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Learning Outcomes

After completing this module a student will be able to:

1. Use basic PC hand tools effectively
2. Assemble and disassemble a PC
3. Perform basic troubleshoot of a PC
4. Work with different cables, connectors and its crimping techniques for PC
5. Install and maintain software for a PC
6. Manage files effectively in Windows and Linux environments
7. Work with Linux environment using Linux commands
8. Create documents, spreadsheets, and make presentations using Open Office.
9. Customize PC in Windows and Linux environments
10. Manage PC in Windows and Linux environments
11. Perform troubleshooting and maintenance of the PC based on the faulty condition.

Learning Outcome 1 - Able to use basic PC hand tools effectively

After achieving this learning outcome, a student will be able to use basic PC hand tools effectively. In order to achieve this learning outcome, a student has to complete the following:

1. Remove screws using screwdriver (1 Hr)
2. Cut and Skin cables using cutting plier (1 Hr)
3. Desolder electronic components using desoldering pump, Remove electronic components using tweezers (1 Hr)
4. Solder electronic components (1 Hr)
5. Crimp CAT 6 cables using crimping tool (1 Hr)

Activity 1

Aim: Remove screws using screwdriver

Learning outcome : Able to use basic PC hand tools effectively.

Duration : 1 hour

List of Hardware/Software requirements:

1. Cabinet
2. Screwdriver

Code/Program/Procedure (with comments):

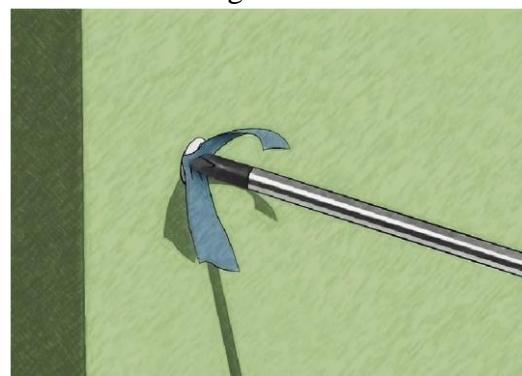
1. **Maximize the grip strength.** If you can still grip the screw head with a screwdriver, try one last time to remove it by hand. Follow these instructions first to maximize your chances:

- If the screw is fastened to metal, spray on penetrating oil, such as WD40, and let sit at least fifteen minutes.[1]
- Use the largest manual screwdriver that fits your screw.
- If possible, grip the screwdriver handle with a wrench to get more leverage.



2. **Add material for extra grip.** If the screwdriver keeps slipping out of the stripped hole, cover it with a small piece of material that gives extra grip. Press this into the hold with the screwdriver and try again. Here are some options:

- Wide rubber band, cut to form one band
- A piece of steel wool
- A piece of green abrasive from a kitchen sponge
- Duct tape, with the adhesive side against the screw head



3. **Tap the screwdriver into place with a hammer.** Tap the screwdriver in gently to avoid breaking the screw head. Skip this step if you are working with a fragile object.

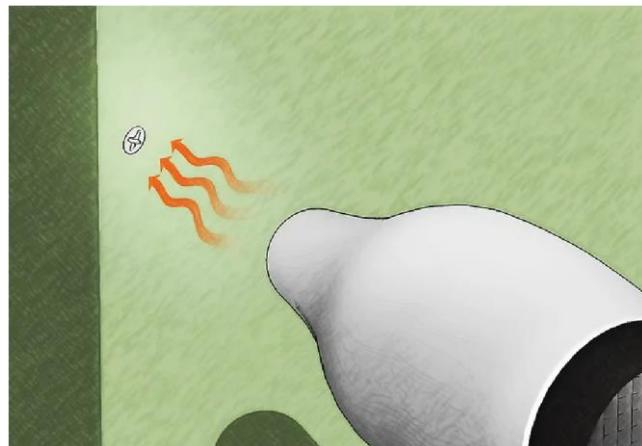
- This is a good option when a Philips head screw is stripped.
- You can also take a square #1 drill bit and hammer it into the screw head. Do this until it penetrates into the stripped Philips head screw.



4. **Push down hard as you rotate.** Place your palm against the end of the screwdriver, with your arm directly behind it. Press directly down into the screw with your full forearm as you rotate the screwdriver.

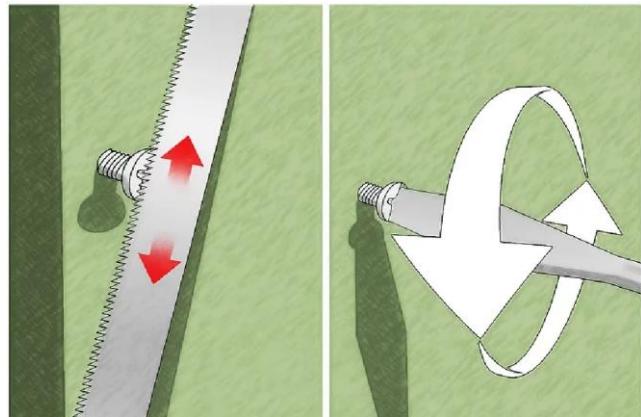
- If the tool you are using is slipping, stop using it immediately. Further slippage will only continue to wear down the screw head and make it harder to remove.

Definitely be sure you are going in the correct direction for removal, which is usually--but not always--counterclockwise ("lefty loosey, righty tighty"). Pressing down hard as you are unscrewing will help prevent slippage.



5. **Heat the area.** If you can heat the screw without damaging the object the screw is attached to, this will often loosen the threads. Apply a heat gun or propane torch to the screw, moving it constantly to avoid overheating. Once it is hot enough to sizzle a drop of water, let the screw cool, then try again.[2]

- This works especially well if the screw has been set in place with a bonding agent.



6. **Cut a flat-head notch with a dremel or hacksaw.** If your screwdriver still can't get a good grip, cut a notch into the screw head. Insert a flat-head screwdriver and attempt to turn the screw.[3] You can combine this with any of the approaches above.

Output/Results snippet:



References:

- <https://www.wikihow.com/Remove-a-Stripped-Screw>

Activity 2

Aim: Cut and Skin cables using cutting plier

Learning outcome : Able to use basic PC hand tools effectively.

Duration : 1 hour

List of Hardware/Software requirements:

1. Skin Cables
2. Cutting plier

Code/Program/Procedure (with comments):

1. Place the wire into the proper slot for the size wire you are. With the wire at a slight angle, push the handles of the stripper together.



2. By gently rocking the stripper blades back and forth to cut through the insulation but not into the wire.



Output/Results snippet:



References:

Activity 3

Aim: Desolder electronic components using desoldering pump, Remove electronic components using tweezers

Learning outcome: Able to use basic PC hand tools effectively.

Duration : 1 hour

List of Hardware/Software requirements:

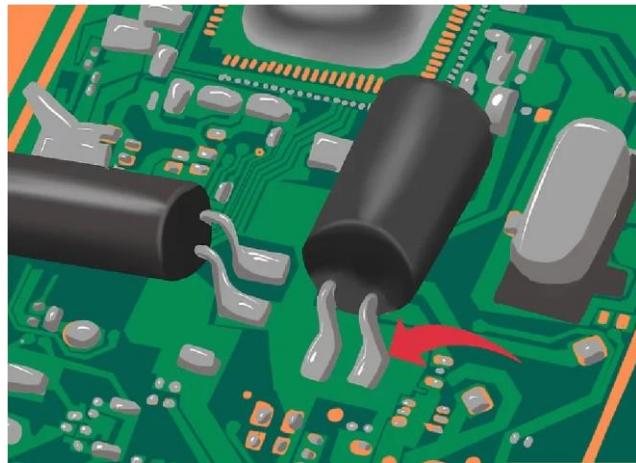
1. Desoldering pump
2. Tweezers.

Code/Program/Procedure (with comments):

A desoldering pump also known as solder sucker is a small mechanical device which sucks the liquid/molten solder from the joint where the components are mounted. In order to desolder a component from the PCB, we first heat up the solder joint with the soldering iron till the solder liquefies/melts.



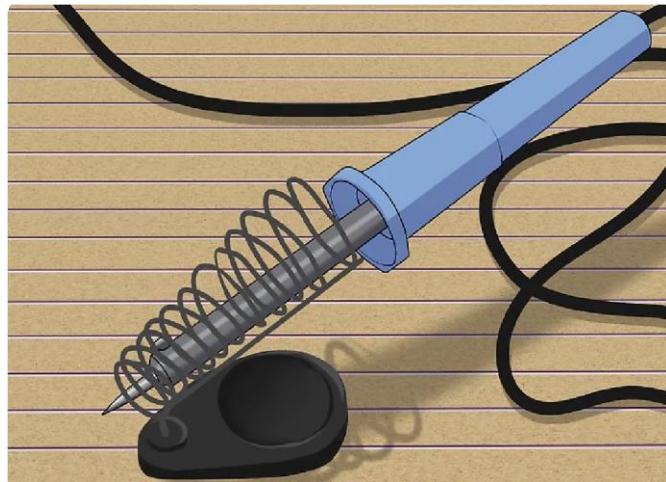
1. Locate the terminals for the component to be removed. A desoldering pump, also called a solder sucker, vacuums up melted solder to separate soldered components from a circuit board. Thoroughly examine both sides of the board to isolate the specific spots holding each component in place.
 - The desoldering pump works best for through-hole connections. You can use it on surface-mounted devices as well, but it is less effective.[1] That said, it's one of the cheapest options.
 - You can easily ruin a circuit board by accidentally separating the board layers during the desoldering process. Ensure that you only desolder the exact pins you need to remove a faulty component.



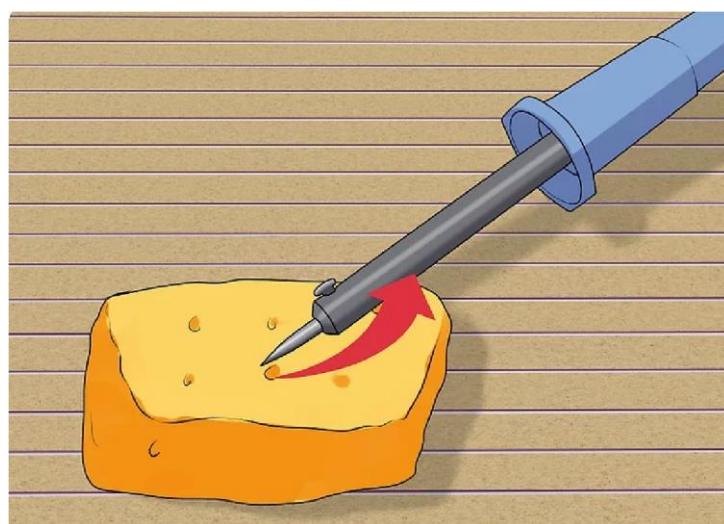
2. Clean the terminals. Using isopropyl alcohol on a toothbrush, gently clean the terminals of the component(s) to be removed. Ensure that you clean only the terminals on the soldered side of the board and not anything on the component side.



3. Attach a heat sink. The heat from the soldering iron can damage sensitive components such as integrated circuits or transistors. To dissipate some of the heat, clip a metal alligator clip between the component and the terminal you plan to desolder.[2]

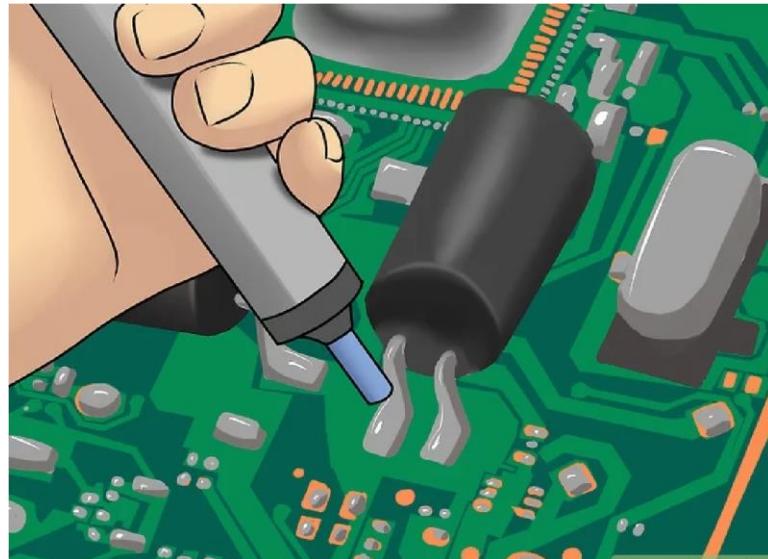


4. Clean your soldering iron as it heats. Turn your soldering iron on and let it heat up for about three minutes. Using a wet sponge make quick passes from base to tip over your soldering iron to clean it.
 - You may see a tiny bit of smoke as you pass the sponge, but it's just from the moisture in the sponge.

