Hardware and Networking

Dismantling of a Computer

Step 1: Unplugging

Unplug ever cable that is connected to the computer

Wear a grounding strap or touch an unpainted metal part of the computer to discharge any static electricity. If you walk across a carpet at any point, touch an unpainted metal part of the computer again to discharge the built up static electricity.

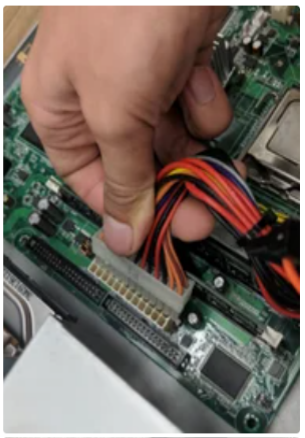
Step 2: The Casing

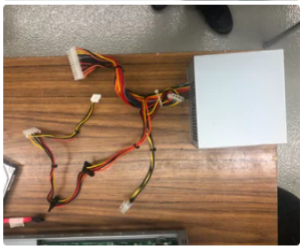
After your computer is unplugged move to a clean working space, preferably a table.

First off all take the black casing off the PC by sliding it towards the front side. Then place the case at the side as you don't need it anymore

.

Step 3: The Power Supply





The Power Supply manages all the power for the computer. The Power Supply is a large metal box located in the top left corner.

The power supply supplies power to every component in a computer, therefore it has the most wires out of every other component in the computer. The first thing you do is unplug every wire coming from the power supply. The list below is everything that you have to disconnect:

- Motherboard (very large connector/plug)
- CD/DVD drive[s] power
- Internal hard drive power
- Portable hard drive slot power

Once everything is unplugged, unscrew the screws holding the power supply in place, on the back of the computer. Next, push the power supply from the outside, then lift it out.

Keep the screws/bolt aside in a bag so when you assembling it back, it will be easier.

Step 4: CD/DVD Drive

This one of the easiest components to remove. Just push the grey metal and pull out the drive.
If you don't have a second drive, there should be a flat piece of metal covering the drive slot

Step 5: System Fan

Most computers have two fans: the system fan, the one blowing air into the computer, and the CPU fan, the one blowing air into the CPU heatsink.

The system fan is located at the back side of the computer, the side with all the component plugins.

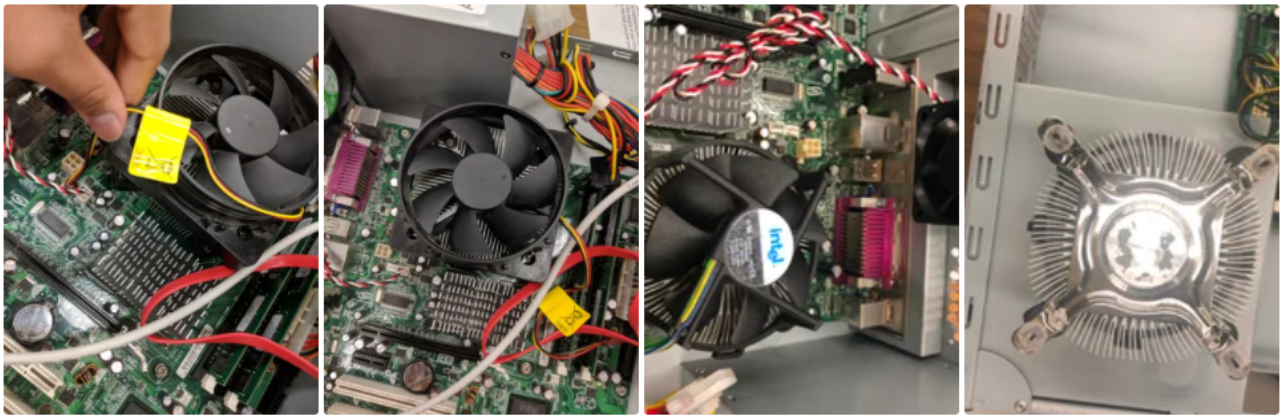
First, unplug the fan from the motherboard. You can find the plug by following the wire from the fan.

It should be labeled "SYS_FAN1". Next, you will have to unscrew the fan from the outside.

You should now be able to lift the fan out of the PC.

Keep the screws/bolt aside in a bag so when you assembling it back, it will be easier.

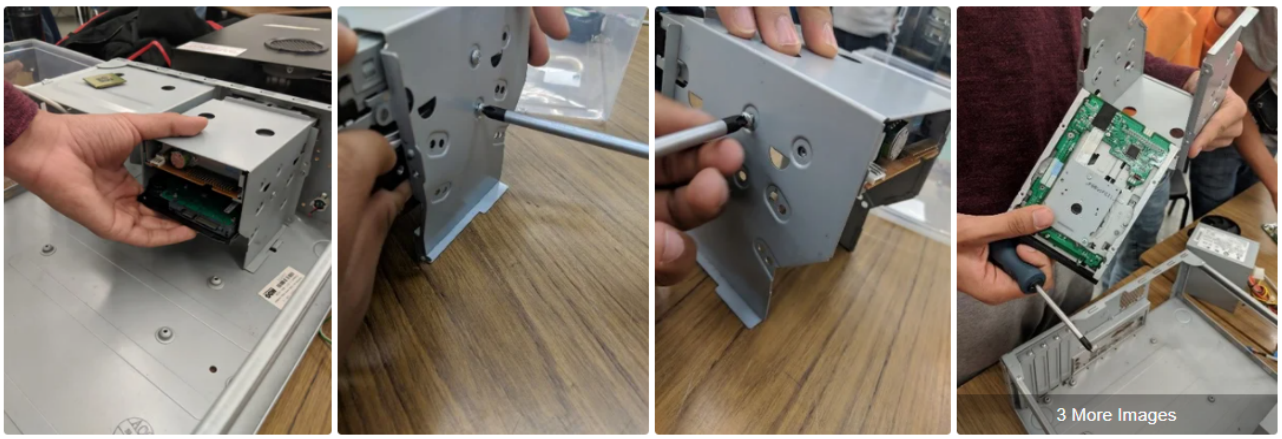
Step 6: CPU Fan



The CPU fan is located right on top of the CPU heat sink, which is a large piece of metal with fins on the top. The CPU fan plugs into the motherboard which is hard to access. But just follow the wires and you should easily find it.

To remove the fan from the heat sink, remove the four screws securing it in place

Step 7: Hard Drive and Floppy Disk



Remove the metal casing on the top side of the PC.

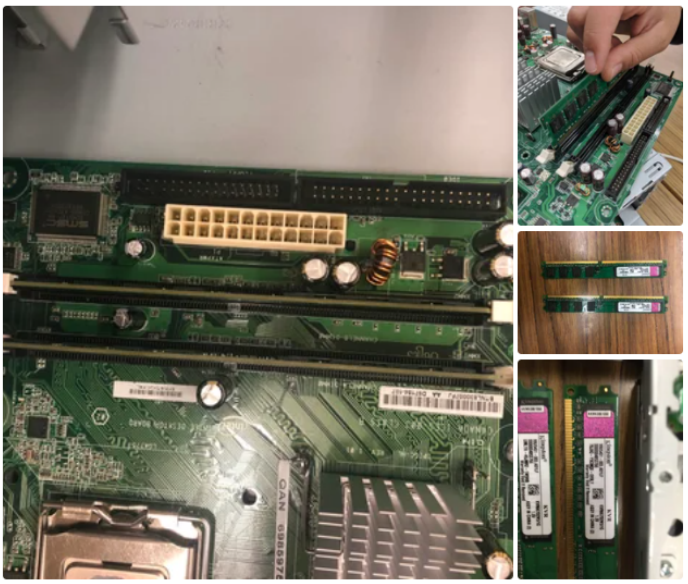
Remove the hard drive and floppy disk combo from the computer. Then, remove each.

Keep the screws/bolt aside in a bag so when you assemble it back, it will be easier.

Step 8: The Power Switch

To remove the button, you will need to push it from the back, the side with the wires. For clarification, see the pictures.

