece of malicious software that inserts itself into another software program that it uses to replicate itself. Ransomware is a software virus.

WAV

Waveform Audio File Format. An audio file standard for uncompressed audio.

Web

Also called the World Wide Web, this is an information space on the Internet that is accessible from devices such as computers, cell phones, and tablets, using a URL as the address.

Web Browser

A software program that allows you to access sites on the Internet, or web.

Web Cookie

See Cookie.

Website

A location connected to the Internet that maintains one or more pages on the World Wide Web

Wi-Fi

Short for wireless (the “fi” is an arbitrary syllable added on)

Widget

A graphical element that displays information or provides quick access to certain parts of an app. Mobile devices frequently have a weather widget that is linked to your weather app, and which tells you the current temperature and forecast.

Wireless Access Point

A device that allows your device to access the internet. If a wireless access point (or router) does not have a password, it is unsecure, and you should assume that anyone can see what you are doing on your device.

Wireless Router

A piece of hardware that allows devices to connect to the internet without being plugged into the wall. Your wireless at home should be password protected, so that strangers cannot access all devices in your home using that wireless network.

Wireless

A technology that allows computers to connect to a network and/or the internet without using a physical connection. Wireless is available in an area when a wireless access point (also called a hotspot) has been created and made accessible to devices. Public wireless is less secure and caution should be used (ie, don’t make purchases or send private emails over a wireless network). Private wireless networks (such as in your home) should be secured with a password.

WWW

World Wide Web. An information system on the Internet which allows documents to be connected to other documents by hypertext links, enabling the user to search for information by moving from one document to another.

Index

Please Support OLLI@WVU!

Osher Lifelong Learning Institute
Mountaineer Mall Unit C-17
PO Box 9123
Morgantown, WV 26506-9123
Office: (304) 293-1793
Email Address: olli@hsc.wvu.edu
http://www.olliatwvu.org