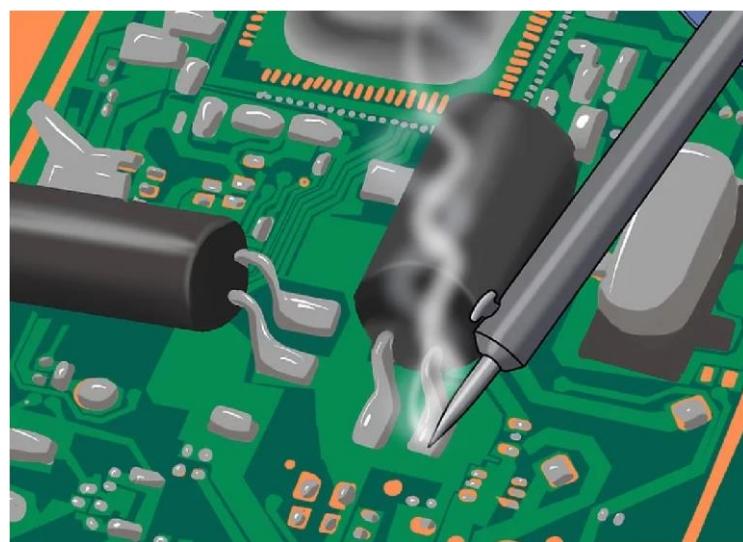


5. Push down on the desoldering pump. Press the end of the pump until it clicks into place.

This compresses a spring, and latches it in the depressed position.

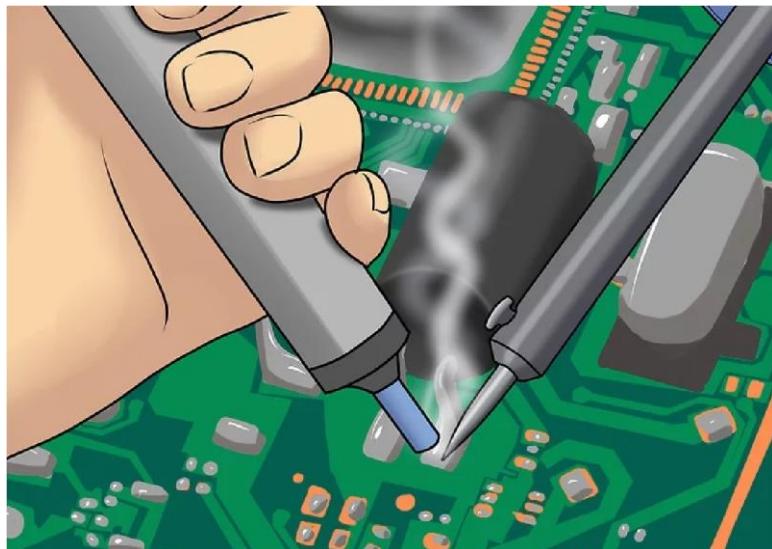


6. Heat the old solder with your soldering iron. Using the tip of your soldering iron, heat the old solder until it melts. You can push the terminal with the soldering iron tip at the same time to help free the component as the old solder melts.
 - Use an old soldering iron if you have one, since pushing with the iron can wear the iron down.

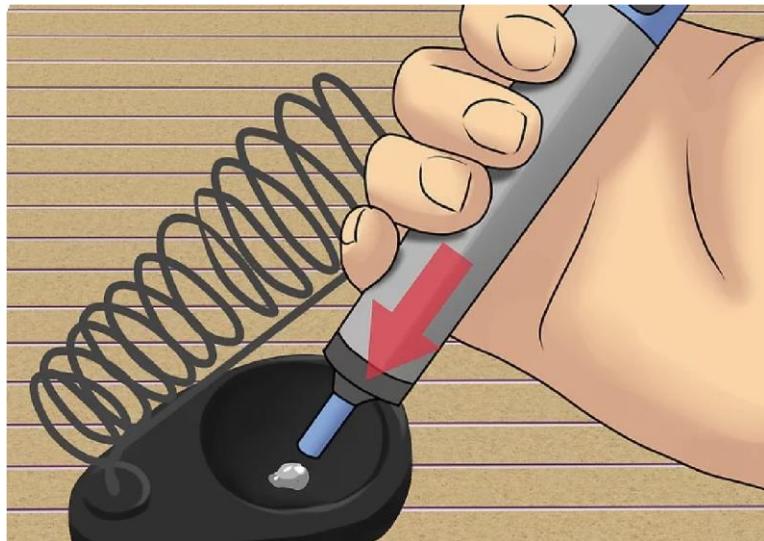


7. Vacuum up the melted solder. Touch the tip of the desoldering pump to the solder pad and melted solder, without applying pressure.[3] Release the spring (usually by pushing a button on the side) and the piston will shoot back quickly. This creates a vacuum which pulls the melted solder up into the pump.[4]

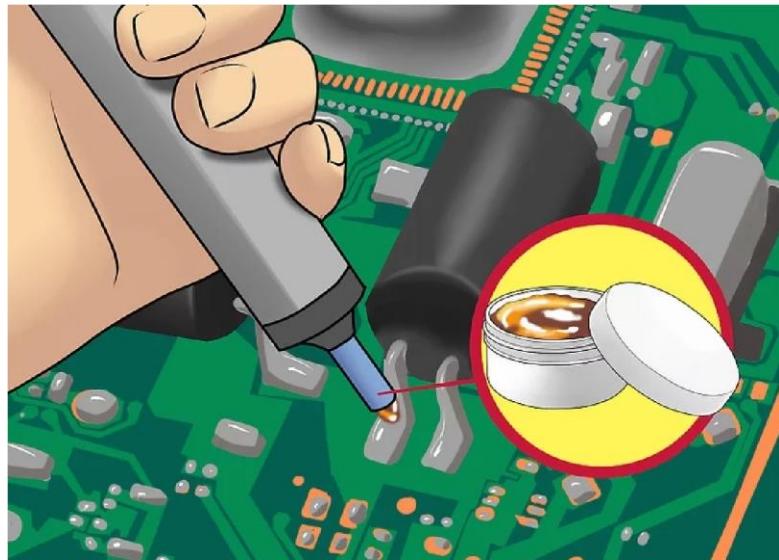
- The tip of the pump may melt a little during use. Most pumps either have replaceable tips or are cheap to begin with, but you can try to reduce the damage by pausing for a moment after melting the solder.
- Melted solder can harden again quickly. Work with only one terminal at a time. For the greatest efficiency, hold the soldering iron in one hand and keep the desoldering pump ready in the other.



8. Empty the desoldering pump into the trash. After each use, push the pump down again over a trash can to re-arm it and to clear out the solder. If you leave the old solder inside, it can leak back out as you go to vacuum the next terminal.

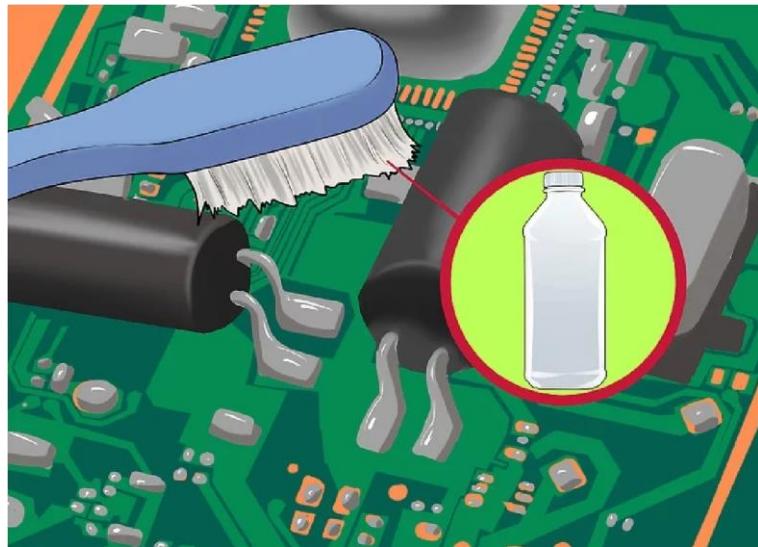


9. Troubleshoot difficult connections. It often takes multiple passes with the soldering iron and pump before the component is free. If you're not making progress after a few tries, try any or all of these adjustments:
 - Apply flux first to help the melted solder flow.
 - Melt a little new solder to mix in with the old, hardened solder.
 - For through-hole connections, use the tip of the soldering iron to gently wiggle the terminal from side to side. This breaks the connection to the sides of the hole.[5]



10. Clean the board. You may notice brown resin stuck around the solder pad, since this can melt when heated. You can remove this with a commercial resin cleaner, or scrape it away very carefully with a small, flat-head screwdriver or steel wool. Finish by cleaning the area with a toothbrush dampened with isopropyl alcohol.

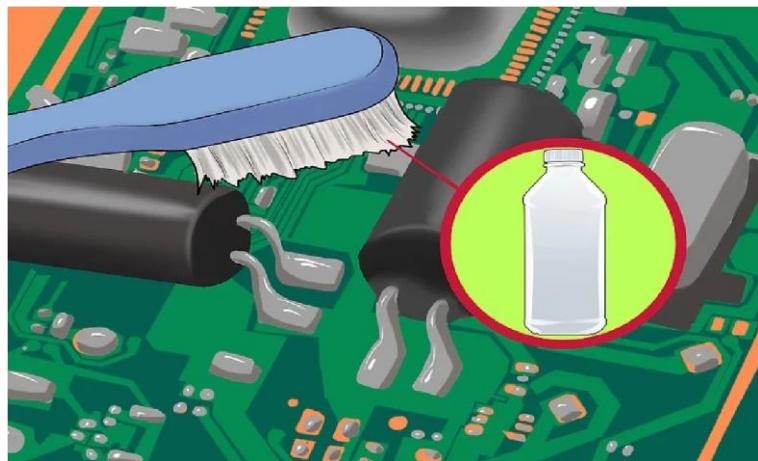
- Sometimes, the pressure from the iron or pump will shift the solder pad slightly. It should still work as long as the traces connecting the pad to other components are still intact. If the traces are broken, you will need to solder on new ones.[6]
- If there are still traces of solder on the pad, it's easy to pick these up using a desoldering braid, described below.



Remove electronic components using tweezers

1. Take the Tweezer wick and place it over the solder you want to remove
2. With the soldering iron, lightly press on the wick, to ensure the heat is transferred through to the solder.

Output/Results snippet:





References:

- <https://www.wikihow.com/Desolder>

Activity 4

Aim: Solder electronic components

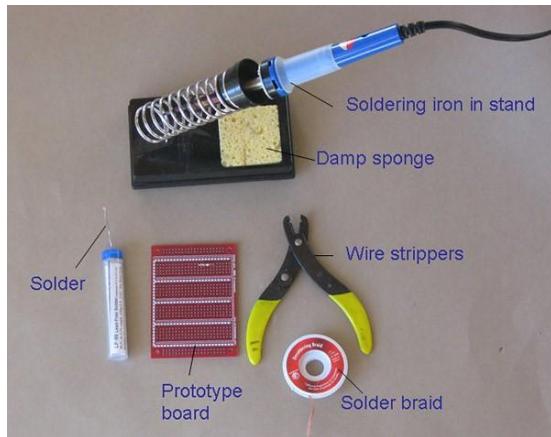
Learning outcome: Able to use basic PC hand tools effectively.