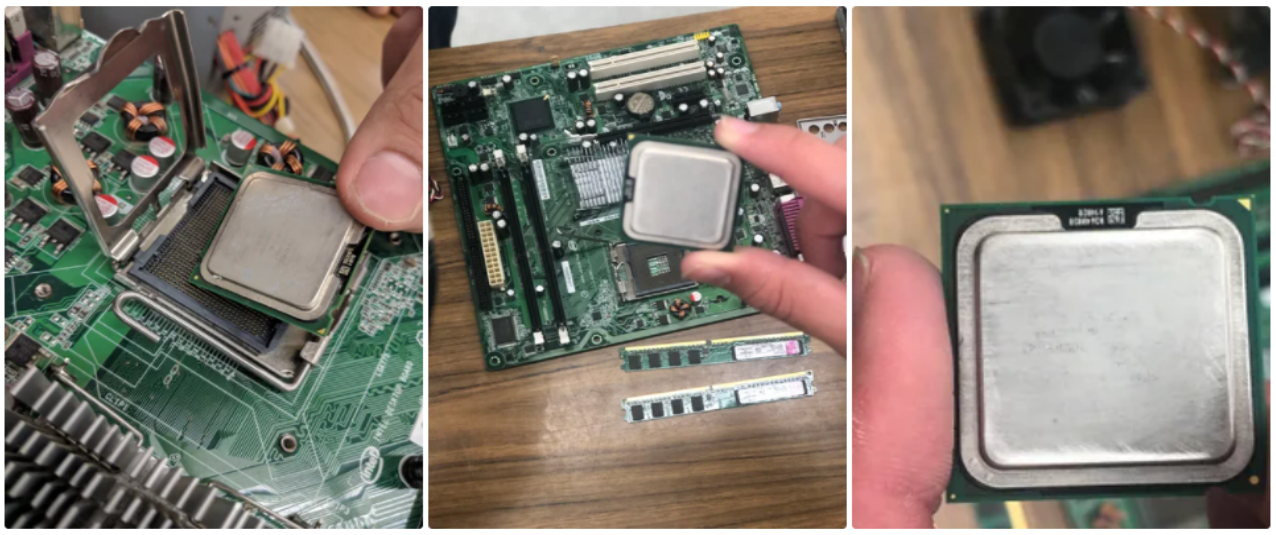
Step 9: RAM (Random Access Memory)



A RAM is the memory or information storage in a computer that is used to store running programs and data for the programs. So, the more RAM you have, the faster your computer runs. Most computers have 4 or 2 RAM slots.

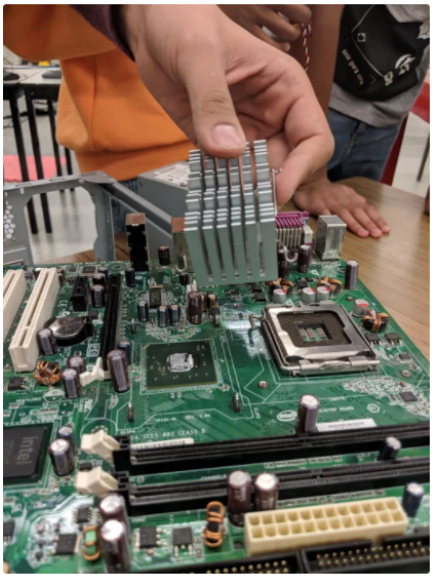
To remove the RAM, push down on both tabs holding the RAM in place, which are located at both ends of the RAM.

Step 10: CPU



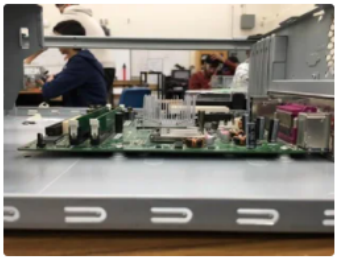
Remove the CPU by working the lever. Handle with care.

Step 11: Heat Sinker

Take out the heat sink through the lever, handle with care.

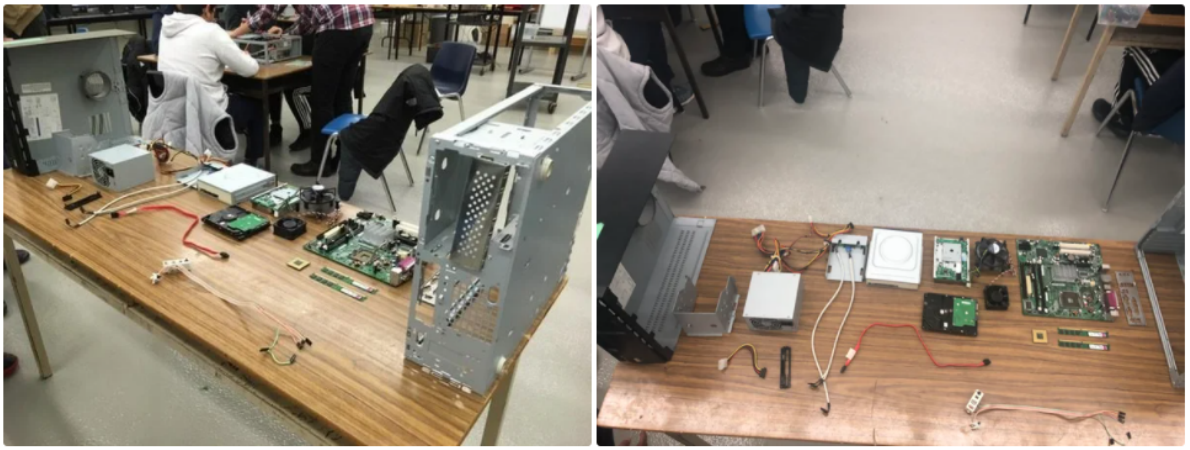
Step 12: The Motherboard


The motherboard is the mother of the computer! The motherboard links every component in the computer together. The CPU, RAM, and expansion cards are attached directly to it, and every other part of the computer is in one way or another attached to it.

The motherboard has seven screws holding it to the frame, which are indicated by large white circles around them. Remove those seven, then lift the motherboard out of the frame.
Keep the screws/bolt aside in a bag so when you assemble it back, it will be easier.

Step 13: Done

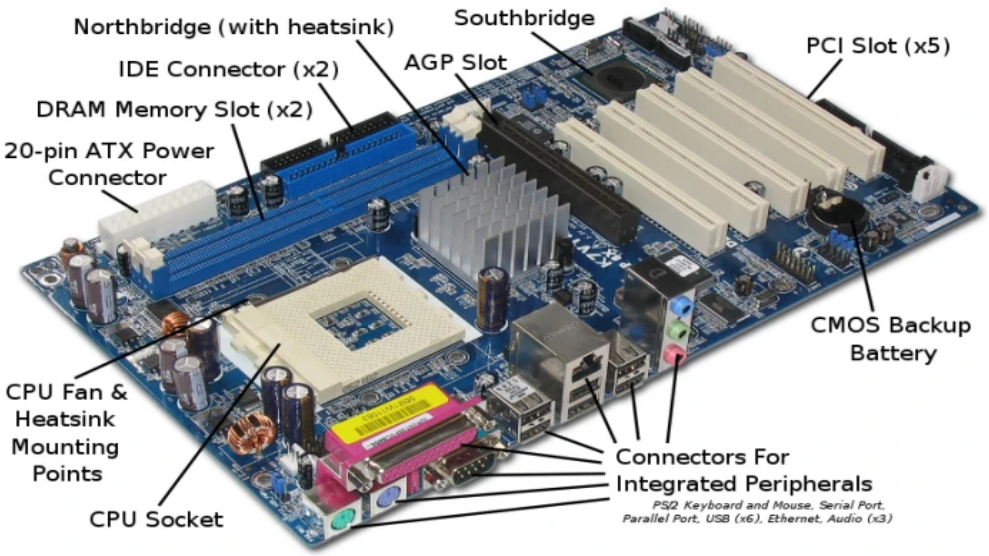


These are all the components that are disassembled from the PC.

