

Computer Basics

Chapter 01 Outcomes

- To Define and Explain the functions of a computer
- To Explain the parts of computer
- Identify types and uses of software
- Identify types and characteristics of various classes of computers
- Explain the difference between data, information, and Knowledge
- How to protect computer from viruses

What is a computer?

A **computer** is an electronic device that manipulates information, or data. It has the ability to **store, retrieve, and process** data. You may already know that you can use a computer to **type documents, send email, play games, and browse the Web**. You can also use it to edit or create **spreadsheets, presentations, and even videos**.

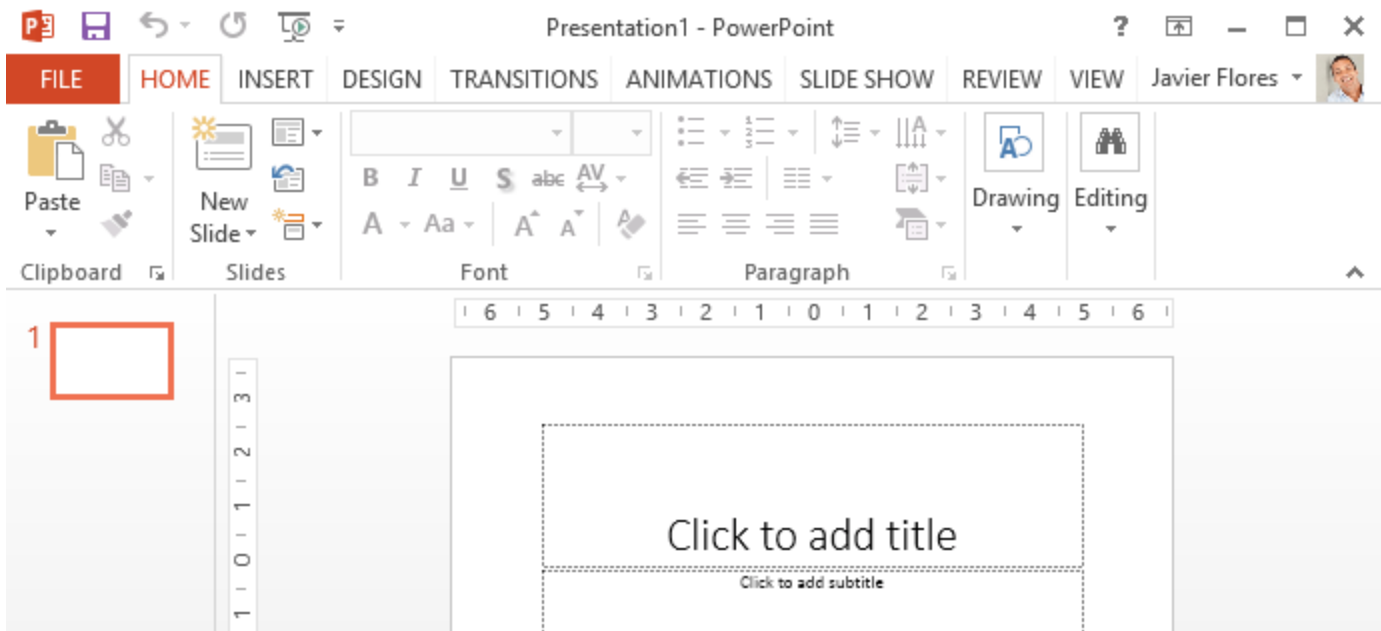
Hardware vs. software

Before we talk about different types of computers, let's talk about two things all computers have in common: **hardware** and **software**.

- **Hardware** is any part of your computer that has a **physical structure**, such as the keyboard or mouse. It also includes all of the computer's internal parts, which you can see in the image below.



- **Software** is any **set of instructions** that tells the hardware **what to do and how to do it**. Examples of software include web browsers, games, and word processors. Below, you can see an image of Microsoft PowerPoint, which is used to create presentations.



Everything you do on your computer will rely on both hardware and software. For example, right now you may be viewing this lesson in a **web browser** (software) and using your **mouse** (hardware) to click from page to page. As you learn about different types of computers, ask yourself about the differences in their hardware. As you progress through this tutorial, you'll see that different types of computers also often use different types of software.

What are the different types of computers?

When most people hear the word **computer**, they think of a **personal computer** such as a **desktop** or **laptop**. However, computers come in many shapes and sizes, and they perform many different functions in our daily lives. When you withdraw cash from an ATM, scan groceries at the store, or use a calculator, you're using a type of computer.

Desktop computers



Many people use **desktop computers** at work, home, and school. Desktop computers are designed to be placed on a desk, and they're typically made up of a few different parts, including the **computer case**, **monitor**, **keyboard**, and **mouse**.

Laptop computers



The second type of computer you may be familiar with is a **laptop computer**, commonly called a laptop. Laptops are battery-powered computers that are **more portable** than desktops, allowing you to use them almost anywhere.

Tablet computers



Tablet computers—or **tablets**—are handheld computers that are even more portable than laptops. Instead of a keyboard and mouse, tablets use a **touch-sensitive screen** for typing and navigation. The **iPad** is an example of a tablet.

Servers



A **server** is a computer that serves up information to other computers on a network. For example, whenever you use the Internet, you're looking at something that's stored on a server. Many businesses also use local **file servers** to store and share files internally.

Other types of computers

Many of today's electronics are basically **specialized computers**, though we don't always think of them that way. Here are a few common examples.

- **Smartphones:** Many cell phones can do a lot of things computers can do, including browsing the Internet and playing games. They are often called **smartphones**.

- **Wearables:** Wearable technology is a general term for a group of devices—including **fitness trackers** and **smartwatches**—that are designed to be worn throughout the day. These devices are often called **wearables** for short.
- **Game consoles:** A **game console** is a specialized type of computer that is used for playing *** **games** on your TV.
- **TVs:** Many TVs now include **applications**—or **apps**—that let you access various types of online content. For example, you can stream *** from the Internet directly onto your TV.

PCs and Macs

Personal computers come in two main styles: **PC** and **Mac**. Both are fully functional, but they have a different look and feel, and many people prefer one or the other.

PCs



This type of computer began with the original **IBM PC** that was introduced in 1981. Other companies began creating similar computers, which were called **IBM PC Compatible** (often shortened to **PC**). Today, this is the most common type of personal computer, and it typically includes the **Microsoft Windows** operating system.

Macs



The **Macintosh** computer was introduced in 1984, and it was the first widely sold personal computer with a graphical user interface, or **GUI** (pronounced **gooey**). All Macs are made by one company (**Apple**), and they almost always use the **Mac OS X** operating system.

Computer Basics **measurement units in computer**

Memory unit is the amount of data that can be stored in the storage unit. This storage capacity is expressed in terms of Bytes.

The following table explains the main memory storage units –

S.No.	Unit & Description
1	Bit (Binary Digit) A binary digit is logical 0 and 1 representing a passive or an active state of a component in an electric circuit.
2	Nibble A group of 4 bits is called nibble.
3	Byte A group of 8 bits is called byte. A byte is the smallest unit, which can represent a data item or a character.