Duration : 1 hour

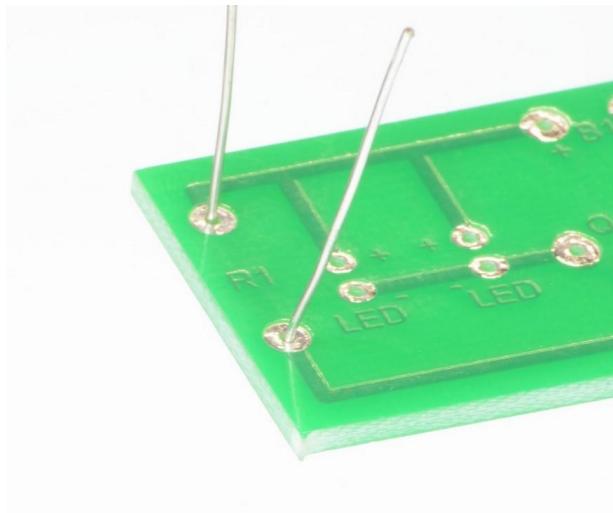
List of Hardware/Software requirements:

1. A soldering iron
2. Rosin core solder
3. Stand on which to hold the hot soldering iron
4. Sponge

Code/Program/Procedure (with comments):



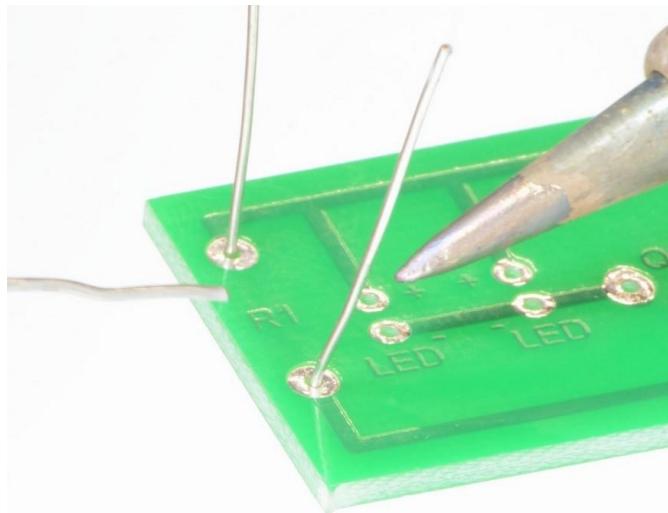
1. Start with the smallest components working up to the taller components, soldering any interconnecting wires last.
2. Place the component into the board, making sure it goes in the right way around and the part sits flush against the board.
3. Bend the legs slightly to secure the part. Place the board so you can access the pads with a soldering iron.



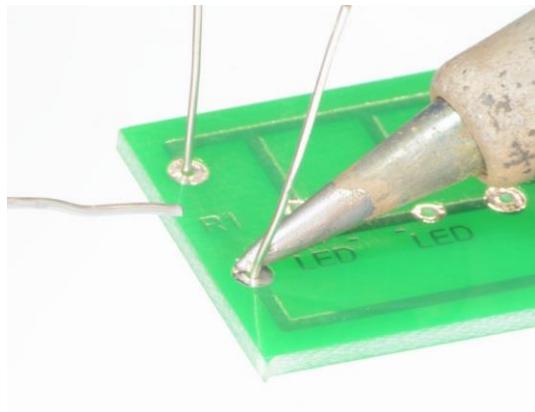
4. Make sure the soldering iron has warmed up. If necessary use a brass soldering iron cleaner or damp sponge to clean the tip.



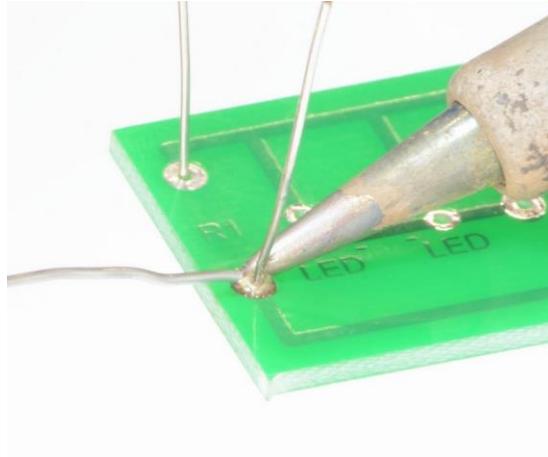
5. Pick up the Soldering Iron in one hand, and the solder in the other hand.



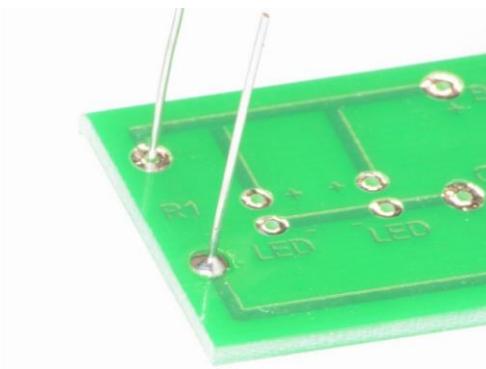
6. Place a soldering iron tip on the pad.



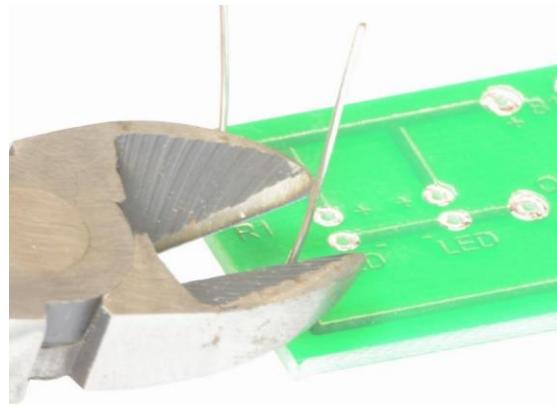
7. Feed a small amount of solder into the joint. The solder should melt on the pad and flow around the component leg.



8. Remove the solder, then remove the soldering iron.



9. Leave the joint to cool for a few seconds, then using a pair of cutters trim the excess component lead.



10. Some connections are made with stranded wire. It is usual to ‘tin’ wire to make it easier to place through the holes in the PCB, and to help it solder successfully. To tin wire firstly strip a small length of the insulation off. Then twist the strands together to form a single neat core. With the soldering iron in one hand, and solder in the other place the soldering iron tip at the end of the twisted core. This will heat the wire. ‘Wipe’ the end of the solder down the twists. This will melt when the wire is hot enough and apply a small amount of solder.



A well tinned wire only has a small amount of solder on it, just enough to hold the twist together. It should be possible to see the twisted strands through the solder.

Output/Results snippet:

References:

- <https://kitronik.co.uk/blogs/resources/how-to-solder-in-ten-easy-steps>

Activity 5

Aim: Crimp CAT 6 cables using crimping tool

Learning outcome: Able to use basic PC hand tools effectively.

Duration : 1 hour

List of Hardware/Software requirements:

1. CAT 6 Cables
2. Crimping Tool
3. Connectors

Code/Program/Procedure (with comments):

Step 1

- This procedure generally applies to Cat 6 RJ45 connectors.
- An alternate method is given for connectors utilizing a "load bar".

Step 2

- Cut the cable to the length needed.
- If you plan to use snagless boots, this would be a good time to slide them on.
- Be sure the boots will be facing "out" towards the connector.

Step 3

- Strip back the cable jacket approximately 1 inch.
- Use the cutter provided with the crimping tool or strip by hand.
- Be careful not to nick the individual wires.
- Un-twist each of the 4 pairs and straighten each wire as much as possible between the fingers.

Step 4

- Use the 568-B wiring scheme on both ends for a standard patch cable.

RJ45 PINOUT T-568B**Step 5**

- Bring all of the wires together as closely as possible.
- Hold the grouped (and sorted) wires together tightly between the thumb, and the forefinger.
- Cut all of the wires at a perfect 90 degree angle from the cable, ● 1/2 inch from the end of the cable jacket.
- Use a sharp cutting tool so as not to "squash" the wire ends.

**Step 6**

- With the connector pins facing up, carefully insert the wires into the connector.
- Apply a moderate amount of force in order to properly seat the wires against the contacts in the connector.

Alternate for "load bar" Type Connectors

A.

- Note that the load bar has slots on one side with a flanged edge on one end.
- The slotted side should face the pins inside the connector.
- The wires are inserted into the flanged end.

B

- Hold the grouped (and sorted) wires together tightly, between the thumb, and forefinger.
- Cut all of the wires at a sharp angle from the cable.
- Use a sharp cutting tool so as not to "squash" the wire ends.

C.

- Hold the load bar so the staggered holes face toward the cable.
- Insert the wires through the load bar, one at a time, carefully observing the orientation.
- Slide the load bar as far down as possible.



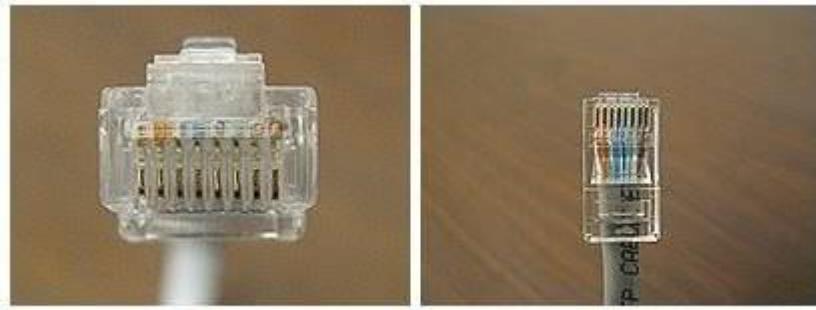
D.

- Cut off the excess wire ends with a straight cut about 0.25" past the load bar.
- With the connector pins facing up, slide the load bar assembly into the connector.
- Insure that the wires are firmly seated to the end of the connector.

The brown pair wires should be on the right side.

Step 7

- Observe the tip of the connector to confirm that all the wires are fully inserted.
- The end of each wire you should be in full view.
- There should be enough of the cable jacket inside the connector to crimp against.
- Tip: Slide the load bar forward as necessary to provide the ideal placement.



Step 8

- Place the connector into the crimp tool, and squeeze hard so that the handle reaches its full swing.

Step 9

- Repeat the process on the other end using the desired wiring scheme.
- Be sure to slide the snagless boots snugly over the connectors when finished .

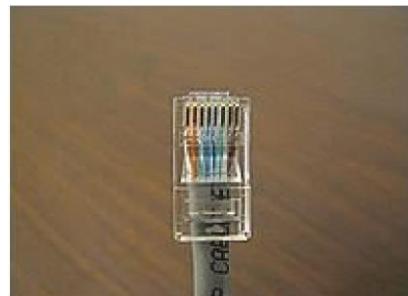
Step 10

- Always use a cable tester to check for continuity, opens and shorts.

Step 11

- Building patch cables takes practice so keep at it until you master your technique!

Output/Results snippet:



References:

- <https://www.warehousecables.com/how-to-make-a-cat6-patch-cable>

Learning Outcome 2 - Able to disassemble and assemble a PC

After achieving this learning outcome, a student will be able to disassemble and assemble a PC. In order to achieve this learning outcome, a student has to complete the following:

1. Remove power cords and peripheral cables (1 Hr)
2. Remove the cabinet and identify the components, slots, sockets, and connectors of motherboards. (1 Hr)
3. Remove the SMPS (1 Hr)
4. Remove Hard disk Drive, RAM, CMOS Battery, coolant fan and DVD/BD Drive (1 Hr)
5. Remove add on cards Remove and clean the motherboard (1 Hr)

6. Mount the motherboard on cabinet (1 Hr)
7. Connect Hard disk Drive, RAM, coolant fan, DVD/BD Drive and fix CMOS Battery
(1 Hr)
8. Connect the SMPS and add on cords (1 Hr)
9. Assemble the cabinet. And connect the peripherals (1Hr)
10. Connect power cords and switch on power supply and run the PC (1 Hr)

Activity 1

Aim: Remove power cords and peripheral cables

Learning outcome: Able to disassemble and assemble a PC.