Identification of A Personal Computer

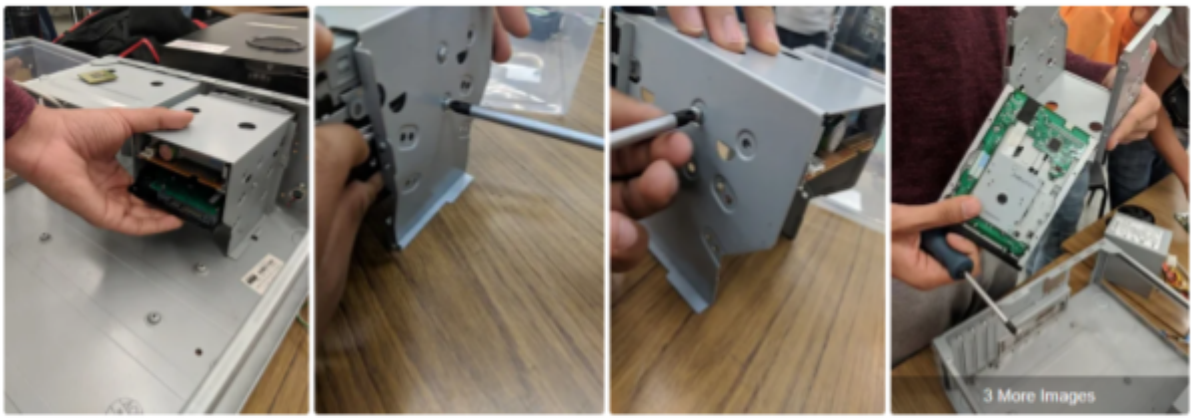
Power Supply

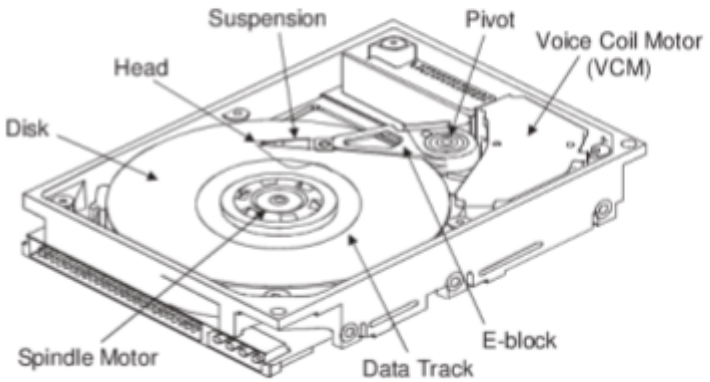
Motherboard



Processor

Hard Disk





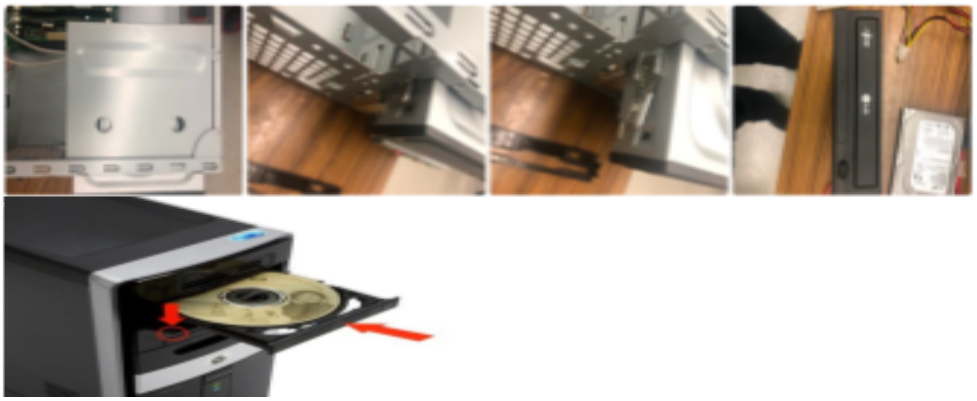
Memory (RAM & ROM)

RAM (Random Access Memory)

ROM (Read Only Memory)

CMOS Battery

CD Drive



Parts of Computer (Monitor, CPU, Keyboard, Mouse etc.)

Basic parts of a Computer

Printer

Scanner

Pen Drive

How to Assemble a Computer

The assembling of the computer system is exactly the opposite of disassembling operation. Before starting assembling the computer system, make sure you have the screws and a screwdriver for those.

Step 1: Mount the Processor

The first step for assembling the computer system starts with mounting the processor on the processor socket of the motherboard. To mount the process, you don't need to apply any force. The special ZIF (zero insertion force) sockets are usually used to prevent any damage to the processor pins. Once the processor is mounted, the heat sink will be attached on top of the processor. The CPU fan is also attached on top of the heat sink.

Step 2: Fix the Motherboard in the Tower Case

Now the motherboard is to be fixed vertically in the tower case and the screws are fixed from behind of the motherboard.

Step 3: Connect the Power Supply

Now line up the power supply at the top back end of the cabinet and screw it. The power connectors for motherboard power supply and CPU fan power supply are to be connected. If the cabinet cooling FAN is required then it is to be screwed at the back end grill of the cabinet and its power connector is to be connected from SMPS.

Step 4: Install the Drives

Install the CD/DVD drives at the top front end of the cabinet and screw it. Install the Hard disk drive and floppy disk drive below CD/DVD drive and screw it. Make sure once screwed there is no vibration in either of the CD/DVD, hard disk or floppy disk drives.

Step 5: Connect Cables

Now select the appropriate data cable and connect one end of the cable to its drive socket and another end at its appropriate connector on the motherboard. For SATA hard disk drives or

CD/DVD drives use SATA cable and its power cable, else use IDE data cable. Do the proper jumper settings as per the usage requirement.

Step 6: Mount the Memory Modules

It is time now to mount the memory modules on the motherboard by aligning the RAM to its socket on the motherboard and press it downward. Make sure the side tab are fixed into the RAM notch. If not, you may still have to press a bit.

Step 7: Install the Internal Cards

Install the internal cards to its socket and attach the cables or power cable to it. The selection of right socket or slot is required as per the type of socket.

Step 8: Cover the Tower

Cover the tower by placing it and pressing towards front side and screw it.

Step 9: Connect the External Devices and Power

Connect the external devices with CPU at its appropriate socket. It includes mouse and keyboard at PS2 or USB connectors. Monitor at the video output socket. Connect the power cable to the back of tower in SMPS. Plug in the power cable to the electric board.