4	<p style="text-align: center;">Word</p> <p>A computer word, like a byte, is a group of fixed number of bits processed as a unit, which varies from computer to computer but is fixed for each computer.</p> <p>The length of a computer word is called word-size or word length. It may be as small as 8 bits or may be as long as 96 bits. A computer stores the information in the form of computer words.</p>
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The following table lists some higher storage units –

S.No.	Unit & Description
1	<p style="text-align: center;">Kilobyte (KB)</p> <p style="text-align: center;">1 KB = 1024 Bytes</p>
2	<p style="text-align: center;">Megabyte (MB)</p> <p style="text-align: center;">1 MB = 1024 KB</p>
3	<p style="text-align: center;">GigaByte (GB)</p> <p style="text-align: center;">1 GB = 1024 MB</p>
4	<p style="text-align: center;">TeraByte (TB)</p> <p style="text-align: center;">1 TB = 1024 GB</p>
5	<p style="text-align: center;">PetaByte (PB)</p> <p style="text-align: center;">1 PB = 1024 TB</p>

Introduction

Take a look at the front and back of your computer case and count the number of **buttons**, **ports**, and **slots** you see. Now look at your monitor and count any you find there. You probably counted at least 10, and maybe a lot more.

Each computer is different, so the buttons, ports, and sockets will **vary from computer to computer**. However, there are certain ones you can expect to find on

most desktop computers. Learning how these ports are used will help whenever you need to connect something to your computer, like a new printer, keyboard, or mouse.

Front of a computer case

Click the buttons in the interactive below to become familiar with the front of a computer.



Back of a computer case

The back of a computer case has **connection ports** that are made to fit **specific devices**. The placement will vary from computer to computer, and many companies have their own special connectors for specific devices. Some of the ports may be **color coded** to help you determine which port is used with a particular device.

Click the buttons in the interactive below to become familiar with the back of a computer.



Other types of ports

There are many other types of ports, such as FireWire, Thunderbolt, and HDMI. If your computer has ports you don't recognize, you should consult your manual for more information.

Now you try it! Practice connecting the cables with the interactive game below.

Peripherals you can use with your computer

The most basic computer setup usually includes the **computer case**, **monitor**, **keyboard**, and **mouse**, but you can plug many different types of devices into the extra ports on your computer. These devices are called **peripherals**. Let's take a look at some of the most common ones.

- **Printers:** A **printer** is used to **print** documents, photos, and anything else that appears on your screen. There are many types of printers, including **inkjet**, **laser**, and **photo** printers. There are even **all-in-one printers**, which can also scan and copy documents.



- **Scanners:** A **scanner** allows you to **copy a physical image or document** and save it to your computer as a **digital (computer-readable)** image. Many scanners are included as part of an all-in-one printer, although you can also buy a separate **flatbed** or **handheld** scanner.
- **Speakers/headphones:** **Speakers** and **headphones** are output devices, which means they send information from the computer to the user—in this case, they allow you to **hear sound and music**. Depending on the model, they may connect to the **audio** port or the **USB** port. Some monitors also have built-in speakers.



- **Microphones:** A **microphone** is a type of input device, or a device that receives information from a user. You can connect a microphone to **record sound** or **talk with someone else** over the Internet. Many laptop computers come with built-in microphones.
- **Web cameras:** A **web camera**—or **webcam**—is a type of input device that can record **videos** and take **pictures**. It can also transmit video over the Internet in **real time**, which allows for **video chat** or **video conferencing** with someone else. Many webcams also include a microphone for this reason.



- **Game controllers and joysticks:** A game controller is used to control computer games. There are many other types of controllers you can use, including **joysticks**, although you can also use your **mouse** and **keyboard** to control most games.

- **Digital cameras:** A **digital camera** lets you capture pictures and videos in a digital format. By connecting the camera to your computer's USB port, you can transfer the images from the camera to the computer.
- **Mobile phones, MP3 players, tablet computers, and other devices:** Whenever you buy an electronic device, such as a mobile phone or MP3 player, check to see if it comes with a **USB cable**. If it does, this means you can most likely connect it to your computer.

Inside a computer

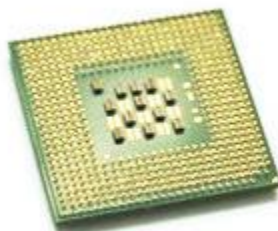
Have you ever looked **inside a computer case**, or seen pictures of the inside of one? The small parts may look complicated, but the inside of a computer case isn't really all that mysterious. This lesson will help you master some of the basic **terminology** and understand a bit more about what goes on inside a computer.

Motherboard



The **motherboard** is the computer's **main circuit board**. It's a thin plate that holds the CPU, memory, connectors for the hard drive and optical drives, expansion cards to control the video and audio, and connections to your computer's ports (such as USB ports). The motherboard connects directly or indirectly to every part of the computer.

CPU/processor



The central processing unit (CPU), also called a **processor**, is located inside the **computer case** on the motherboard. It is sometimes called the brain of the computer, and its job is to carry out commands. Whenever you press a key, click the mouse, or start an application, you're sending instructions to the CPU.

The CPU is usually a **two-inch ceramic square** with a **silicon chip** located inside. The chip is usually about the size of a thumbnail. The CPU fits into the motherboard's **CPU socket**, which is covered by the **heat sink**, an object that absorbs heat from the CPU. A processor's **speed** is measured in **megahertz (MHz)**, or millions of instructions per second; and **gigahertz (GHz)**, or billions of instructions per second. A faster processor can execute instructions more quickly. However, the actual speed of the computer depends on the speed of many different components—not just the processor.

RAM (random access memory)



RAM is your system's **short-term memory**. Whenever your computer performs calculations, it temporarily stores the data in the RAM until it is needed.

This **short-term memory disappears** when the computer is turned off. If you're working on a document, spreadsheet, or other type of file, you'll need to **save** it to avoid losing it. When you save a file, the data is written to the **hard drive**, which acts as **long-term storage**.

RAM is measured in **megabytes (MB)** or **gigabytes (GB)**. The **more RAM** you have, the more things your computer can do at the same time. If you don't have enough RAM, you may notice that your computer is sluggish when you have several programs open. Because of this, many people add **extra RAM** to their computers to improve performance.

Hard drive



The **hard drive** is where your software, documents, and other files are stored. The hard drive is **long-term storage**, which means the data is still saved even if you turn the computer off or unplug it.

When you run a program or open a file, the computer copies some of the data from the **hard drive** onto the **RAM**. When you **save** a file, the data is copied back to the **hard drive**. The faster the hard drive, the faster your computer can **start up** and **load programs**.

Power supply unit



The power supply unit in a computer **converts the power** from the wall outlet to the type of power needed by the computer. It sends power through cables to the motherboard and other components.

If you decide to open the computer case and take a look, make sure to **unplug** the computer first. Before touching the inside of the computer, you should touch a

grounded metal object—or a metal part of the computer casing—to discharge any static buildup. Static electricity can be transmitted through the computer circuits, which can seriously damage your machine.