Duration: 1 hour

List of Hardware/Software requirements:

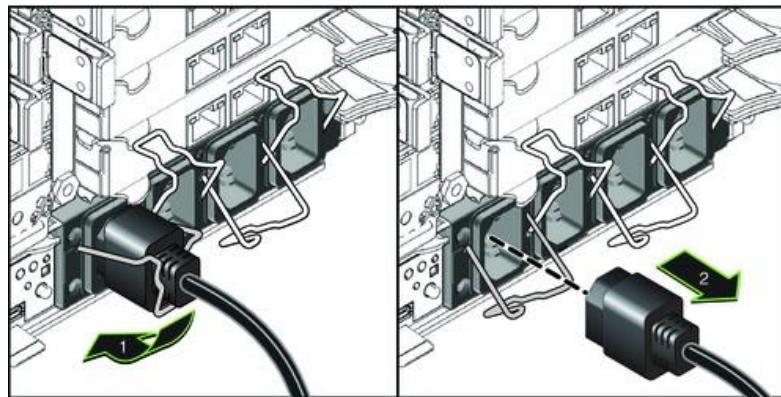
1. AC power cable
2. Screwdriver

Code/Program/Procedure (with comments):

Step 1

Turn off the computer, unplug the power cord and unplug any peripheral items attached to the computer, such as the keyboard, mouse, monitor, headphones, and any external drives.

- To unlock an AC power cable, push down or lift the retaining clip.
- The arrangement of the clips alternates. To remove the first and third cables (counting from the left) push down on the clip. To remove the second and fourth cables lift up the clips.



- To remove the cable, pull it out of the socket.

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. Person's finger touching an unpainted metal surface within a computer to discharge static electricity

Step 2

Remove at least one of the side covers, usually the right side as you face the front of the computer. You might find it easier to access all the parts if you remove both side covers; there are sometimes thumb screws on the covers to make access easier.

Step 3

Disconnect all the connectors, then remove any card readers and internal DVD players.

These are usually screwed into place.

Step 4

Remove any standalone fans. This is a good time to remove any dust, lint, and pet hair from the fans if you're planning on reusing them.

Step 5

Disconnect the cables and remove the storage drive. Generally, storage drives are held in place by multiple screws. If you have a hard drive, be gentle when moving the drive as hard bumps can damage the internal parts.

Step 6

Remove the memory (RAM) modules by pushing the clips on both ends of the module down. This will cause the module to pop up for easy removal. Do not touch the gold connectors on the chips if you're reusing the modules. If you're not reusing the RAM, find out how it can be used in other applications.

Step 7

Remove the power supply unit by unplugging the remaining connectors, then unscrewing the unit from the frame.

Step 8

Remove any adapter or expansion cards from the motherboard. Although these cards usually slide into preconfigured slots, there can be screws. Do not touch the gold connectors on the cards if you're reinstalling the cards.

Step 9

Disconnect all the cables from the motherboard, then unscrew it from the frame by loosening each screw a little bit before going around again to loosen each screw properly. This prevents any potential warping of the motherboard by gradually releasing the tension on it.

All the components should now be out of the computer case. If you're reusing the case, this is a good time to get rid of all the dust and lint that might have collected.

Output/Results snippet:

References:

- <https://www.instructables.com/id/Disassemble-a-Computer/>

Activity 2

Aim: Remove the cabinet and identify the components, slots, sockets, and connectors of motherboards

Learning outcome: Able to disassemble and assemble a PC.

Duration: 1 hour

List of Hardware/Software requirements:

1. Cabinet
2. Screwdriver

Code/Program/Procedure (with comments):

Remove the Cabinet

Remove the Side Panel Retaining Screws

Remove the outermost screws from the case—the ones that are holding the side panels to the rest of the case. You'll likely need a phillips-head screwdriver to remove these screws but some cases have screws you can turn by hand.

Set these screws aside, or unscrew them as far as you can if this case doesn't have fully removable screws. You'll need to use them to secure the side panels to the case again when you're through working inside your computer.

Remove the Case Side Panel



The case side panel can now be removed.

Sometimes the panel can simply be lifted off while other times it may be attached to the case in a slide-lock manner. No matter the mechanism, you should be able to easily jar the panel loose.

Remove the adapter cards:

Make sure if the card has any cables or wires that might be attached and decide if it would be easier to remove them before or after you remove the card. Remove the screw if any, that holds the card in place. Grab the card by its edges, front and back, and gently rock it lengthwise to release it.

Remove the drives:

Removing drives is easier. There are possibly three types of drives present in your computer system, Hard disk drive, CD/DVD/Blue-ray drives, floppy disk drives (almost absolute now a day). They usually have a power connector and a data cable attached from the device to a controller card or a connector on the motherboard. CD/DVD/Blue Ray drive may have an analog cable connected to the sound card for direct audio output.

The power may be attached using one of two connectors, a Molex connector or a Berg connector for the drive. The Molex connector may require to be wiggled slightly from side to side and apply gentle pressure outwards. The Berg connector may just pull out or it may have a small tab which has to be lifted with a screwdriver.

Now Pull data cables off from the drive as well as the motherboard connector. The hard disk drive and CD/DVD drives have two types of data cables. IDE and SATA cables. The IDE cables need better care while being removed as it may cause the damage to drive connector pins. Gently wiggle the cable sideways and remove it. The SATA cables can be removed easily by pressing the tab and pulling the connector straight back.

Now remove the screws and slide the drive out the back of the bay.

Remove the memory module:

Memory modules are mounted on the motherboard as the chips that can be damaged by manual force if applied improperly. Be careful and handle the chip only by the edges.

SIMMs and DIMMs are removed in a different way:

SIMM - gently push back the metal tabs while holding the SIMM chips in the socket. Tilt the SIMM chip away from the tabs until a 45% angle. It will now lift out of the socket. Put SIMM in a safe place.

DIMM- There are plastic tabs on the end of the DIMM sockets. Press the tabs down and away from the socket. The DIMM will lift slightly. Now grab it by the edges and place it safely. Do not let the chips get dust at all.

CPU cooler

Output/Results snippet:

References:

- <https://turbofuture.com/computers/Dissassembling-and-Assembling-the-computer-system>

Activity 3

Aim: Remove the SMPS

Learning outcome: Able to disassemble and assemble a PC.

Duration: 1 hour

List of Hardware/Software requirements:

1. Cabinet
2. Screwdriver

Code/Program/Procedure (with comments):

The power supply is a large metal box located at the upper-back part of the computer. They sometimes come with an on/off switch that is accessible from the back of the computer.

The main power cord also plugs into the back of the power supply.

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 I will do is unplug every wire coming from the power supply. The list below is everything that I had 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 four 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.

Output/Results snippet:

References:

- <https://www.instructables.com/id/Disassemble-a-Computer/>

Activity 4

Aim: Remove Hard disk Drive, RAM, CMOS Battery, coolant fan and DVD/BD Drive

Learning outcome: Able to disassemble and assemble a PC.

Duration: 1 hour

List of Hardware/Software requirements:

1. Cabinet
2. Screwdriver

Code/Program/Procedure (with comments):

Removable Hard Disk Drive

Open your machine

First, you need to remove the side panel from the computer case. The side panel is usually held in place by several screws, or may be held in place with a bracket or clamp. Remove the fasteners securing the side panel, and carefully pull it off. Once the panel is removed, you can see the inside of the computer. The next step is to locate the hard drive inside the case. In most computer cases, it's located towards the front at the bottom of the case, as indicated in the image below.

Hard drive removal

Once you've found the hard drive, disconnect the power supply cable from the back of it.

Also, disconnect the IDE or SATA cable, which is located next to the power connector.

The hard drive is secured in place by two to four screws, as is shown in the picture below. Otherwise, it will be held by a mounting bracket with a clamp. With the securing mechanism loosened, gently remove the hard drive.



Remove RAM

So pretty much, the more RAM you have, the faster your computer runs. Most computers have 4 RAM slots, and two RAM chips.

- 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 tabs are fixed into the RAM notch. If not, you may still have to press a bit.
- To remove the RAM, push down on both tabs holding the RAM in place, which are located at both ends of the RAM.

Remove CMOS Battery

- Remove the power cord to make sure that your computer receives no power.
 - Make sure you're grounded. Static discharges can damage your computer.
 - Find the battery on your motherboard
-
- Remove it.

Remove Cooling Fan

- Release the retention clips on each side of the heatsink from the motherboard socket mounting lugs.

- Lightly twist the CPU cooler clockwise and counterclockwise to loosen the seal between the heatsink and the lid of the CPU.
- Carefully lift the CPU cooler from the CPU

Remove DVD/BD Drive

- The CD/DVD drive is one of the easiest components to remove. First, unplug the ribbon from the back of the drive. Once that is completed, pull on the tab securing the drive in place, then push it out from the inside.
- If you don't have a second drive, there should be a flat piece of metal covering the drive slot.
- Follow the inscribed instructions to remove it.

Output/Results snippet:

References:

- <https://turbofuture.com/computers/Dissassembling-and-Assembling-the-computer-system>

Activity 5

Aim: Remove add on cords Remove and clean the motherboard

Learning outcome: Able to disassemble and assemble a PC.

Duration: 1 hour

List of Hardware/Software requirements:

1. Screwdriver
2. Compressed Air, Makeup Brush, Vacuum with attachments
3. Cotton
4. Isopropyl Alcohol 99% (or any 90%+)

Code/Program/Procedure (with comments):

Expansion cards give a computer new capabilities, once installed. Different examples are:

Bluetooth

Wireless Internet

Ethernet

TV

Different computers come stock with different cards. My computer came stock with a TV and Ethernet card. If you only have one, remove that one. If you have two, remove the two!

There should be a single screw on top of each expansion card slot, whether it's occupied, or empty. Remove the screws on the occupied card slots. Once the screws are removed, you should be able to remove the cards by pulling them carefully upward. Some expansion cards have cables leading to other parts of the computer, for example, my TV card is connected to the connectivity center on the front of my computer. You will have to unplug any cables attached to an expansion card.

Make sure if the card has any cables or wires that might be attached and decide if it would be easier to remove them before or after you remove the card. Remove the screw if any, that holds the card in place. Grab the card by its edges, front and back, and gently rock it lengthwise to release it.

Clean the motherboard

Step 1: Power off the PC: The first and foremost thing you should do to clean the motherboard is to turn off your system completely. Once you have turned off the PC, the next task is to unplug the entire power source from the desktop PC.

Step 2: Remove the case and disassemble the PC: Now remove the case from the back side of the processor using the screwdrivers. Take out the motherboard from there and then place it on a flat clean surface. Best is to keep it on a clean cloth. You can also use the vacuum first if you found some heavy dirt all over it.

Step 3: Clean: Now the cleaning task starts off! First, go for a basic cleaning. Use the compressed Air to remove the dust and dirt from the motherboard. You can also use a vacuum attachment to get rid of stubborn dust. But if you are using the vacuum attachment, ensure to keep them a few inches away for the best result. Next use the Makeup Brush & Compressed Air Can for the best cleaning results.

Step 4: Deep clean (Only try when your motherboard is faulty or dead): If you feel that basic clean is not enough to clean your motherboard then go for a deep clean. It requires you use the 99% Isopropyl Alcohol. In case the motherboard is filled with sticky substances and solders junks, a cleaning with alcohol is the best solution for that. Take a 1L bottle of Isopropyl Alcohol 99% in a small container and then gently put the motherboard in it to give a proper alcohol bath (try to shake it slowly when it's dipped properly). The stubborn and sticky particles will eventually go off to leave the motherboard as a new one.