1 Install the power supply

2 Install the motherboard

3 Install the CPU

4 Mount the CPU cooler

5 Install the RAM

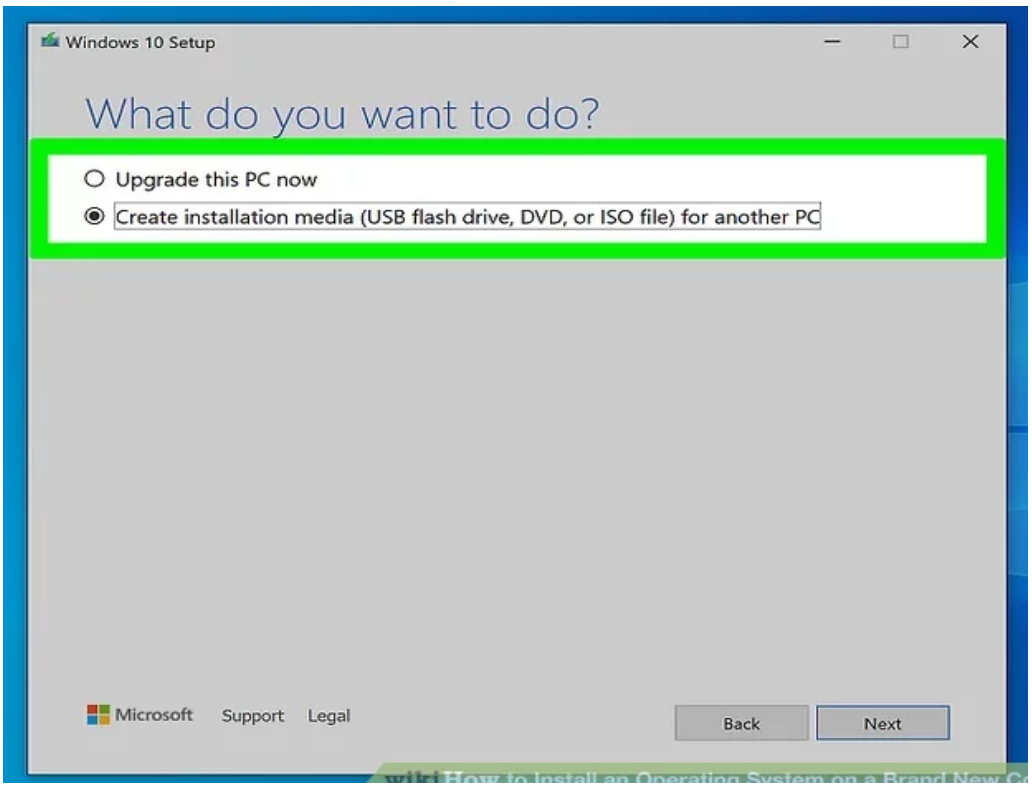
6 Install the hard drive

7 Install the optical drive

8 Install the graphics card

9 Install the operating system

Installing Windows 10

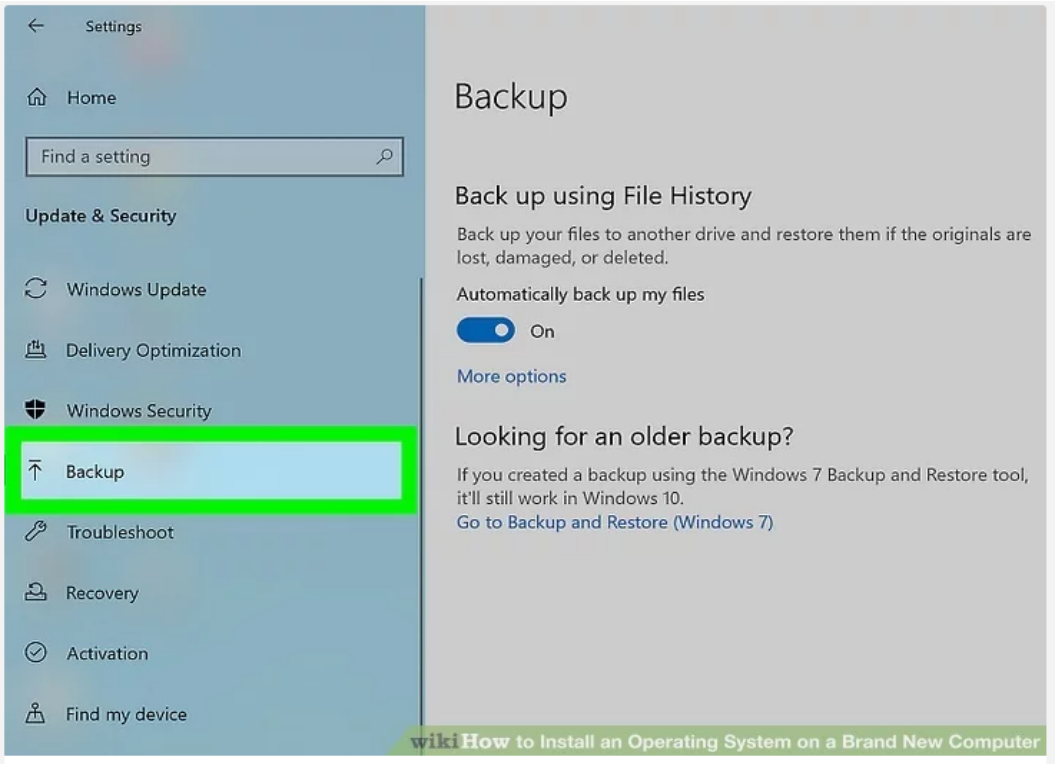


Step 1

Create a Windows Installation Media. If you order Windows 10 for a new PC build, they may send you an installation media. If you don't have a Windows installation media, you can make one. You'll need a computer with internet access and an 8 GB USB flash drive (16 GB recommended). You also need to know if the computer you want to install Windows 10 on has 32-bit or 64-bit architecture. You will also need to purchase Windows to get a product key. This can be done before or after the installation. Use the following steps to create a Windows Installation Media:

- Insert a USB drive with at least 8 GB of space into any computer with internet access. This will wipe any existing data on the USB drive, so be sure to back up any data you want to keep.
- Go to https://www.microsoft.com/en-us/software-download/windows10 in a web browser.
- Click Download Tool Now.
- Open the "MediaCreationTool.exe" file in your web browser or Downloads folder.
- Click Accept.
- Select "Create Installation Media (USB drive, DVD, ISO file) for another PC" and click Next.
- Select your language, Windows edition, and PC architecture and click Next.
- Select "USB flash drive" and click Next.

- Select your USB drive and click Next.

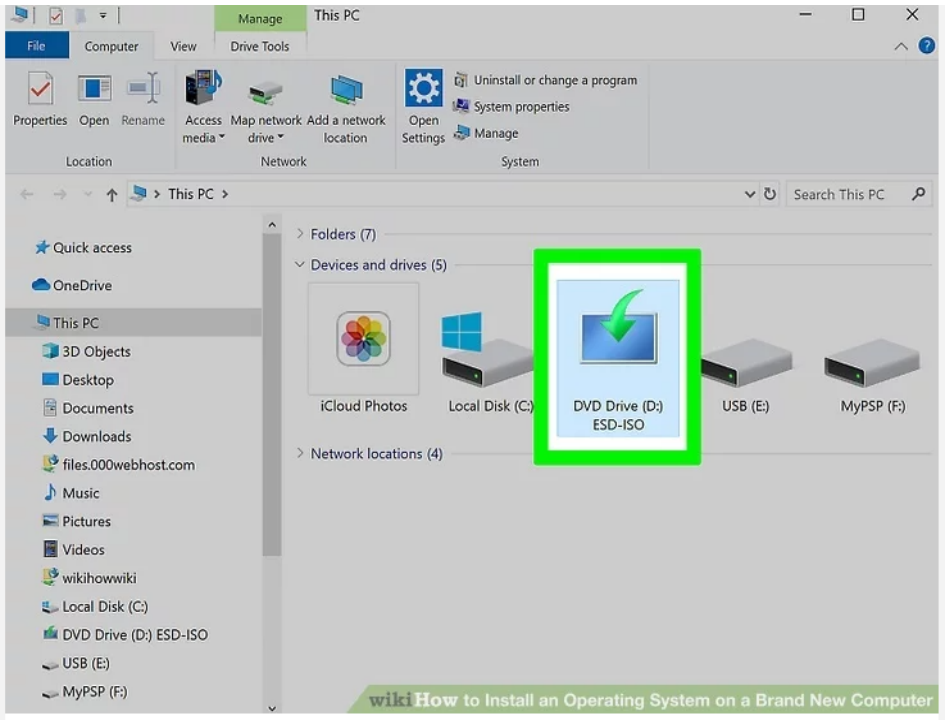


Step 2

Backup your files (optional). If you already have a Windows installation on your computer, a new Windows installation may overwrite your files. Back up any data you want to keep before beginning a new Windows installation. You can back up your files to OneDrive, Google Drive, Dropbox, or an external hard drive or USB flash drive.