Expansion cards

Most computers have **expansion slots** on the motherboard that allow you to add various types of **expansion cards**. These are sometimes called **PCI (peripheral component interconnect) cards**. You may never need to add any PCI cards because most motherboards have built-in video, sound, network, and other capabilities. However, if you want to boost the performance of your computer or update the capabilities of an older computer, you can always add one or more cards. Below are some of the most common types of expansion cards.

Video card



The **video card** is responsible for **what you see** on the monitor. Most computers have a **GPU (graphics processing unit)** built into the motherboard instead of having a separate video card. If you like playing graphics-intensive games, you can add a faster video card to one of the **expansion slots** to get better performance.

Sound card

The **sound card**—also called an audio card—is responsible for **what you hear** in the speakers or headphones. Most motherboards have integrated sound, but you can upgrade to a dedicated sound card for higher-quality sound.

Network card



The **network card** allows your computer to communicate over a network and access the Internet. It can either connect with an **Ethernet** cable or through a **wireless** connection (often called **Wi-Fi**). Many motherboards have built-in network connections, and a network card can also be added to an expansion slot.

Bluetooth card (or adapter)



Bluetooth is a technology for wireless communication over short distances. It's often used in computers to communicate with wireless **keyboards**, **mice**, and **printers**. It's commonly built into the motherboard or included in a **wireless network card**. For computers that don't have Bluetooth, you can purchase a USB adapter, often called a **dongle**.

What is a laptop computer?

A laptop is a personal computer that can be **easily moved** and used in a variety of locations. Most laptops are designed to have all of the functionality of a desktop computer, which means they can generally run the same **software** and open the same types of **files**. However, laptops also tend to be more expensive than comparable desktop computers.

How is a laptop different from a desktop?

Because laptops are designed for portability, there are some important differences between them and desktop computers. A laptop has an **all-in-one design**, with a built-in **monitor, keyboard, touchpad** (which replaces the mouse), and **speakers**. This means it is fully functional, even when no peripherals are connected. A laptop is also quicker to set up, and there are fewer cables to get in the way.

You'll also have the option to connect a regular mouse, larger monitor, and other peripherals. This basically **turns your laptop into a desktop computer**, with one main difference: You can easily disconnect the peripherals and take the laptop with you wherever you go.

Here are the main differences you can expect with a laptop.

- **Touchpad:** A touchpad—also called a **trackpad**—is a touch-sensitive pad that lets you control the pointer by making a drawing motion with your finger.



- **Battery:** Every laptop has a battery, which allows you to use the laptop when it's not plugged in. Whenever you plug in the laptop, the battery **recharges**. Another benefit of having a battery is that it can provide **backup power** to the laptop if the power goes out.
- **AC adapter:** A laptop usually has a specialized power cable called an **AC adapter**, which is designed to be used with that specific type of laptop.



- **Ports:** Most laptops have the same types of ports found on desktop computers (such as **USB**), although they usually have **fewer ports** to save space. However, some ports may be different, and you may need an adapter in order to use them.

- **Price:** Generally speaking, laptops tend to be **more expensive** than a desktop computer with the same internal components. While you may find that some basic laptops cost less than desktop computers, these are usually much less powerful machines

What is a mobile device?

A mobile device is a general term for any type of **handheld computer**. These devices are designed to be extremely portable, and they can often fit in your hand. Some mobile devices—like **tablets**, **e-readers**, and **smartphones**—are powerful enough to do many of the same things you can do with a desktop or laptop computer.

Tablet computers

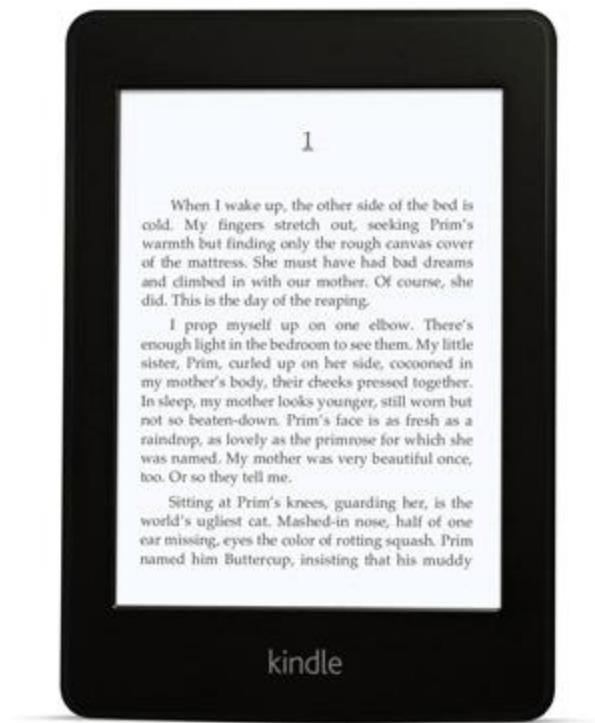
Like laptops, **tablet computers** are designed to be portable. However, they provide a different computing experience. The most obvious difference is that tablet computers don't have keyboards or touchpads. Instead, the entire screen is touch-sensitive, allowing you to type on a **virtual keyboard** and use your finger as a mouse pointer.



Tablet computers can't necessarily do everything traditional computers can do. For many people, a traditional computer like a **desktop** or **laptop** is still needed in order to use some programs. However, the convenience of a tablet computer means it may be ideal as a **second computer**.

E-readers

E-book readers—also called **e-readers**—are similar to tablet computers, except they are mainly designed for reading **e-books** (digital, downloadable books). Notable examples include the **Amazon Kindle**, **Barnes & Noble Nook**, and **Kobo**. Most e-readers use an **e-ink** display, which is easier to read than a traditional computer display. You can even read in bright sunlight, just like if you were reading a regular book.



You don't need an e-reader to read e-books. They can also be read on **tablets, smartphones, laptops, and desktops.**

Smartphones

A smartphone is a more powerful version of a traditional cell phone. In addition to the same basic features—phone calls, voicemail, text messaging—smartphones can **connect to the Internet** over Wi-Fi or a cellular network (which requires purchasing a monthly **data plan**). This means you can use a smartphone for the same things you would normally do on a computer, such as checking your email, browsing the Web, or shopping online.



Most smartphones use a **touch-sensitive screen**, meaning there isn't a physical keyboard on the device. Instead, you'll type on a virtual keyboard and use your fingers to interact with the display.

Other standard features include a high-quality digital camera and the ability to play digital music and video files. For many people, a smartphone can actually replace electronics like an old laptop, digital music player, and digital camera in the same device.

What is an application?

You may have heard people talking about using a **program**, an **application**, or an **app**. But what exactly does that mean? Simply put, an **app** is a type of software that allows you to **perform specific tasks**. Applications for desktop or laptop computers are sometimes called **desktop applications**, while those for mobile devices are called **mobile apps**.