Step 5: Assemble back: Once the cleaning process is done, allow the motherboard to dry completely after the alcohol bath. This step is highly required to prevent any further damage. Anyways, alcohol will get dried easily as it is evaporated. Now, reinstall the motherboard on the proper area and attach the case properly with the screwdrivers. Power the unit again and turn it on to check if it is working.

Output/Results snippet:

References:

- <https://www.instructables.com/id/Disassemble-a-Computer/>
- <https://www.deskdecode.com/how-to-fully-clean-a-desktop-pc-motherboard-isopropyl-alcohol-bath/>

Activity 6

Aim: Mount the motherboard on cabinet

Learning outcome: Able to disassemble and assemble a PC.

Duration: 1 hour

List of Hardware/Software requirements:

1. Cabinet
2. Screwdriver

Code/Program/Procedure (with comments):

1. Verify that you are as static free as possible.
2. Open the case you want to mount the motherboard in

3. Verify all metal hex nuts are in place to fit the new board. Make sure none will short any solder points on the board.
4. Verify all plastic spacers are in place to accommodate the new motherboard.
5. Place the motherboard into the case.
6. Screw the screws in place to hold the board in place. Make sure they are the only thing that lines up with the hex nuts.

Output/Results snippet:

References:

- <https://www.wikihow.com/Mount-a-Motherboard-in-a-Case>

Activity 7

Aim: Connect Hard disk Drive, RAM, coolant fan, DVD/BD Drive and fix CMOS Battery

Learning outcome: Able to disassemble and assemble a PC.

Duration: 1 hour

List of Hardware/Software requirements:

1. Cabinet
2. Screwdriver
3. Hard disk Drive(PATA or SATA)
4. RAM
5. coolant fan

6. CMOS Battery

7. DVD/BD Drive

Code/Program/Procedure (with comments):

Connect Hard Disk Drive

The general procedures for installing any hard drive are similar, but the exact steps and the sequence of steps vary depending on the type of drive you are installing PATA or SATA and the particulars of your case. The basic steps required to install a hard drive are:

1. Configure the drive as a master or slave device (PATA only).
2. Mount the drive in the chassis.
3. Connect the data cable to the drive and to the PATA or SATA interface.
4. Connect a power cable to the drive. Before you remove the case panels to install the hard drive:
5. Restart the system and run BIOS Setup. Note the current configuration which ATA and SATA ports are in use and the descriptions of the devices that are connected to them.

Alternatively, use a diagnostic program such as Everest Home Edition to determine the current configuration of your drives and interfaces.

6. If you are also installing a PATA or SATA interface card or RAID adapter, configure that card per the maker's instructions and attach the cables to it. If that card will replace some or all of the embedded PATA or SATA interfaces, use CMOS Setup to disable those interfaces.

Connect RAM:

If your computer uses more than one stick like mine, refer to the manual for which slot to install the stick. If only one stick is going to be inserted, place it in the slot closest to the CPU.

The slots are keyed as are the RAM sticks, so make sure the notch is lined up. Even correctly lined up it will take considerable force, this is where having those standoffs in the correct spots pays off. Having done this for several computers, I still get uneasy pushing so hard on electronics.

You will know when they are set firmly as the locking tabs will snap into place and hold the RAM firmly in the slot.

Connect Coolant Fan:

1. Before opening your computer, make sure that it is unplugged and in a non-static surface.
 2. Turn off the computer and move it to the non-static surface.

Use your screw-driver to open the case panel.

3. Remove the panel and take a look at the motherboard. It should look similar to the image.

4. Now proceed to remove your previous CPU heatsink. In order to do this, you need to undo the lever on the right side. Do this by gently pulling up on the lever until it becomes unhinged and loose.

The CPU should come off with ease.

5. Check that all the components are in correctly so that there are no complications in the install process. The CPU should be perfectly flat.

6. Apply the thermal paste onto the CPU. The amount of paste used should be about the size of a grain of rice.
7. Take the replacement heat sink and line it up correctly with the lever facing the PCI ports.
8. Connect the left connector bracket to the left side. This is important because it allows the lever to lock in the CPU heat sink so that it does not move.
9. Connect the right side. Pull the lever all the way back and push the bracket down until it clicks into place.

10. Take the lever and push it forward until it clicks into place. If the lever does not lock, stop pushing the lever. Just pull the lever back and repeat the last two steps over again.

11. Plug in the wire. There will be a wire that is not connected which is located on the heatsink fan. Take the wire and plug it into the CPU fan socket. It is located near the CPU and has several metal prongs.

Connect DVD/BD Drive

The optical drive for this computer is a DVD/CD read/write combo. Some people prefer to only connect an optical drive when installing items but one being in place at all times comes in handy when something comes up and you do not want to open the case and connect the drive.

Fix CMOS Battery:

Open the computer case and find the battery on the motherboard. Verify it is accessible and can be removed. Today, most computers use a coin cell CMOS battery, like the CR2032 battery shown in the picture.

Output/Results snippet:

References:

- <https://www.wikihow.com/Install-a-CPU-Cooler-in-an-AMD-Motherboard>
- https://www.ifixit.com/Wiki/Installing_a_Hard_Drive

Activity 8

Aim: Connect the SMPS and add on cords

Learning outcome: Able to disassemble and assemble a PC.

Duration: 1 hour

List of Hardware/Software requirements:

1. Cabinet
2. Screwdriver
3. SMPS
4. Cables

Code/Program/Procedure (with comments):

1. Find a power supply for your computer. The power supply that you buy depends on the computer's motherboard and housing size, meaning that you'll need to research your motherboard model to see which power supplies will fit.
2. Assemble your tools. You'll need at least one screwdriver (typically a Phillips head) to open the CPU housing, which is usually the right-hand side of the CPU box when looking at the back of the box. You may need a different screwdriver for your power supply as well—look at the screws that came with the power supply to determine whether or not this is the case.
3. Ground yourself. This will help prevent you from accidentally damaging the internal components of your computer with static electricity.

You can buy a grounding strap to help keep you grounded while working.

4. Open the computer case. You should be looking at the computer's internals at this point.

5. Lay the computer case on its side, with the exposed side facing up.
6. Set the power supply's voltage switch. If there's a voltage switch on the power supply, switch it to the 110v or 115v setting. This will ensure that your power supply provides ample power without damaging the components to which it's connected.

Not all power supplies have voltage switches, and those that do normally have the switch set to the standard of the region for which they were purchased.

7. Find the power supply's intended location. Power supply units (PSUs) typically sit at the top of the case; this is why the computer's power cable usually plugs into the top-back section of the case.
 - Refer to your computer's instruction manual for the proper placement of the power supply unit, or look for a rectangular cut-out on the back of the case.
 - If you're removing an old power supply, look for a power plug on the back of the case to find the power supply.

8. Insert the power supply. The power supply should have a distinct "back" with plugs and a fan, as well as a "bottom" with a fan on it. The "back" should face the back of the case, while the "bottom" should face the internal part of the case.

If you have an old power supply in your computer, remove it first.

9. Screw the power supply into place. With the "back" of the power supply unit pressed against the back of the case, insert the included screws to lock the power supply into place.

Many CPU housings have shelves on which the power supply will rest.

10. Attach the power supply to the motherboard. Find the main power cable on the power supply (usually the one with the largest plug) and attach it to the long, rectangular port on the motherboard, then attach the secondary power cable to the motherboard.

- Depending on your power supply and motherboard, you may not have a secondary power cable.
- The plug used to attach the power supply to the motherboard is usually a 20- or 24-pin connector.

11. Connect the power supply to other computer components. Using the smaller cables, connect the power supply to your computer's hard drive, CD drive, and graphics card. If you have other components in your case (e.g., a lighting system), you may need to plug these in as well.[1]

12. Close and plug back in your PC. Place the cover back on the PC, then stand it up and plug it back into the wall and your monitor.

13. Turn on your computer. If everything is connected and powered properly, the fan on the power supply should turn on and your computer will boot like usual. If you hear a beep and nothing happens, then something inside is not connected correctly, or the power supply is not providing enough power to your components.[2]

Output/Results snippet:

References:

- <https://www.wikihow.com/Install-a-Power-Supply>

Activity 9

Aim: Assemble the cabinet. And connect the peripherals

Learning outcome: Able to disassemble and assemble a PC.

Duration: 1 hour

List of Hardware/Software requirements:

Code/Program/Procedure (with comments):

1. Processor (CPU)
2. Computer Case
3. Optical Drive (DVD RW and SATA capable)
4. Memory (RAM)
5. Power Supply
6. SATA Cables
7. Motherboard (SATA Capable)
8. Processor Fan
9. Case Fan
10. Hard Drive (SATA Capable)
11. Assortment of case and drive screws

Step 1: Remove Side Panels on Case

After removing the case from the box, the panels are removed from this case with thumb screws. Your specific model's manual will have more information if you are unsure for your case.

Included were standoffs for mounting the motherboard, following the included template, thread into the corresponding holes in the case.

Step 2: Insert Motherboard

In my assembly process, as I was just transferring the parts from one case to another, leaving the CPU cooler installed was the easiest option. Depending on the motherboard, case, CPU and CPU fan, this might need to be done before installing or once in place.

Before setting the board in, the I/O panel faceplate needs to be snapped into the location in the back of the case. Be sure to orient it to the board.

Once the board is resting in the case, line up the first hole, I suggest a corner. Do not tighten all the way down until all screws are started so that the others will line up.

After all are in and tightened, there should be little or no deflection of the board if you gently press on it. It is advisable that any place there is a mounting location for the board, that it is screwed into a standoff. This will provide support while installing the components into the motherboard.

This case has a cutout for access to the back of the motherboard for the massive CPU coolers that have brackets that attach to the back of the board.

Step 3: Check Clearances

Being that this computer includes high performance components, some of them are large enough that clearance can become an issue. For this reason once the board was installed I fitted the graphics card so there would not be more surprises later in the process.

Step 4: Front Panel Connections

Once the graphics card was removed again, it was time to attach the connections for the buttons, lights, USB ports and audio connections. As every case and motherboard differ slightly, it is best to refer to the manual for the placement and orientation of connections. Some of these connections are made to only work in one direction so be careful when using force, it might be in an incorrect orientation.

Step 5: Install Power Supply

The power supply from the previous case was modular so only the cables that are needed are plugged into the unit. As well this makes cable management cleaner in the end. Normally the supply is screwed into the back panel by 4 screws, though some cases include a clamp to hold it down that way.



The second picture shows all of the cables that my computer needs to function properly.

Not pictured, below the supply there is a hole with a filter for the power supply to circulate air independent of the case fans.

Step 6: Power Motherboard

With the motherboard power being the largest cable and sometimes just long enough, I suggest running this cable first and plugging it into the board, if there is a second cable for the CPU remember to connect it as well.

Step 7: Installing Optical Drive

The optical drive for this computer is a DVD/CD read/write combo. Some people prefer to only connect an optical drive when installing items but one being in place at all times comes in handy when something comes up and you do not want to open the case and connect the drive.

The second picture shows the tool-less design of the case to hold the drive in place.

Step 8: Installing the Hard Drives

The size and number of hard drives your computer contains is completely dependent on your style of use and storage needs. This computer uses 4 drives, two in raid and the rest for a main drive and miscellaneous storage.

Picture 2 shows the location for the drives in the case, this model has a cross mounted design, others might have them in the same direction as the optical drive installed previously.

Picture 3 is an example of possible tool-less drive mounting hardware, these clips allow the drive to be just slid in and locked into place.

Picture 4 depicts the drives installed and spaced out for air flow. This is very important to extend the lifespan of the drive key when you are making a long term investment or run your computer continuously.

Picture 5 shows the back of the drives where the connections for power and signal are made.

Picture 6 shows the cables attached.

Step 9: Connect Cables

It is time to connect the cables for the hard drives and optical drives. The cables are keyed so they will only fit in one direction into the board, don't forget the cable that is attached to the optical drive. This computer does not use the IDE cable but if you are connecting an older optical or hard drive they might require it.