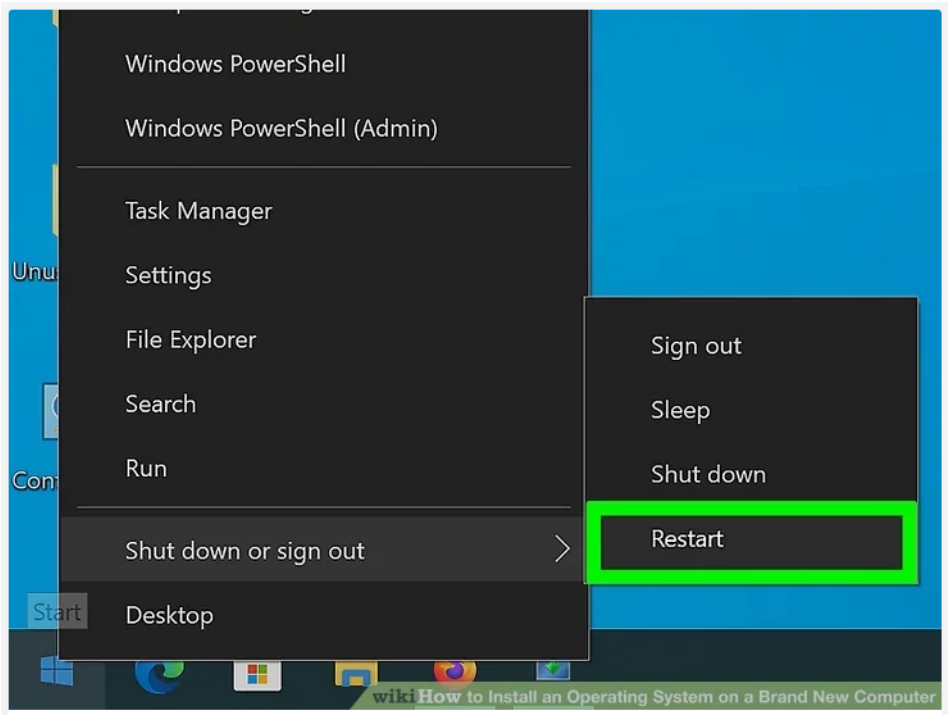
Step 3

Insert the Windows Installation Media in the computer you want to install Windows on. You can insert the Windows Installation menu into any free USB port.



Step 4

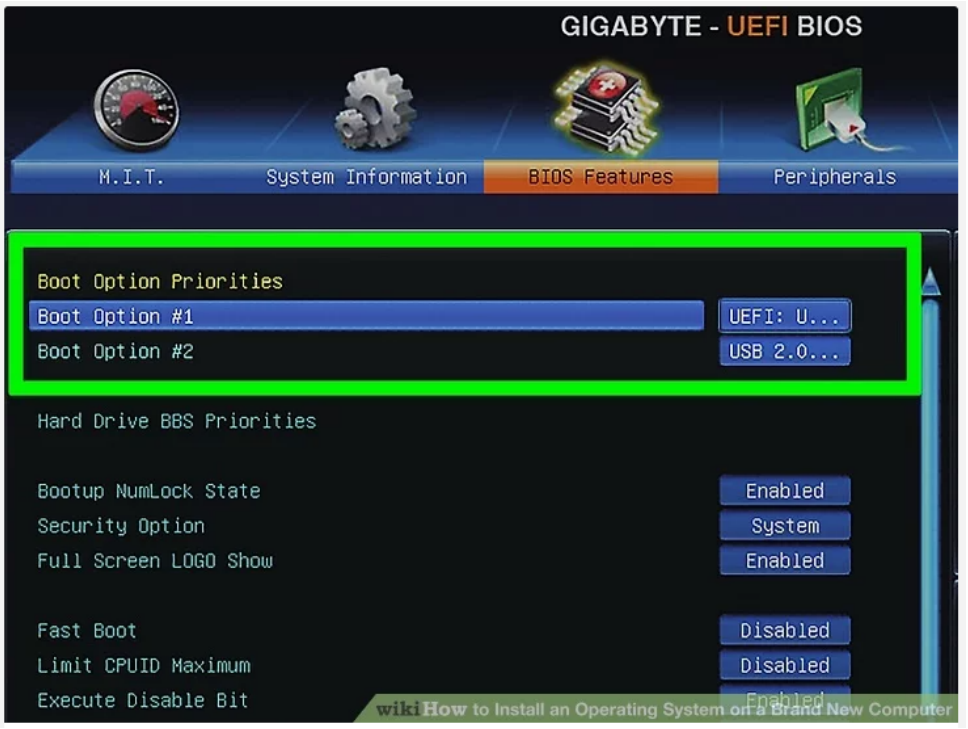
Boot the computer. If the PC is already powered on, restart it using the normal restart procedures of the operating system that is installed on the PC. If it is not yet powered on, press the power button to boot it up.



Step 5

Enter the Boot menu. Most newer computers have a boot menu you can enter while booting up. The way you enter it is different, depending on your motherboard. The most common way to enter the Boot menu is to press F10, F11, F12, F2, or Esc as the PC boots up. This Boot menu will display a list of drives you can boot from.

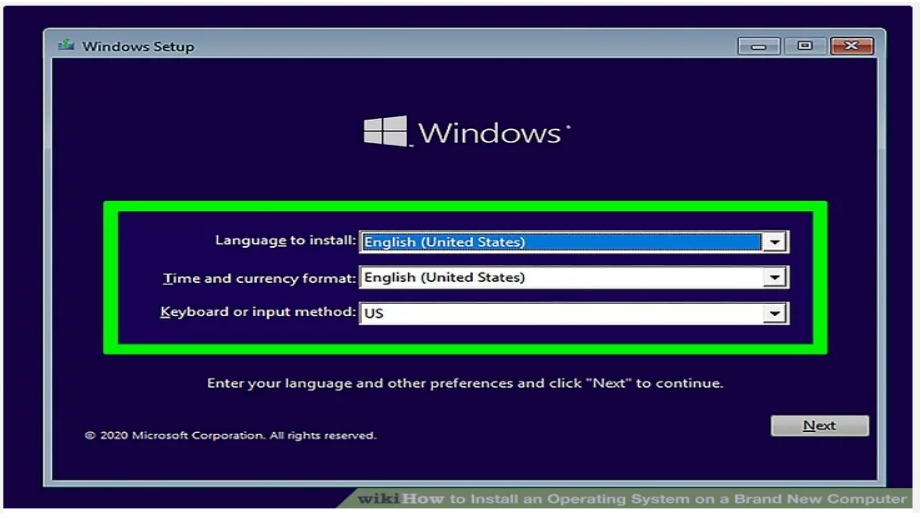
If you are using an older PC that does not have a Boot menu, you will need to Enter the BIOS while booting up. The buttons you press to enter the BIOS is different from one PC manufacturer to another. It will usually say what buttons you need to press while your computer boots up. You typically need to press F1 F2, F3, Esc or Delete to enter the BIOS. You may need to be quick about it. You can also reboot your PC into the BIOS from inside the Windows Settings menu.



Step 6

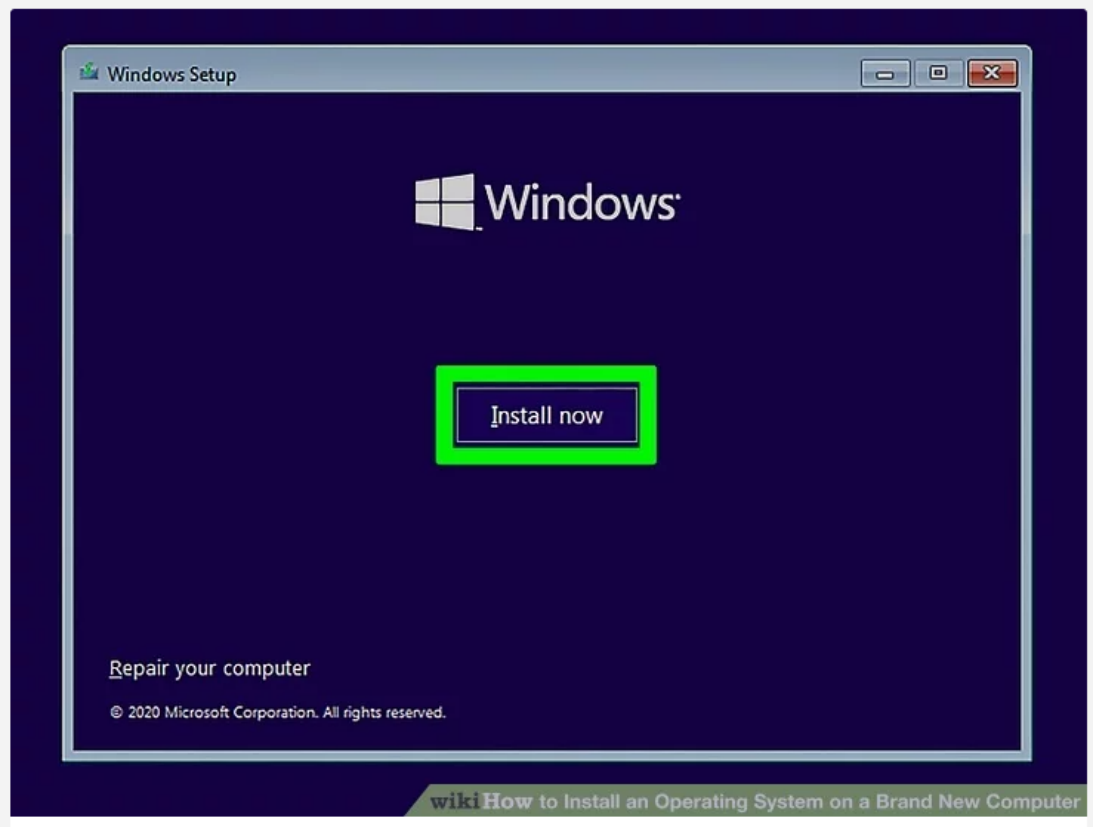
Select the USB drive. This is the drive that has the Windows Installation Media. This will boot the PC from the Windows Installation Media. Once the computer boots from the USB drive, press any key to start the Windows installation process.
If you are inside the BIOS settings. Locate the option that says "Boot", "Boot order", "Priorities" or something similar. Change the boot order so that your PC boots from the USB drive first. Then select the option to save and exit. This will reboot your PC from the USB drive.