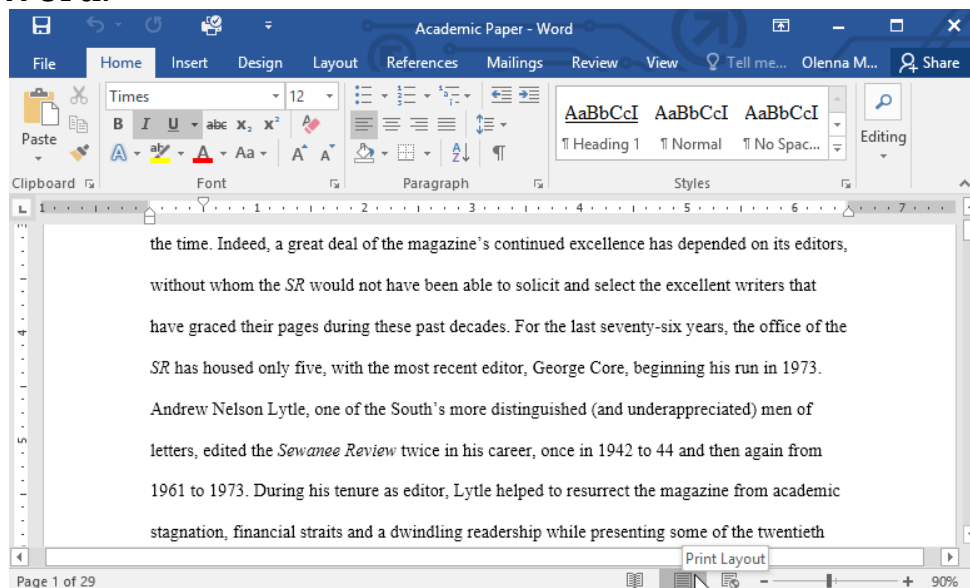
When you open an application, it runs inside the **operating system** until you close it. Most of the time, you will have more than one application open at the same time, which is known as **multi-tasking**.

App is a common term for an **application**, especially for **simple applications** that can be downloaded **inexpensively** or even **for free**. Many apps are also available for **mobile devices** and even some **TVs**.

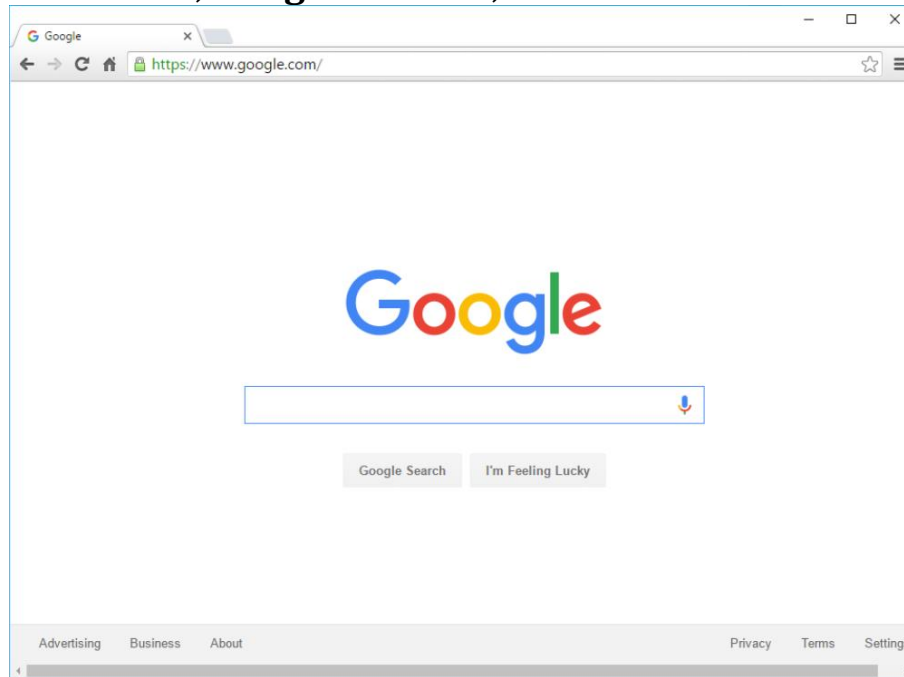
Desktop applications

There are countless desktop applications, and they fall into several categories. Some are more **full featured** (like **Microsoft Word**), while others may only do **one or two things** (like a **clock** or **calendar** app). Below are just a few types of applications you might use.

- **Word processors:** A word processor allows you to write a letter, design a flyer, and create many other types of documents. The most well-known word processor is **Microsoft Word**.



- **Web browsers:** A **web browser** is the tool you use to access the **Internet**. Most computers come with a web browser **pre-installed**, but you can also download a different one if you prefer. Examples of browsers include **Internet Explorer**, **Mozilla Firefox**, **Google Chrome**, and **Safari**.



- **Media players:** If you want to listen to **MP3s** or watch **movies** you've downloaded, you'll need to use a **media player**. **Windows Media Player** and **iTunes** are popular media players.

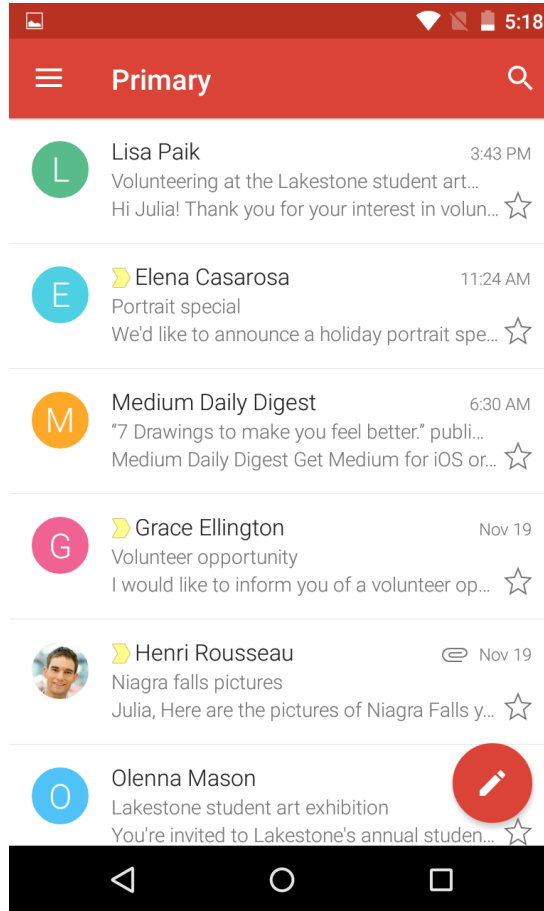


- **Games:** There are many types of games you can play on your computer. They range from card games like **Solitaire** to action games like **Halo**. Many action games require a lot of **computing power**, so they may not work unless you have a newer computer.

Mobile apps

Desktop and laptop computers aren't the only devices that can run applications. You can also download apps for mobile devices like **smartphones** and **tablets**. Here are a few examples of mobile apps.

- **Gmail:** You can use the Gmail app to easily view and send emails from your mobile device. It's available for [Android](#) and [iOS](#) devices.



- **Instagram:** You can use Instagram to quickly share photos with your friends and family. It's available for [Android](#) and [iOS](#).
 - **Duolingo:** With a combination of quizzes, games, and other activities, this app can help you learn new languages. It's available for [Android](#) and [iOS](#).
- GCFLearnFree.org offers a variety of **mobile apps**. You can go to our [Mobile Apps page](#) to download them for free.

Installing new applications

Every computer and mobile device will come with some applications already built in, such as a web browser and media player. However, you can also purchase and install new apps to add more functionality.