Step 10: Install RAM

It is time for the ram to be inserted. If your computer uses more than one stick like mine, refer to the manual for which slot to install the stick. If only one stick is going to be inserted, place it in the slot closest to the CPU.

The slots are keyed as are the RAM sticks, so make sure the notch is lined up. Even correctly lined up it will take considerable force, this is where having those standoffs in the correct spots pays off. Having done this for several computers, I still get uneasy pushing so hard on electronics.

You will know when they are set firmly as the locking tabs will snap into place and hold the RAM firmly in the slot.

Step 11: Install Graphics Card and Expansion Cards

If your computer does not come with a graphics card integrated into the motherboard or you are adding an additional card, this is the time to do so.

With some high performance cards, additional power cables might need to be installed. The manual for the card should tell you how many cables are needed. In my case it is a 6-pin and an 8-pin.

After that is in place and secured with screws in place (a time where tool-less is not enough), the network card and audio card for the computer are connected into the slots below the graphics card.

Step 12: Cable Management

With all components in place, it is time to make your hard work look like a work of art. Hiding cables and organizing them will help in the future if you are looking for high airflow through the case or to light it up.

Small steps taken throughout the process of installing the components can pay off huge at this point by not needing to re-run the cables around brackets or through holes in the frame. Some of the management was done out of the box for this model being that the front panel and fan cables were already secured ahead of time. Another thing to think of is that the back panel does not leave a large space if you have several cables running over the top of others.

A few trial and error steps later this will look and perform with ease. Also, it is a nice point to brag once you call up your friends to show off the system you assembled with your own hands.

This step is also when fans and lights can be connected.

The assembly of a brand new computer can take several hours. Just to remove and mount in a new case with no other modifications took me 3 hours, 2.5 of that just the re-installing time.

With the job complete it is time to fire it up and enjoy your creation. From here you can add your operating system and software as you see fit.

Output/Results snippet:

References:

- <https://www.instructables.com/id/Computer-Assembly/>

Activity 10

Aim: Connect power cords and switch on power supply and run the PC

Learning outcome: Able to disassemble and assemble a PC.

Duration: 1 hour

List of Hardware/Software requirements:

1. Power Cables

24-pin power to motherboard (always required)

4/8-pin EPS12V power to CPU (always required)

6/8-pin power to video card (normally required)

SATA power to storage devices (normally required)

MOLEX power to accessories (optional)

CPU fan & case fan power (required)

Power cable to system's power supply (always required)

Data Cables

SATA data to storage (normally required)

USB2.0 front panel headers (normally required)

USB3.0 front panel header (normally required)

HD Audio front panel header (normally required)

Signaling Cables

Power switch [PWR_SW]

Reset switch [RESET]

Power LEDs [PWR_LED]

Hard Drive LEDs [HDD_LED]

Code/Program/Procedure (with comments):

1. Connect your power supply cables beginning with the 24-Pin Motherboard connector.
2. Next, connect the 8-Pin CPU/ Motherboard cable. Some motherboards will only require a 4-Pin connector.
3. Next, connect the 6 or 8-Pin PCI power cable to your video card. Some video cards do not require additional power from the power supply. Some video cards will require two 6 or 8-Pin PCI power cables.
4. Next, connect your storage or disk device such as your HDD, SSD, or DVD Drive. Connect the SATA data cables that were included with your motherboard. Connect one end to the hard drive or disk drive and the other end into the appropriate SATA slot on your motherboard. Consult the manual for additional instructions on which slot to use.
5. Connect the SATA power cable from the power supply to the drives.
6. Connect any USB headers from your accessories such as the GRID+ or Aperture M Card Reader.
7. Connect the SATA or MOLEX power for any of your accessories or coolers such as the SATA power connector in the Kraken™ liquid cooler.
8. Connect the USB 3.0 connector to enable the USB 3.0 slots on the outside of your case. (If there are any)
9. Connect the HD Audio and USB headers to enable the USB 2.0 and Headset / Mic ports on the outside of your case.
10. Connect the Power SW, Reset SW and LED indicator headers into the motherboard to enable the activity LEDs and power / reset buttons on your case.

Output/Results snippet:

References:

- <https://blog.nzxt.com/psu-cable-connections/>

Learning Outcome 3 - Able to perform basic troubleshoot of PC

After achieving this learning outcome, a student will be able to perform basic troubleshoot of PC. In order to achieve this learning outcome, a student has to complete the following:

1. Check PC Power Supply. (1 Hrs)
2. SMPS cables and connection to the motherboard. (1Hrs)
3. Check connection of I/O devices to PC. (1 Hrs)
4. Remove and reinsert RAM and reinsert CMOS battery.(1 Hrs)
5. Check HDD/DVD Cables.(1 Hrs)

Activity 1

Aim: Check PC Power Supply. (1 Hrs)

Learning outcome: Able to perform basic troubleshoot of PC..

Duration: 1 hour

List of Hardware/Software requirements:

1. PC/Laptop
2. Windows/Linux Operating System

Code/Program/Procedure (with comments):

The power supply is often forgotten when it comes to diagnosing computer problems, but testing your power supply first can save you a lot of troubleshooting headaches down the road. If your computer experiences Blue Screen of Death crashes, hard drive errors, or just plain won't boot, you may be dealing with a faulty power supply. Run these quick tests before you start swapping out expensive hardware.

Testing if it Powers On

1. **Shut down your computer:** Once the computer has been shut down, or if it isn't starting to begin with, flip the switch on the back of the power supply. Unplug the power supply from the outlet.
2. **Open your computer case:** Disconnect the power supply cables from all of the components inside the case. Follow each cable from the power supply to the component to make sure that everything is properly unplugged.

Make note of where everything was plugged into for when you reassemble the case.

- 3. Make a paper clip tester:** You can use a paper clip to help test your power supply and trick it into thinking that it has been switched on. To do this, straighten a paperclip and then bend it into a “U” shape.
 - This paperclip will act as the pins that are inserted into the power supply that give it the “Power ON” signal.
 - 4. Find the 20/24 Pin connector that normally attaches to your computer’s motherboard:** It is typically the largest connector for the power supply.
 - 5. Find the green pin and a black pin (pins 15 & 16):** You will be inserting the ends of the paperclip into the green pin (there should be only one) and a neighboring black pin. Before you do this, double check to make sure that the power supply is completely disconnected from any power outlet, that it is switched off, and that it is not connected to any computer components.
 - The green pin is typically pin 15 on a pin chart.

6. **Insert the paperclip:** Once you have placed the paperclip into each of the pins, place the cable somewhere where it won't be disturbed. Plug the power supply back into the outlet, and flip the switch in the back.

 7. **Check the fan:** Once the power supply is receiving power, you should be able to hear and/or see a fan moving. This will let you know that the power supply is at least working. If the power supply does not turn on at all, double check your pins (after unplugging) and
again. If it still does not turn on, then it is most likely dead.
 - This test will not tell you if the power supply is functioning as it should, just that it is turning on. You will need to perform the next test to ensure that it is outputting correctly.

Testing the Output

- 1. Check the output through software:** If your computer is functional and you can load your operating system, try using software to check your power supply's output. SpeedFan is a freeware program that will read your computer's diagnostics and report back your temperatures and voltage's. Check the readouts to ensure that they fall within accepted tolerances.

- If your computer does not work, skip to the next step.
- 2. Shut down the computer:** Unplug the power supply from the outlet. Turn off the power switch on the back of the power supply. Open the computer and disconnect all of the components from the power supply. Follow the cables from the power supply to each component to ensure that everything has been properly disconnected.
- 3. Test the power supply with a power supply testing unit:** These are available online and from computer stores, and are not very expensive. Find the 20/24 pin connector on the power supply. This is typically the largest cable for the power supply.
- Connect the power supply testing unit to the 20/24 pin connector.

-
- Plug the power supply back into the outlet and turn it on. Your power supply should turn on automatically and your power supply tester will light up.
 - Some power supply testers require you to turn on the power supply using a switch or button on the tester. Others will turn on automatically.
 - Check the voltages. The 20/24 pin connector will have multiple readouts, but there are 4 essential measurements you need to look for:
 - +3.3 VDC
 - +5 VDC
 - +12 VDC
 - -12 VDC
 - Ensure that the voltages are within normal accepted tolerances. +3.3, +5, +12 can all be within +/- 5%. The -12 can be within +/- 10%. If any of the readings are outside that range, than the power supply is bad and needs to be replaced.
 - Test the other connectors. Once you've verified that the main connector is outputting power properly, test each of the other connector cables one by one.

Unplug and turn off the power supply between each test.

4. Test the power supply with a multimeter: Straighten a paperclip and then bend it into a “U” shape. Find the green pin on the 20/24 pin connector. Plug the paperclip into the green pin (pin 15) and into one of the neighboring black pins. This will trick the connector into thinking it’s plugged into the motherboard.

- Plug the power supply back in and turn it on.
- Find a pinout chart for your power supply. This will let you know which pins provide which voltages.
- Set your multimeter to the VBDC setting. If your multimeter does not auto-range, set the range to 10V.
- Connect the negative probe of the multimeter to a ground (black) pin on the connector.
- Connect the positive probe to the first pin that you want to test. Make a note of the voltage displayed.
- Check the voltages to make sure they fall within the tolerance threshold. If any of the voltages are outside of the tolerance range, then the power supply is defective.
- Repeat the process for each of the peripheral connectors. Refer to the specific pinout charts for each connector to see which pins to test.

5. Reassemble your computer: Once you’ve tested and verified all of the power connectors, you can reassemble your computer. Ensure that all of your devices are properly plugged back in, and that all of the motherboard connectors are properly seated.

Once you have finished reassembling the computer, you can try powering it on.

- If you are still having computer errors, or your computer will not start, move on to other troubleshooting steps.
- The first place to check will be your motherboard.

References:

-
-

Activity 2

Aim: SMPS cables and connection to the motherboard. (1Hrs)

Learning outcome: Able to perform basic troubleshoot of PC..

Duration: 1 hour

List of Hardware/Software requirements:

1. PC/Laptop
2. Windows/Linux Operating System

Code/Program/Procedure (with comments):

What is an SMPS?

SMPS is referred to as Switched Mode Power Supply. It is a device that efficiently provides a regulated voltage, from a different level of input voltage. The device transfers the power from a source (basically an electrical grid) to the computer system. Technically briefing, an SMPS in a desktop system that converts 220V AC and 50HZ into +5V, -5V, +12V and +3.3 V DC at various electrical components in the computer.

How to keep the SMPS healthy?

- Be sure that SMPS collects voltage at 120V or 220V (household frequency)
- Don't use a splitter on the source of power
- Be sure that each output is within tolerance (Non-fluctuating Voltage) ● Check the AC Input voltage with the help of a Multimeter.

Common problems appearing from a faulty SPMS

- 1) The power is not reaching the computer system –

Solutions:-

-
- Check the power from the source
 - Check the setting of the voltage in CPU
 - Check the front panel of motherboard
 - Check the power supply connections to the motherboard
 - Check the SMPS without connecting to the motherboard.

This step may require the help of professionals and thus, you need to hire a computer repair service in Bunbury.

2) Computer getting started after second or third try – Solutions:-

- Check the power supply switch on the cabinet
- Consider replacing SM

3) Display comes to monitor and becomes black –

Solutions:-

- Replace SMPS and try again
- The problem may arise from Motherboard

4) The PC powers on without display –

Solutions:-

- Check the VGA cable and monitor connections
- Discard the SMPS, it has been damaged badly by voltage fluctuation
- Check the Display Card Modem

5) There is a whistling/squealing/motor like noise from SMPS when PC starts –

Solutions:-

- Check the SMPS fan
- Genuine SMPS problem, consider replacing

6) The PC freezes or reboots suddenly – Solutions:-

- Overheating problem of SMPS

All these solutions need to be applied through professionals to prevent further problems.

Output/Results snippet:

Activity 3

Aim: Check connection of I/O devices to PC. (1 Hrs)

Learning outcome: Able to perform basic troubleshoot of PC..