Step 7



Select your language, time and currency, and keyboard input and click Next. Use the drop-down menus to first select your

language. Then select your country or region, and your keyboard input method. Then click Next.

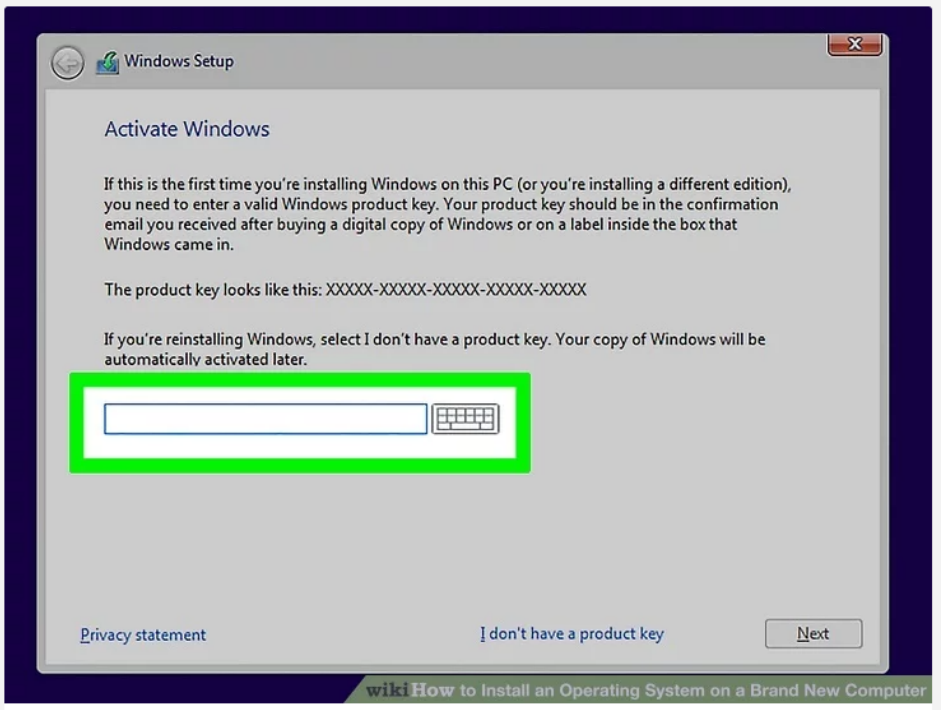


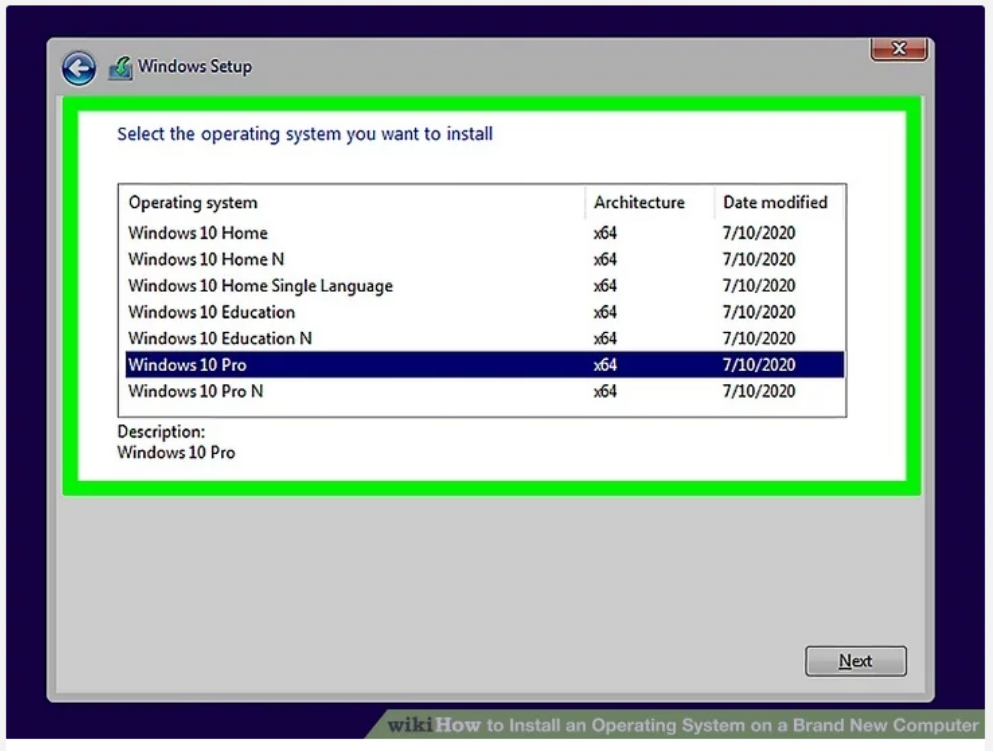
Step 8

Click Install Now. It's the button in the center of the screen.

Step 9

Enter your Windows product key and click Next. If you've already purchased Windows, you can find your license key in your confirmation email. If you have not purchased Windows, click I don't have a product key. You'll need to purchase Windows and activate it later on.