Computer Basics

Getting Started with Your First Computer

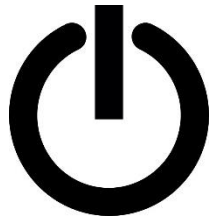
Getting started with your first computer

A computer is more than just another household appliance. The vast amount of information and possibilities can be overwhelming. But you can accomplish a lot with a computer, and using one can be a good experience. Let's walk through getting started with your first computer.

Turning on a computer for the first time can be different from one computer to the next. Your experience could be different from this lesson. It's OK to ask someone for help.

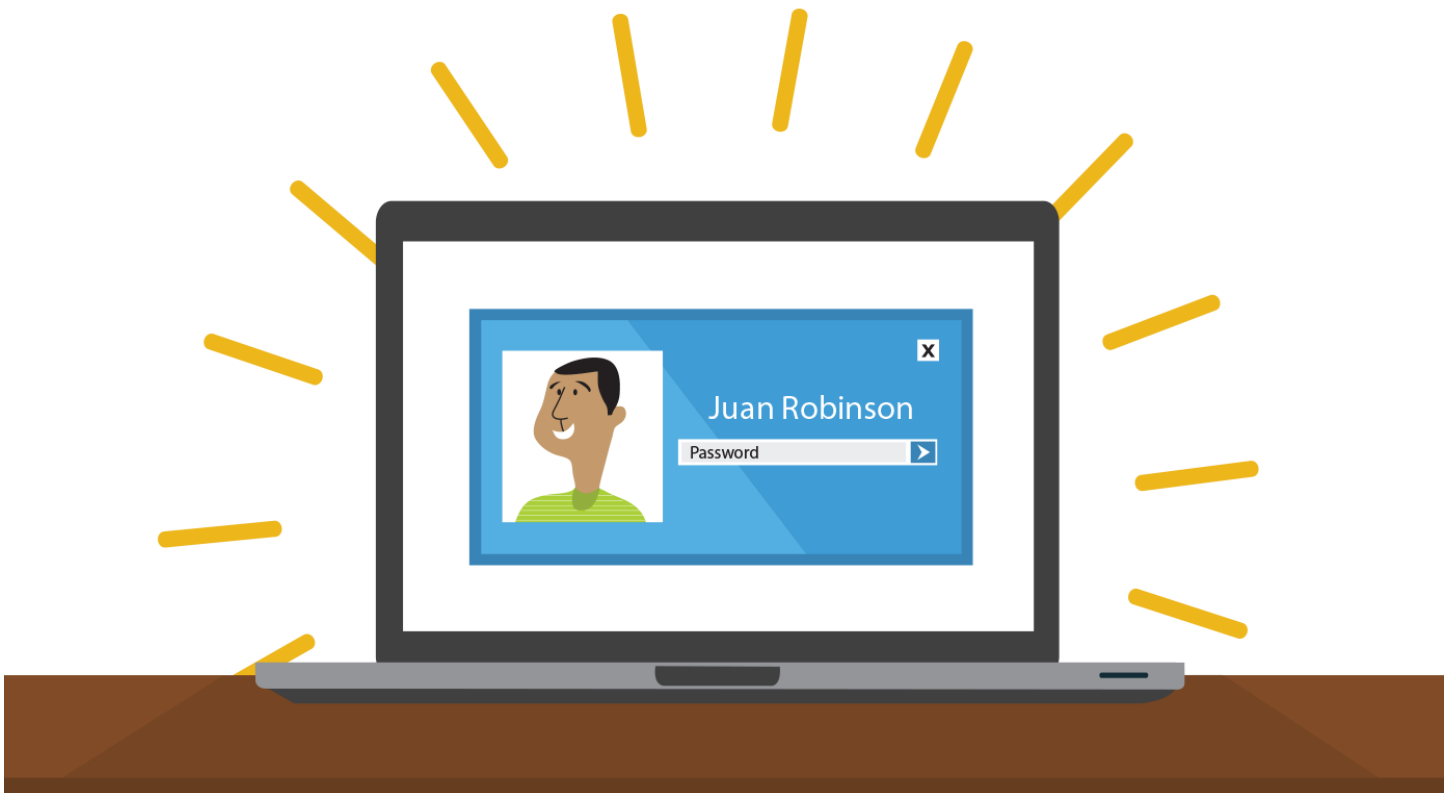
Turning on a computer

The very first step is to **turn on** the computer. To do this, locate and press the **power** button. It's in a different place on every computer, but it will have the universal power button symbol (shown below).



Once turned on, your computer takes time before it's ready to use. You may see a few different displays flash on the screen. This process is called **booting up**, and it can take anywhere from 15 seconds to several minutes.

Once the computer has **booted up**, it may be ready to use, or it may require you to **log in**. This means identifying yourself by typing your user name or selecting your profile, then typing your password. If you've never logged in to your computer before, you may need to **create an account**.