Duration: 1 hour

List of Hardware/Software requirements:

1. PC/Laptop
2. Windows/Linux Operating System

Code/Program/Procedure (with comments):

These parts of the computer are part of a general category of computers called **Input/Output Devices**. When you turn on your computer and push the power button on the computer monitor, you are interacting with an I/O device. When you show your students a video on a flash video site with audio, you are using the speakers, another I/O device. When these parts of the computer are not functioning properly, usage of the computer becomes severely compromised. This section of site will focus on troubleshooting Input/Output Devices.

This section will be broken down into the four major categorical Input/Output devices on the computer that many teachers and students encounter problems with in the school setting. They are:

- Monitors
- Keyboards
- Mice
- Speakers

Monitors: troubleshooting includes discussion of the various settings on the monitor including horizontal and vertical size and position, color hue, degaussing, and connectivity issues.

Keyboard: includes troubleshooting keyboard devices including dealing with sticky keys, cleaning procedures, and connectivity issues.

Mice: includes troubleshooting basic mice devices including erratic mouse movement, cleaning procedures for optical and ball mice, and connectivity issues.

Speakers: Includes troubleshooting for computer speakers including lack of sound, on screen volume controls, and connectivity issues.

Activity 4

Aim: Remove and reinsert RAM and reinsert CMOS battery.(1 Hrs)

Learning outcome: Able to perform basic troubleshoot of PC..

Duration: 1 hour

List of Hardware/Software requirements:

1. PC/Laptop
2. Windows/Linux Operating System

Code/Program/Procedure (with comments):

CMOS stands for “Complementary Metal Oxide Semiconductor.” The CMOS battery powers the BIOS firmware in your laptop..

BIOS needs to remain operational even when your computer isn't plugged into a power source. That's where the battery comes in. When your computer gets unplugged, BIOS relies on the CMOS battery for power.

You'll find CMOS batteries in both laptops and desktop PCs, but it's used more frequently in a laptop. That's because laptops are usually unplugged for a longer amount of time than desktop PCs. Most desktop PCs are unplugged from their power source very infrequently.

The CMOS battery gets charged whenever your laptop is plugged in. It's only when your laptop is unplugged that the battery loses charge. Most batteries will last 2 to 10 years from the date they're manufactured. The more you leave your laptop plugged in, the longer your battery will last.

Here are the CMOS battery failure symptoms:

- The laptop has difficult booting up
- There's a constant beeping noise from the motherboard
- The date and time have reset
- Peripherals aren't responsive or they don't respond correctly
- Hardware drivers have disappeared
- You can't connect to the internet **boot up problems and incessant beeping**

As we mentioned previously, BIOS is largely responsible for booting up your computer. Without the battery, your laptop may have a very difficult time booting up or it may not boot up at all. You also might hear a constant beeping noise from the motherboard, another indication of a battery failure.

Time and date from long, long ago

If your laptop manages to boot, you might notice that the date and time have reset. Most likely, they've reset to a date long in the past. Even when your computer is shut off,

BIOS maintains a real-time clock that tracks the date and time. CMOS (which is sometimes referred to as a real-time clock, in and of itself) is responsible for maintaining that procedure. So if the date and time have mysteriously reset, that's a very good sign that the CMOS battery died.

Keyboard acting wonky

It's possible that your peripherals don't respond - you can't move your cursor or click on any icons or the laptop won't read any of your keyboard inputs.

Or, your peripherals could be thrown out of whack; your cursor is inaccurate and your key inputs prompt strange responses from the operating system.

Or, your customized keyboard configuration has reset to the default one. These are all signs of CMOS failure, since BIOS is responsible for managing peripherals at startup.

Drivers disappear

If you've installed any drivers on your computer, like those used for your home printer, a CMOS failure may cause those drivers to disappear (you'll have to re-download and re-install them).

No internet connection

Battery failure may also prevent you from connecting to the internet. BIOS is tasked with maintaining hardware and network drivers.

One thing you should be relieved about is that CMOS failure typically won't cause you to lose any of your personal files. Nothing in storage is affected. You'll still have all of your pictures, videos, and documents waiting for you as soon as you've replaced the battery.

How to remove and replace the CMOS battery

Let's remove that pesky ol' CMOS battery and replace it with a new one. It's a relatively simple process. You'll only need a few supplies:

- Screwdriver (Phillips or flathead, depending on the type of laptop you have)

- Compressed air
- New CMOS battery
- ESD mat

You can purchase a new CMOS battery online for a very reasonable price, usually between \$1 and \$10. They are also available, along with ESD pads, at many local retailers like Target, Fry's Electronics, Best Buy, and office supply stores.

1. Find a good workspace

Your laptop components can be damaged by electrostatic discharge (ESD). To avoid building up a charge, don't work on a carpeted surface. Work on a flat, hard surface. In fact, it's best to work on a conductive foam pad, if possible. These pads will prevent ESD.

It's possible that there's static electricity in your hands. Before you start working, rub your hands on a metal surface to get rid of the charge. Better yet, if you have an anti-static wrist band you probably want to put that on for this DIY project.

2. Disconnect everything

Shut down your computer and unplug it from its power source. Unplug any and all cables from the laptop, including peripherals.

3. Remove the laptop casing

Flip the laptop over. Use the screwdriver to remove the screws holding the laptop casing in place.

Remove the casing once you've unscrewed it.

Note that on some laptops, there's only one large casing that needs to be removed. On other laptops, there are several smaller casings that give you access to different computer components. If you're not sure which casing gives you access you what, you might need to unscrew all the casings and do some exploring.

4. Remove the battery

You don't want the computer to accidentally turn on while you're working on it. Usually, the battery is long, heavy, and shaped something like a brick.

5. Remove the CMOS battery

battery's orientation so you know which way to put in the new one. By this point, you should see the motherboard. Be very careful when you're working around the motherboard. This is the most important hardware in your computer and you could seriously damage the laptop if you damage the motherboard.

The CMOS battery is shiny and round. It looks like a button or coin, and it's usually placed within a small holding socket. Remove the CMOS battery - it slides out of the socket just like the batteries in your mouse.

Pro tip: Before you remove it, make sure to take note of the

6. Insert the new battery

Place the new battery in the same location. Make sure you place the new battery in the exact same orientation as the old one.

7. Reattach the casings

Rescrew each of the casings within the computer. Reinstall the battery. Replace the exterior casing.

8. Test the laptop

Plug your laptop back into its power source and turn it on. BIOS should have defaulted back to its original settings, so don't be alarmed if the date and time are still incorrect, or if there are drivers missing. You will need to reset the time and reinstall the drivers.

Pro tip: Your laptop shouldn't have any problem booting up now. If it does, it might be your and not your CMOS.

How to replace the CMOS battery in a desktop computer

. It's even easier to replace the battery in a desktop because desktop computers usually have a more accessible motherboard.

Use BIOS to overclock your computer

All computers have a programmed “clock speed.” Clock speed refers to how fast a computer processor can read incoming electric pulses of information. The most powerful processors have fast clock speeds.

If you’re a PC gamer or a creative professional, you want an ultra-fast processor. PC games and creative applications, like the Adobe Creative Suite, require your CPU to process and render large quantities of information in a short amount of time. If your processor isn’t fast enough to handle all this data, you might. Obviously, lag is a real killer when you’re gaming.

Some processors allow for overclocking. Overclocking is when your processor operates at a faster speed than what it was programmed for. Hardcore gamers love overclocking because it improves game performance. You can activate overclocking via BIOS. Since we’ve been discussing all things BIOS, we might as well share some overclocking secrets to help you boost your processor speed.

Be warned: overclocking may void your PC’s warranty. It may also cause your computer to overheat, which is why you must pay attention to how hot your computer gets when you’re running intensive programs.

If the heat being ventilated from the computer is very noticeable, you should take a break and turn the computer off for a while so it can cool down. Overheating can damage your interior components.

To activate overclocking on Windows 10:

1. Go to Settings —> Update & Security —> Recovery
2. Under “Advanced Startup,” click “Restart now”
3. Your computer will restart, and it will give you access to BIOS settings when it starts back up
4. You need to change the CPU frequency; depending on your computer, there will be an option for “Cell Menu,” “Ai Tweaker,” “CPU Settings,” “Frequency Controller,” or “MB Intelligent Tweaker. Click whichever one appears on your BIOS settings tab.
5. Click the “Adjust CPU Ratio” option

-
6. Click on the “Auto” setting and press “Enter”
 7. You’ll be given a list of alternate settings; choose a number higher than the existing setting and press “Return”

Again, these settings may look entirely different depending on the computer you’re using. No matter what computer you have, just know that you need to access the settings that allow you to increase your CPU frequency/clock speed. You may need to do some experimenting. Be sure not to push your processor until you know that you adjusted the settings correctly.

Some CPU manufacturers, and they may include “auto-overclocking” options you can select.

Read this for more information.

Activity 5

Aim: Check HDD/DVD Cables.(1 Hrs)

Learning outcome: Able to perform basic troubleshoot of PC..

Duration: 1 hour

List of Hardware/Software requirements:

1. PC/Laptop
2. Windows/Linux Operating System

Code/Program/Procedure (with comments):

Opening the computer

Open your computer and locate the CD-ROM and each of the cables connected to it. Below is an example of a disc drive, including where each of the cables should connect to the drive.

Verify connections

Your CD-ROM should have at least two cables connected to it: a Molex power cable and an ATAPI / IDE or SATA cable. The IDE or SATA cable should also connect to the motherboard or another interface card, and the power cable should connect to the power supply. Disconnect the cable from the back of the CD-ROM and reconnect it. Do the same on the opposite end of the cable, if possible.

Next, if your CD-ROM drive is not getting any power, disconnect the power cable from the back of the drive and reconnect it.

Finally, some computers may have a third cable to interface the CD-ROM with the sound card. If the audio for your audio CDs is not working correctly, verify this cable connects to the CD-ROM and sound card.

Check jumpers

If you recently installed any new disk drives, such as a new hard drive, verify that the jumpers are correctly set on the back of the CD-ROM. Having the jumpers set improperly to primary or secondary can cause the CD-ROM not to work. If no jumper settings are on the back, remove the drive and get the jumper settings from the sticker on top of the disc drive.

References:

<Include at least 1 reference per activity where students can go and explore. Remove this part from your final document. >

- ... <https://www.neweggbusiness.com/smartbuyer/components/how-to-troubleshoot-a-pc-power-supply/>
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Learning Outcome 4 - Able to work with different cables, connectors, and its crimping techniques for PC

After achieving this learning outcome, a student will be able to work with different cables, connectors, and its crimping techniques for PC. In order to achieve this learning outcome, a student has to complete the following:

1. Connect SATA/IDE Cables to Hard Disk Drive (1 Hr)
2. Crimp CAT 6 cable to RJ 45 connector (1 Hr)
3. Connect peripherals (Keyboard, Mouse, USB drive, printer) to USB port (1 Hr)
4. Connect SVGA/HDMI Cable to the system (1 Hr)
5. Connect multimedia devices to AV Port (1 Hr)

Activity 1

Aim: Connect SATA/IDE Cables to Hard Disk Drive (1 Hr)

Learning outcome: Able to work with different cables, connectors and its Crimping techniques for PC..

Duration: 1 hour

List of Hardware/Software requirements:

Code/Program/Procedure (with comments):

Step 1: Identification of the drive interface type.

Most modern PCs use the SATA interface for physical connection of hard drives to the computer's system bus, while the IDE (PATA) standard may be found on older machines. To identify the interface type, you should disassemble the device and examine the drive:

- Open the case to access the hard drive. If the device uses removable hard drives in special bays, simply eject the drive from the bay;

- Examine the holder of the hard drive: if the back panel is covered with an enclosure, remove it and then check the back panel.

The following examples will acquaint you with what different hard drive interfaces look like:

Pic. 1. Back panel of an IDE (PATA) drive.