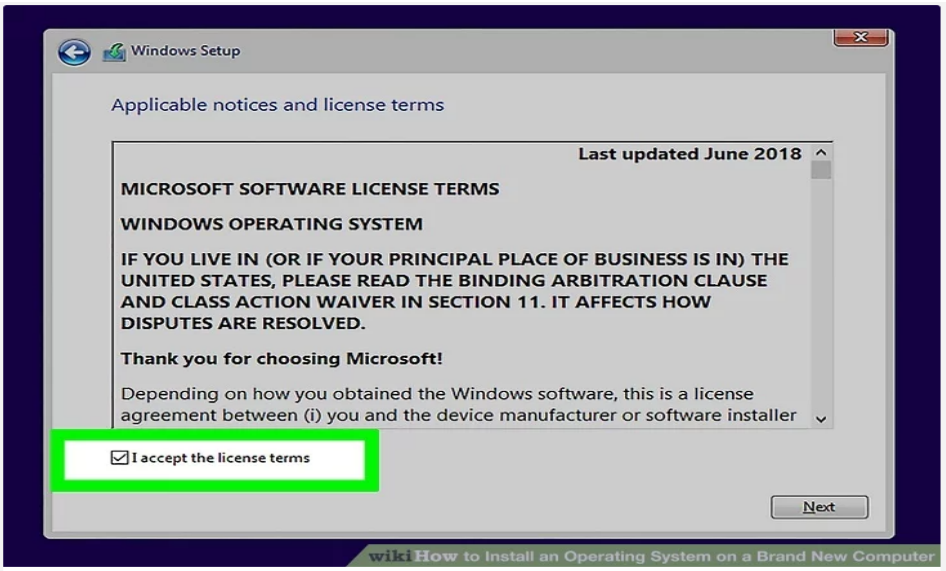


Step 10

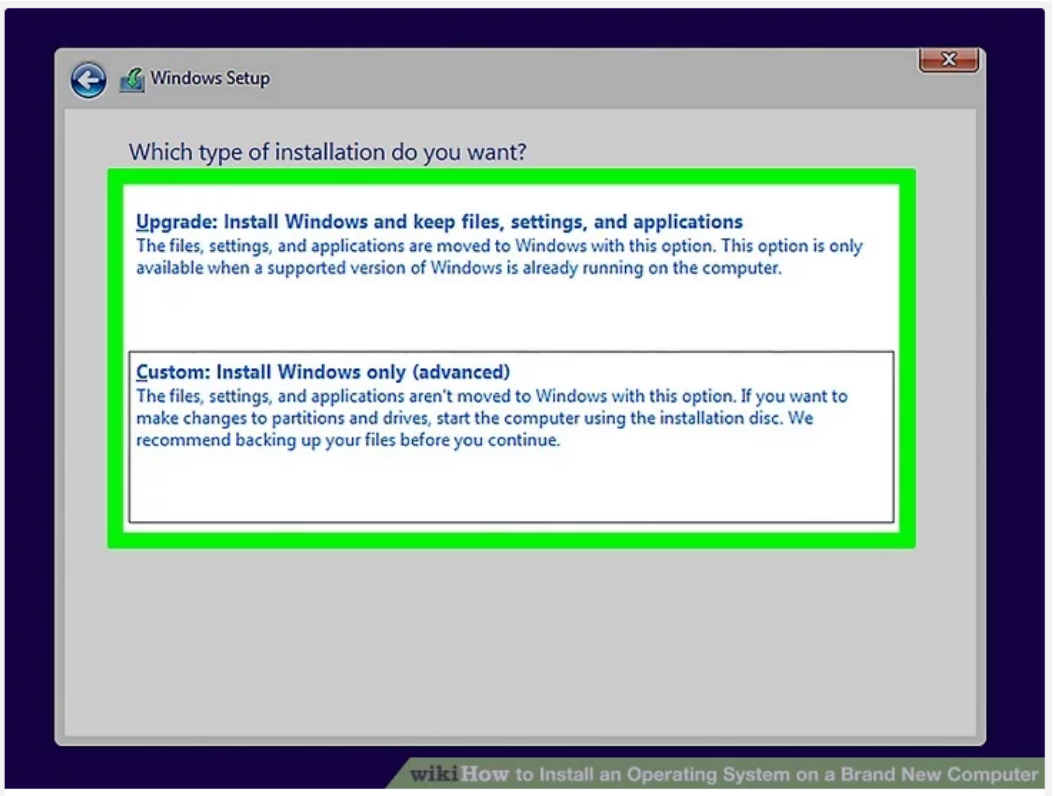
Select which edition of Windows you want to install and click Next. If you've already purchased Windows, check which version of Windows you purchased and make sure you click the right version. If you have not yet purchased Windows, check which version you want to install. Different versions of Windows have a different price.
If you are not sure which version of Windows to install, Windows Home Edition is the most common version of Windows.

Step 11

Click the checkbox next to "I accept the license terms" and click Next. You can read the license terms in the window in the center. Click next



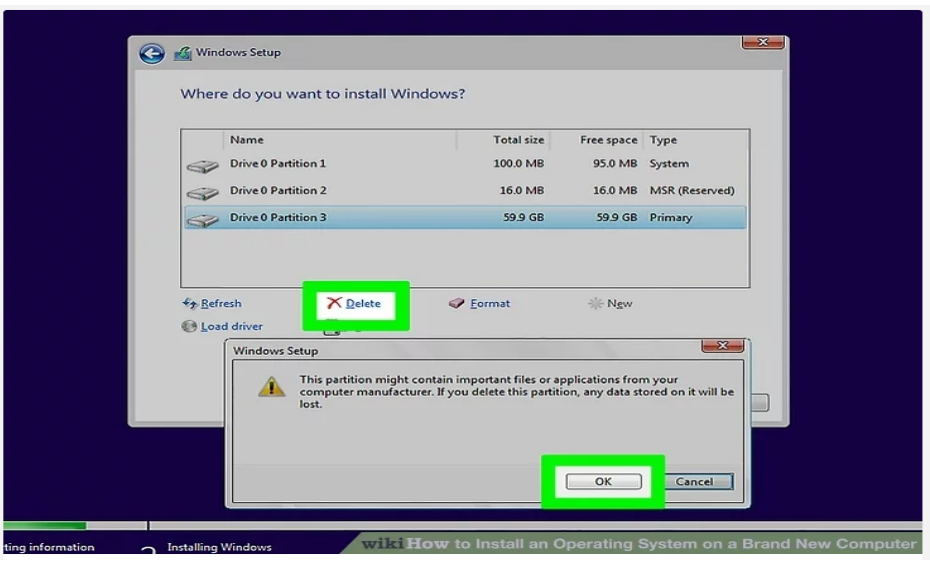
when you are ready to continue.



Step 12

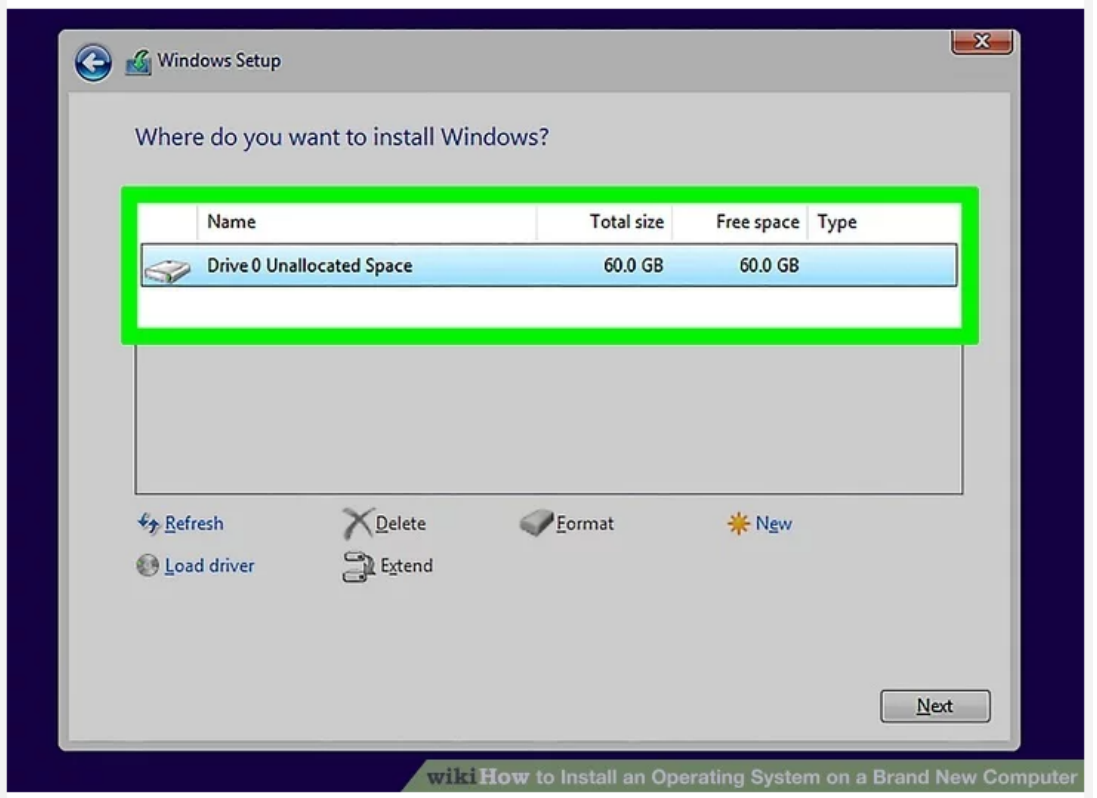
Click Custom: Install Windows only or Upgrade: Install Windows and keep files, settings, and applications. If your computer already has a Windows installation on it, click Upgrade: Install Windows and keep files, settings, and applications. If your computer does not have a Windows installation or you need to reinstall Windows, click Custom: Install Windows

Step 13



Select a drive or partition you want to install Windows on and click Delete. If you have multiple hard drives or a hard drive with multiple partitions, select the

partition you want to install Windows on and click Delete. Be aware that this will erase all data on the drive. Make sure you have backed up all data you want to keep before continuing. This will leave the drive with unallocated space.