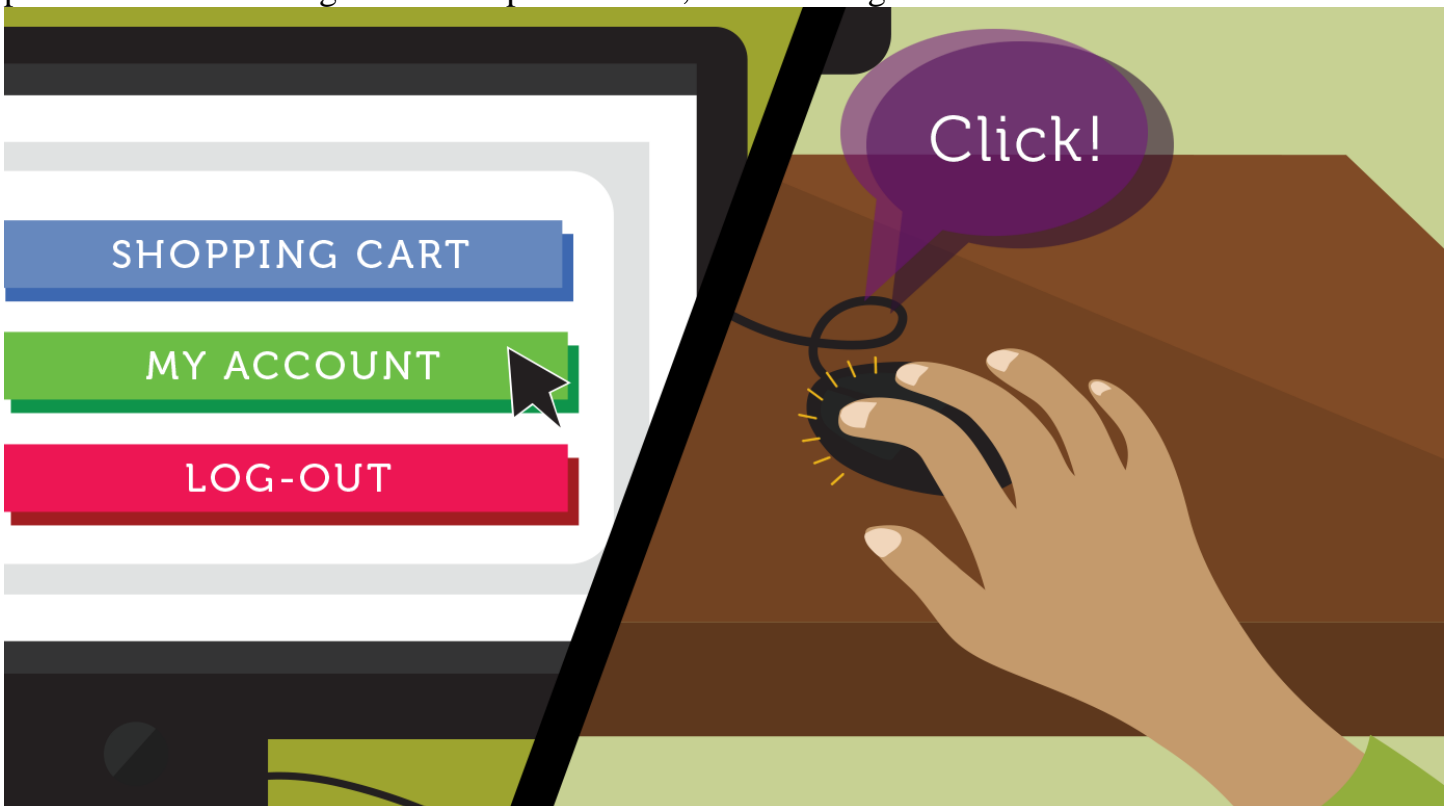
The keyboard and mouse

You interact with a computer mainly by using the **keyboard** and **mouse**, or a **trackpad** on laptops. Learning to use these devices is essential to learning to use a computer. Most people find it

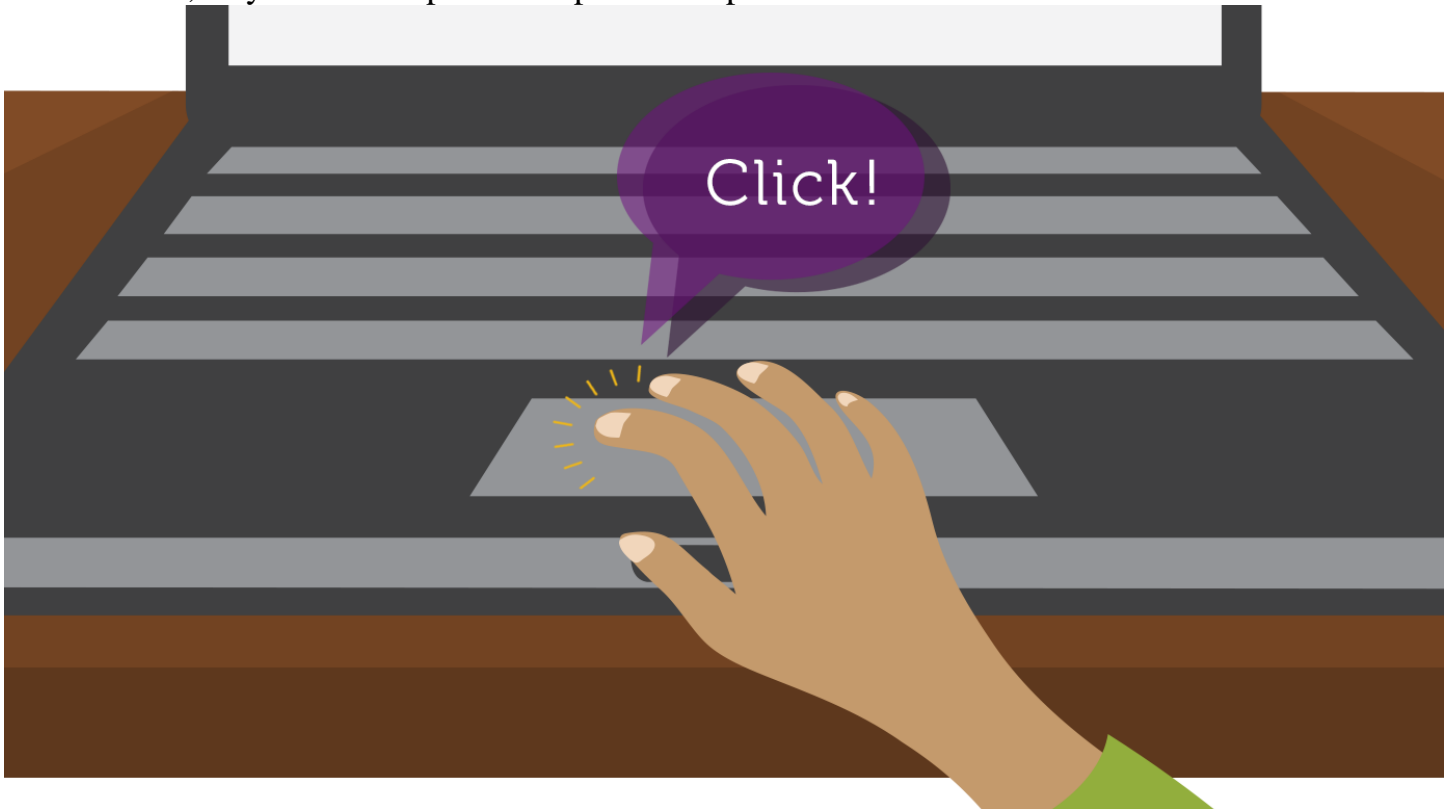
comfortable to place the keyboard on the desk directly in front of them and the mouse to one side of the keyboard.



The mouse controls the **pointer** on the screen. Whenever you move the mouse across the desk, the pointer will move in a similar manner. A mouse usually has two buttons, which are referred to as the left button and the right button. You will often interact with the computer by moving the mouse pointer over something on the computer screen, then clicking one of the buttons.



On laptops, you can use the **trackpad**, located below the keyboard, instead of a mouse. Simply drag your finger across the trackpad to move the **pointer** on the screen. Some trackpads do not have buttons, so you'll either press or tap the trackpad to click.



The keyboard allows you to type letters, numbers, and words into the computer. Whenever you see a flashing vertical line—called the **cursor**—you can start typing.



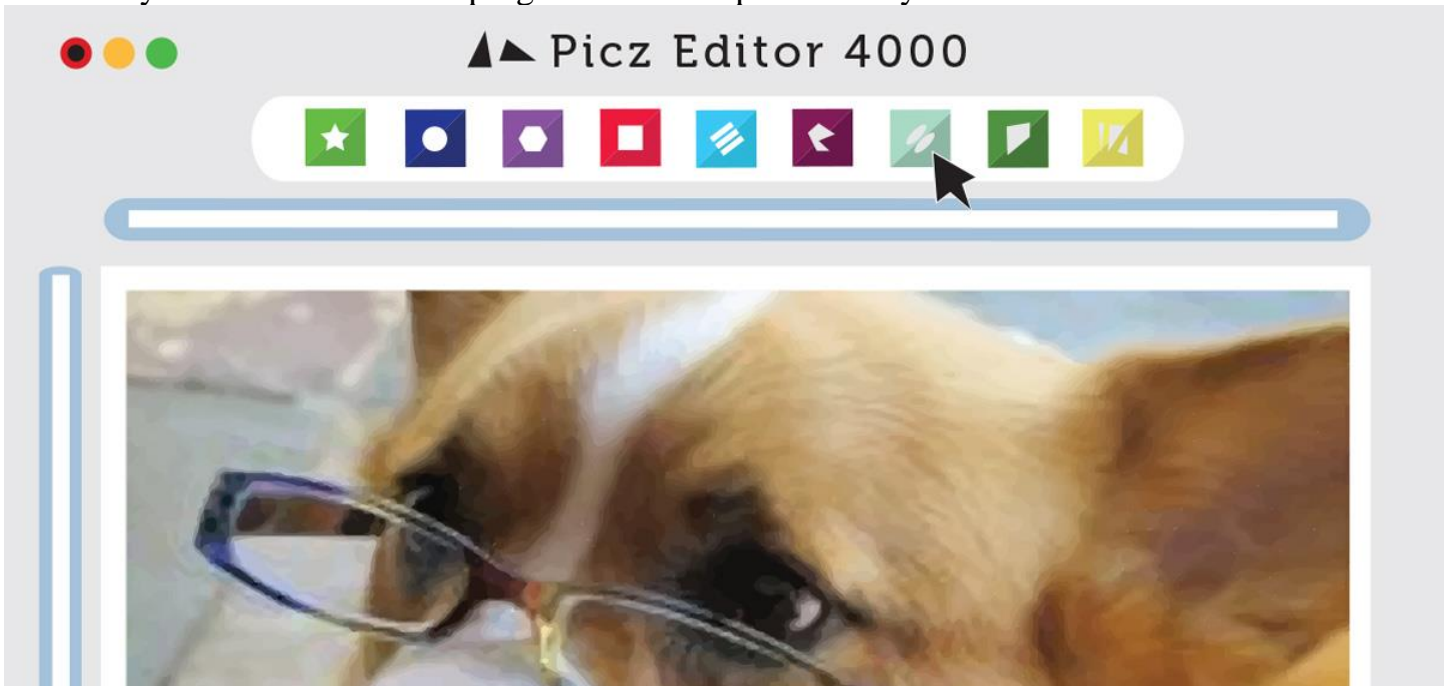
Note that the **mouse pointer** is also called a **cursor**, but it is shaped differently. The **keyboard cursor** is also called the **insertion point**.

Using a computer

The main screen you'll start from is the **desktop**. This is sort of like a main menu or a table of contents. From here, you can access the programs and features you need to use your computer. **Icons** are used to represent the different files, applications, and commands on your computer. An icon is a small image that's intended to give you an idea at a glance of what it represents, like a logo. Double-clicking an icon on the desktop will open that application or file.



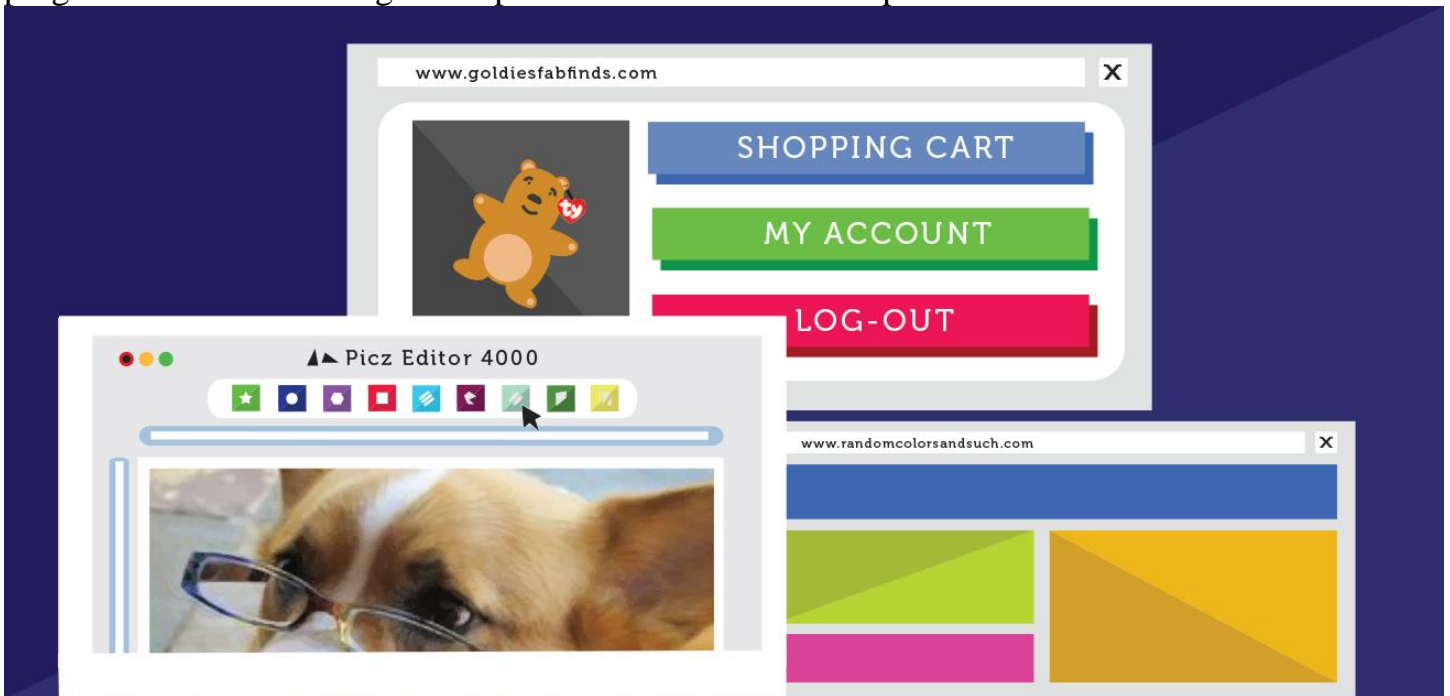
A **button** is a command that performs a specific function within an application. The most commonly used commands in a program will be represented by buttons.



Menus are organized collections of commands and shortcuts. Click a **menu** to open it and display the commands and shortcuts within. Then click an item in the **menu** to execute it.



When you open an application or folder, it is displayed in its own **window**. A **window** is a contained area—like a picture within a picture—with its own menus and buttons specific to that program. You can rearrange multiple **windows** on the desktop and switch between them.