Step 14

Select a drive with unallocated space and click Next. This will start installing Windows on the drive you selected. The amount of time it takes will depend on the hardware of your computer.

Step 15

Remove the USB flash drive and restart your computer. Once Windows is finished installing, your computer will restart automatically. Remove the USB flash drive so that it does not try to boot from the Flash drive again. The first time Windows boots

up, you will need to go through the Setup process.

Basic Troubleshooting and Maintenance

Troubleshooting requires an organized and logical approach to problems with computers and other components. A logical approach to troubleshooting allows you to eliminate variables in a systematic order. Asking the right questions, testing the right hardware, and examining the right data helps you understand the problem. This helps you form a proposed solution to try. Troubleshooting is a skill that you will refine over time. Each time you solve another problem, you will increase your troubleshooting skills by gaining more experience. You will learn how and when to combine, as well as skip, steps to reach a solution quickly. The following troubleshooting process is a guideline that you can modify to fit your needs.

- Explain the purpose of data protection.
- Identify the problem.
- Establish a theory of probable causes.
- Test the theory to determine an exact cause.
- Establish a plan of action to resolve the problem and implement the solution.
- Verify full system functionality, and if applicable, implement preventive measures.
- Document findings, actions, and outcomes.

In this section, you will learn an approach to problem solving that can be applied to both hardware and software. You also can apply many of the steps to problem solving in other work-related areas.

Troubleshooting is the process of identifying what is wrong with these faulty systems when the problem is not immediately obvious. Troubleshooting usually follows a systematic, four-step approach; identify the problem, plan a response, test the solution, and resolve the problem. Steps one to three are often repeated multiple times before a resolution is reached.

PC Maintenance

- Installing Updates
  - Windows/Microsoft automatic updates
  - Java
  - Adobe
    - Reader
    - Flash
  - Anti-Virus/Anti-Malware
    - Virus/malware definitions
    - Program updates
  - Other; Vendor s/w, drivers, utilities.
    - If it ain't broke…

IDENTIFICATION OF NETWORK COMPONENTS

1. LAN Card

The **LAN (Local Area Network) card** is a 'door' to the network from a computer. Any type of network activity requires a LAN card: the Internet, network printer, connecting computers together, and so on. Today many devices contain a network card (or the ability to connect to the Internet), including televisions for their Internet apps, Blu-ray players, mobile phones, VoIP, desk phones, and even refrigerators. LAN cards are hardware devices that can be added to a computer, or they can be integrated into the main hardware of the computer.

2. Wireless Card

The wireless network card is a wireless terminal device, which is used to connect to the Internet through a wireless connection within the wireless coverage of a wireless local area network. Generally speaking, a wireless card is a device that does not need to be connected to a network cable, and a wireless network card is integrated with a general-purpose laptop. Therefore, the laptop can surf the Internet wirelessly like a mobile phone, as long as there is a wireless network signal in the air in the area.

3. Switch

A **network switch** (also called **switching hub**, **bridging hub**, and, by the IEEE, **MAC bridge**) is networking hardware that connects devices on a computer network by using packet switching to receive and forward data to the destination device.

A network switch is a multiport network bridge that uses MAC addresses to forward data at the data link layer (layer 2) of the OSI model. Some switches can also forward data at the network layer (layer 3) by additionally incorporating routing functionality. Such switches are commonly known as layer-3 switches or multilayer switches.

4. Hub

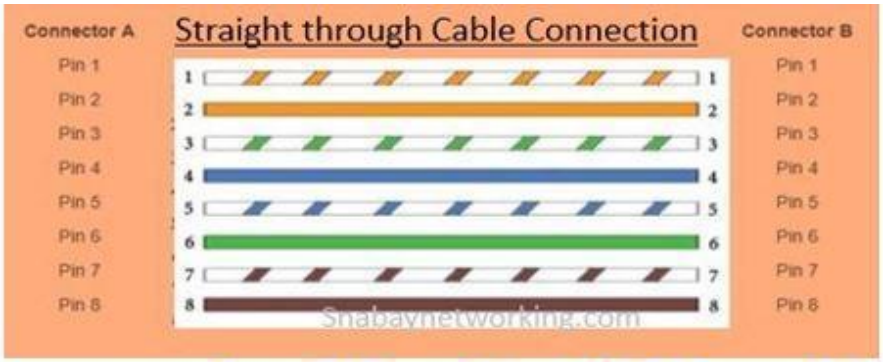
An **Ethernet hub**, **active hub**, **network hub**, **repeater hub**, **multiport repeater**, or simply **hub** is a network hardware device for connecting multiple Ethernet devices together and making them act as a single network segment. It has multiple input/output (I/O) ports, in

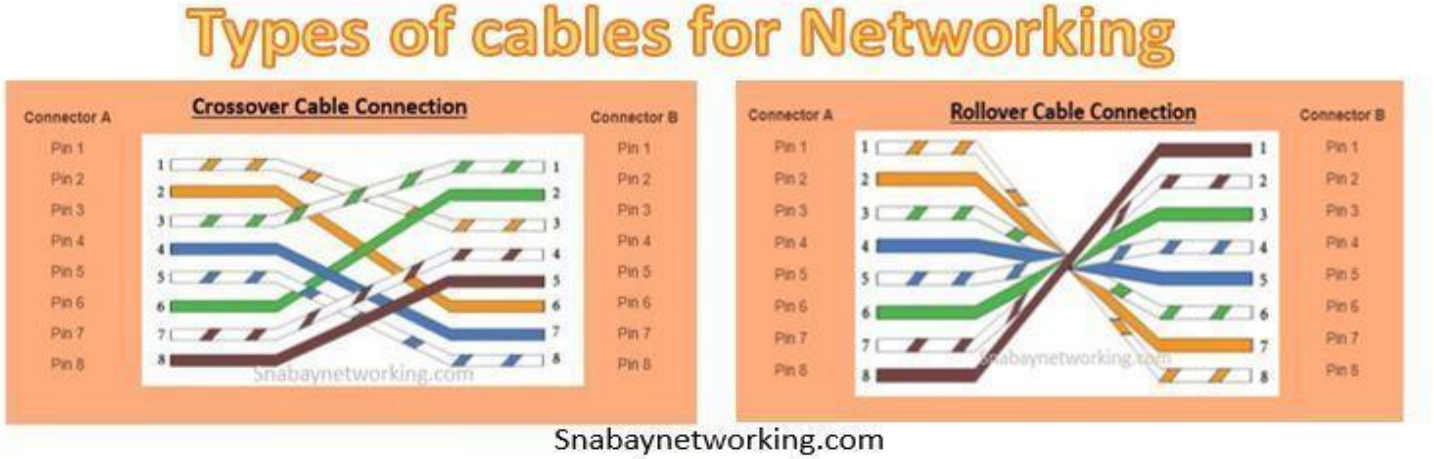
which a signal introduced at the input of any port appears at the output of every port except the original incoming.

5. Router

A **router** is a networking device that forwards data packets between computer networks. Routers perform the traffic directing functions on the Internet. Data sent through the internet, such as a web page or email, is in the form of data packets. A packet is typically forwarded from one router to another router through the networks that constitute an internetwork (e.g. the Internet) until it reaches its destination node.

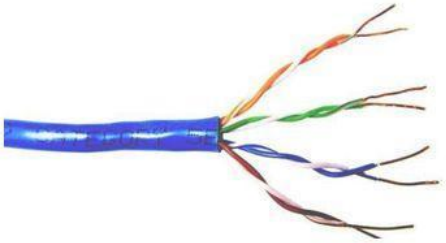
Types of Network Cable





Common network cable types

- Unshielded twisted pair (UTP)



- Shielded twisted pair (STP)

- Coaxial cable

- Fiber optic