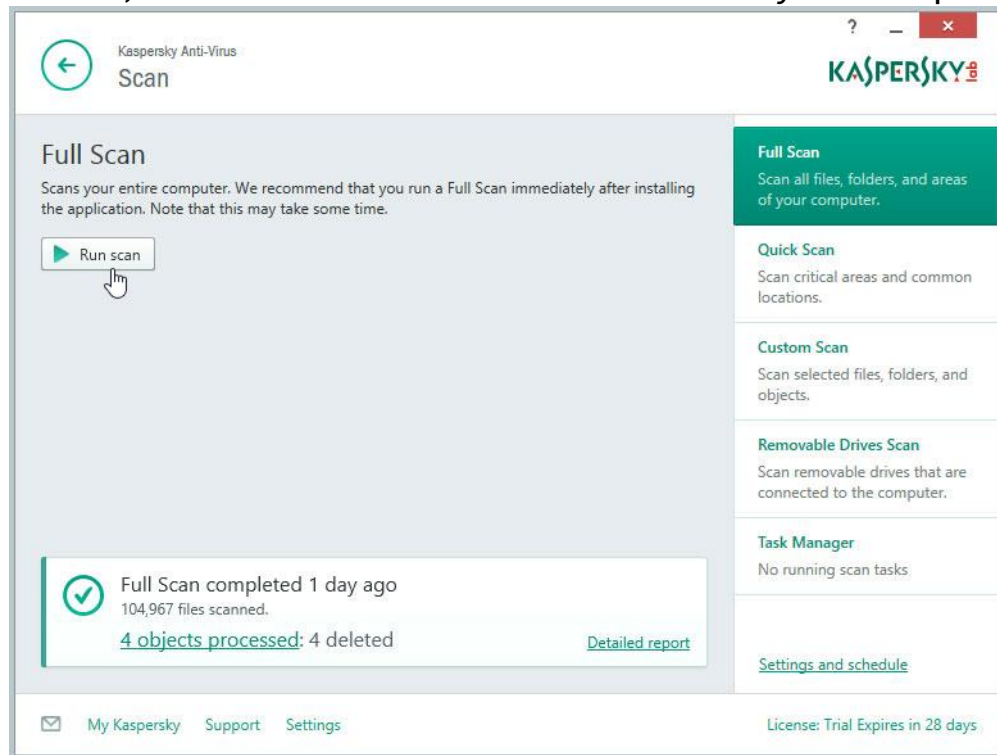
Protecting your computer

Your computer faces many potential threats, including **viruses**, **malware**, and **hard drive failure**. This is why it's important to do everything you can to protect your computer and your files.

Safeguarding against malware

Malware is any type of software that is designed to **damage your computer** or gain **unauthorized access** to your personal information. It includes **viruses**, **worms**, **Trojan horses**, and **spyware**. Most malware is distributed over the **Internet** and is often bundled with other software.

The best way to guard against malware is to install **antivirus software**, such as [Bitdefender](#), [Norton](#), or [Kaspersky](#). Antivirus software helps to **prevent** malware from being installed, and it can also **remove** malware from your computer.



It's also important to **stay smart** when you're browsing the Web or using email. If a website or email attachment looks suspicious, trust your instincts. Keep in mind that your antivirus program **may not catch everything**, so it's best to avoid downloading anything that might contain malware.

To learn more about protecting your computer from malware, check out [How to Avoid Malware](#) in our [Internet Safety](#) tutorial.

Backing up your computer

Imagine what would happen if your computer suddenly stopped working. Would you lose any important documents, photos, or other files? It may be possible to repair your computer, but your files may be **lost forever**. Luckily, you can prevent this by creating **backup** copies of all of your files (or just the important ones) on an **external hard drive** or an **online backup service**.

External hard drives



You can purchase an **external hard drive** and copy the contents of your computer to it. The **initial backup could take several hours**, so you will need to select a period of time when you do not need access to your computer. Running the backup overnight usually works best. Follow-up backups should be conducted on a regular basis, but they should not take as long.

One drawback is that an external hard drive can be lost, damaged, or stolen—just as your computer might be. This is why it's important to keep your drive in a **secure location** when not in use.

Online backup services

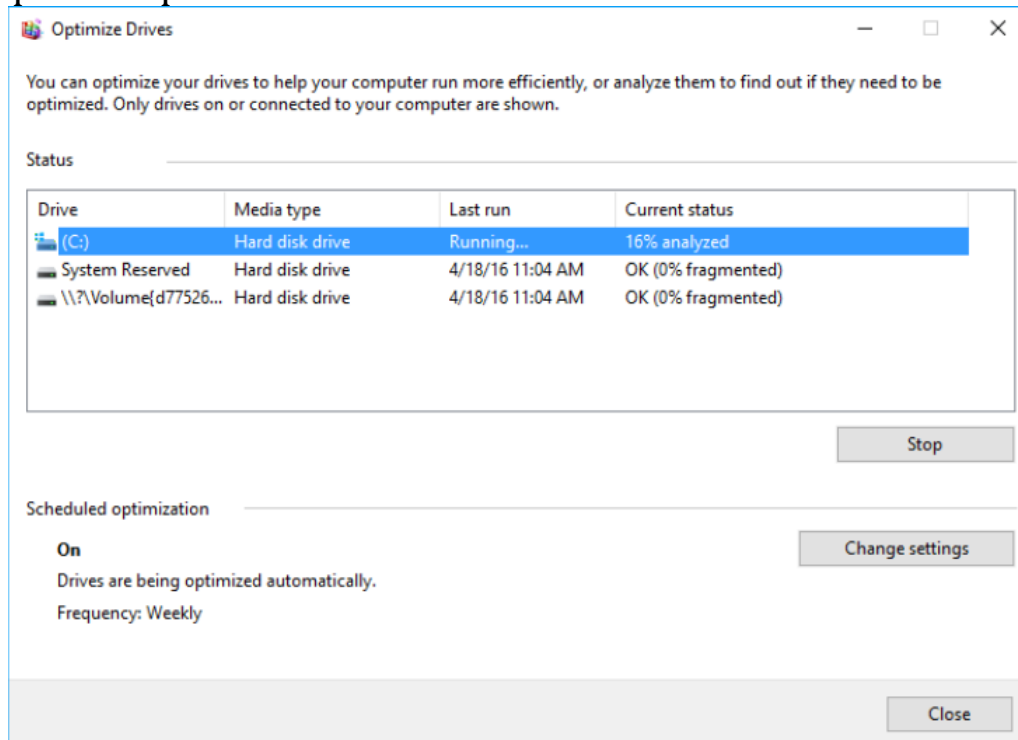
You can also back up your files to an **online backup service** like [Mozy](#), [Carbonite](#), or [Box](#). These services will back up your files **in the cloud**, which means you'll be able to recover them from any computer with an Internet connection. The amount of storage provided by these sites varies, and you will need probably need to pay a fee for adequate storage space.

One drawback to online backup services is that the **initial backup can be slow** and may even take days to upload if you have a lot of files. However, subsequent backups should not take as long.

Other maintenance techniques

To keep your computer running smoothly, it's important to keep files and folders **uncluttered**. Cluttered or unorganized folders make it more difficult to find the files you need. Additionally, unwanted files can eventually fill up your **hard drive**, which will make your computer slower and more difficult to use. Here are a few things you can do to delete unwanted files and improve your computer's performance.

- **Delete files:** If you have any unwanted files, you can delete them manually. To do this, drag them to the **Recycle Bin** or **Trash**, then empty it to permanently delete the files.
- **Run the Disk Defragmenter:** Windows includes a **Disk Defragmenter** program in the Control Panel. If your computer is running slowly, running Disk Defragmenter can help to speed it up.



- **Run a Disk Cleanup:** Windows also includes a **Disk Cleanup** program in the Control Panel. It scans your computer for **temporary files** and other files that can be deleted. You can then delete the files to free up space on your hard drive.