In this picture:

1. IDE data port. Please pay attention to the small hollow in the top center. It is used as an index for correct cable connection. Incorrect cable connection can damage the connector and the drive.
2. Power supply port. It also has a "key" form for correct connection of the power cable.
Incorrect cable connection can damage the connector and the drive.
3. These are used for identification of the order of the drives in a paired IDE cable as well as for additional IDE settings.

Pic. 2. IDE (PATA) data cable.

In this picture, the blue connector is used to connect the cable to the mainboard of the computer/device, while the black one is used to connect the drive. Please pay attention to the "key" on the cable connector that matches the slot of the drive.

IDE cables usually have two drive connectors: a "master" connector (at the end of the cable) and a "slave" connector (in the middle of the cable, closer to the "master" connector).

Pic. 3. Back panel of a SATA drive.

In this picture:

1. SATA data port. Please pay attention to the "key" form of the slot.
2. SATA power supply port. In contrast to IDE, a SATA power cable is wider than a SATA data cable. It has a "key" form as well.



Pic. 4. SATA data cable connector.

A SATA cable consists of two equal endpoints on a thin data cable. It makes no difference which of the ends will be used to connect the drive. Please pay attention to the form of the connector that matches the "key" form of the SATA drive data slot.

Step 2. Choosing the method of connection to the host computer.

Main connection methods include:

- External adapters
- Mainboard connectors
- PCI/PCI-Express expansion

External adapters

This is the safest but at the same time the most expensive method. You need USB/Firewire adapters for each drive to connect them to the host PC.

* If the host computer provides enough disk space, you can create an image of your disk and avoid using an adapter for this disk.

You can find external adapters for both SATA and IDE hard drives; some of them fit both interfaces:



Pic. 5.

USB to IDE hard disk adapter with an external power supply.

Pic. 6. USB to SATA hard disk adapter with an external power supply.

Please note that some USB to SATA adapters have a pair of SATA interfaces, thus, to connect two SATA drives you need only one adapter.

Pay attention to the external power supply: some adapters are powered via USB and don't match

3.5" hard drives used in NAS and desktop computers.

Mainboard connectors

This is the cheapest but not the safest method to connect the drives. Besides, the mainboard is able to place a very limited number of drives.

Before choosing this method, make sure that the computer power supply provides at least 15 Watts of additional power per drive.

Also, see to it that you have a sufficient number of data cables: one cable per two IDE drives and one SATA data cable per one SATA drive.

To check if the method is suitable, examine your motherboard connectors. To do this:

- Remove the screws from the back panel of your computer that hold the Removing two screws that hold the left-side cover is enough (for a tower-type computer);
- Open the left cover panel: pull it a little back and put it aside;
- Examine the expansion slots on the mainboard.

Pic. 7. IDE connectors.

In this picture, you can see two IDE connectors marked as IDE 1 and IDE 2 at the right bottom. As a rule, IDE 1 is colored while IDE 2 is usually black or white. Each IDE connector is capable of hosting two IDE hard drives.

Make sure that the mainboard provides enough free slots. For example, for four disks of your NAS with IDE hard drives you need two free IDE slots on the mainboard: two drives per interface. For four drives with a SATA interface four free SATA slots are needed.

If the mainboard doesn't provide a sufficient number of free slots, use external adapters or expansion cards. If you decide to free up some mainboard slots for extra drives, make sure you don't unplug the system boot drive or RAID.

Expansion cards.

This method of connection is quite efficient, however, is not 100% safe.

Before choosing this method make ensure that the computer power supply is capable of providing at least 15 Watts of additional power per drive plus about 10 Watts for the expansion card. Expansion cards are available for both SATA and IDE drives.

Pic. 9. PCI IDE expansion card with two IDE channels.

Please note that IDE expansion cards have one or more IDE channels. Each channel is capable of hosting two IDE drives. It is recommended to use one card for all the drives.

Pic. 10. PCI SATA expansion card with four SATA channels.

SATA expansion cards have two or more SATA channels. Each channel is capable of hosting one

SATA drive. It's recommended to use one card for all the drives. But as multi-port cards are more expensive, you may consider using several cards to save costs. Besides, there are no requirements to expansion cards for hardware RAID, thus, you can choose an inexpensive one.

Expansion cards can be installed to any free PCI (or PCI Express) slots on the mainboard.

Pic. 11. PCI slots on the mainboard.

Please refer to the expansion card installation manual for more details. Make sure that the expansion card kit contains a sufficient number of data cables: one cable per 2 IDE drives and one SATA data cable per one SATA drive. You might need additional cables.

Step 3. Powering the drives.

There are different ways to power the disks for different types of connection:

- For external USB adapters use an external power supply from an external adapter kit;

The mainboard or an expansion card require that the computer power supply:

- Supports extra 15 Watts per each extra drive;
- Has enough cables to power all the drives.

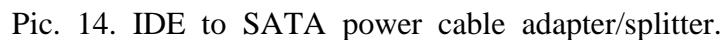
Pic. 12. SATA (left) and IDE (right) power cables.

If you need more power connectors for an IDE drive, use power splitters:



Pic. 13. IDE power cable splitter.

For extra SATA power connectors it's recommended to use IDE to SATA power adapters/splitters:



Pic. 14. IDE to SATA power cable adapter/splitter.

Step 4. Connecting the drives to the host PC.

Before connecting the drives, make sure they are not damaged. Otherwise, you may face the risk of permanent data damage on the failing drive or cause damage to the hardware interface.

- Connecting the drives to external adapters:

- Connect the data interface of each drive to the data interface of the adapter.
Connector "keys" must be matched: key slots must combine with key lugs;
- Connect external power supplies to the drives; pay attention to the "keys";
- Ensure sufficient airflow to cool the drives; it's not recommended to put the drives on each other or use a soft surface with good thermal isolation because this can cause the drives to If the drives get hot, it's recommended to use air coolers;
- Charge external power supplies. The disks must start spinning. Wait until the initialization of the drives is completed (this may take about 5-10 seconds);
- Connect adapter USB cables to the host PC; follow the order of the drives

- Connecting the drives to the mainboard/expansion card:

- Power off the computer and unplug it from the power source;
- Open the left-side cover of the computer case (for tower-type computers);
- If you use an expansion card, install it to a spare PCI/PCI-Express slot. Read the card installation manual for more details;
- Connect the data cables to mainboard/card IDE/SATA expansion slots. Connect power splitters/adapters if needed;
- For IDE drives: make sure that the drive jumper (Pic.1) is set to the "cable select"

(CS) mode. The table of valid jumper positions is available on the drive sticker;

- Connect data cables to the drives. While connecting RAID drives, you should preserve the correct order of the drives. To connect data cables, you must:

- For IDE drives: connect the first drive as the "master" of the first IDE channel, the second drive as the "slave" of the first IDE channel, the third drive as the "master" of the second IDE channel and so on (see description under Pic. 2). The "Cable Select" jumper position ensures correct identification of the drives depending on the position on the cable.

- For SATA drives: connect the first drive to the first free SATA port (for example, SATA3), the second drive – to the next free SATA port and so on.
- Pay attention to connector key elements: key holes must match key lugs.
 - Connect power cables to the drives;
 - Ensure sufficient airflow to cool the drives; it's not recommended to put the drives on each other or to use a soft surface with good thermal isolation because this can cause the drives to If the drives get hot, it's recommended to use air coolers;
 - Plug in and start the computer. Make sure that the operating system is able to boot. Otherwise, revise BIOS configuration for boot device sequence. Read the motherboard BIOS manual for details.

After installation of additional drivers for external adapters, expansion cards, hard disk drives, etc. the system is ready for logical data recovery.

References:

-
-

Activity 2

Aim: Crimp CAT 6 cable to RJ 45 connector (1 Hr)

Learning outcome: Able to work with different cables, connectors and its Crimping techniques for PC..

Duration: 1 hour

List of Hardware/Software requirements:

Code/Program/Procedure (with comments):

Step 1

This procedure generally applies to Cat 6 RJ45 connectors.

An alternate method is given for connectors utilizing a "load bar".

Step 2

Cut the cable to the length needed.

If you plan to use snagless boots, this would be a good time to slide them on.

Be sure the boots will be facing "out" towards the connect

Step 3

Strip back the cable jacket approximately 1 inch.

Use the cutter provided with the crimping tool or strip by hand.

Be careful not to nick the individual wires.

Un-twist each of the 4 pairs and straighten each wire as much as possible between the fingers.

Step 4

Use the 568-B wiring scheme on both ends for a standard patch cable.

Step 5

- Bring all of the wires together as closely as possible.
- Hold the grouped (and sorted) wires together tightly between the thumb, and the forefinger.
- Cut all of the wires at a perfect 90 degree angle from the cable, ● 1/2 inch from the end of the cable jacket.
- Use a sharp cutting tool so as not to "squash" the wire ends.

Step 6

With the connector pins facing up, carefully insert the wires into the connector.

Apply a moderate amount of force in order to properly seat the wires against the contacts in the connector.

Alternate for "load bar" Type Connectors

A.

Note that the loadbar has slots on one side with a flanged edge on one end.

The slotted side should face the pins inside the connector.

The wires are inserted into the flanged end.

B.

Hold the grouped (and sorted) wires together tightly, between the thumb, and forefinger.

Cut all of the wires at a sharp angle from the cable.

Use a sharp cutting tool so as not to "squash" the wire ends.

C.

Hold the load bar so the staggered holes face toward the cable.

Insert the wires through the load bar, one at a time, carefully observing the orientation.

Slide the load bar as far down as possible.

D.

Cut off the excess wire ends with a straight cut about 0.25" past the load bar.

With the connector pins facing up, slide the load bar assembly into the connector.

Insure that the wires are firmly seated to the end of the connector.

The brown pair wires should be on the right side.

Step 7

Observe the tip of the connector to confirm that all the wires are fully inserted.

The end of each wire you should be in full view.

There should be enough of the cable jacket inside the connector to crimp against.

Tip: Slide the load bar forward as necessary to provide the ideal placement.

Step 8

Place the connector into the crimp tool, and squeeze hard so that the handle reaches its full swing.

Step 9

Repeat the process on the other end using the desired wiring scheme.

Be sure to slide the snagless boots snugly over the connectors when finished.

Step 10

Always use a cable tester to check for continuity, opens and shorts

Step 11

Building patch cables takes practice so keep at it until you master your technique!

Activity 3

Aim: Connect peripherals (Keyboard, Mouse, USB drive, printer) to USB port (1 Hr)

Learning outcome: Able to work with different cables, connectors and its Crimping techniques for PC..

Duration: 1 hour

List of Hardware/Software requirements:

Code/Program/Procedure (with comments):

Input/Output, Input Devices, and Peripherals

To take advantage of a computer, the appropriate input/output devices and peripherals must be connected to the proper input/output (I/O) ports. Keyboards, mice, and multimedia devices can be connected to a variety of ports. This section briefly describes those devices and the ports they connect to.

I/O Ports

I/O ports enable a user to input information by way of keyboard, mouse, or microphone; plus they enable the output of information to printers, monitors, USB devices, and so on. The CompTIA A+ exams require you to describe USB, IEEE 1394 (FireWire), and Thunderbolt ports, as well as Bluetooth technology. The most common of these by far is USB.

USB

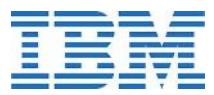
length. USB version 1.1 cables are limited to 3 meters in length (a little less than 10 feet), and USB version 2.0 cables can be a maximum length of 5 meters (a little more than 16 feet).

Maximum recommended USB 3.0/3.1 length is 3 meters. The standard USB cable has four pins: a +5 V pin for power, a positive data pin, a negative data pin, and a ground pin. Most USB connections are half-duplex, meaning that the device can send or receive data but cannot send and receive data simultaneously.

There are various plugs used for the different types of USB connections. The most common are Type A and Type B, which are 4-pin connectors, but there are also mini- and micro-connectors, which are 5-pin. Type A connectors are the type you see on the baUSB ports are used by many devices, including keyboards, mice, printers, flash drives, cameras, and much more. The USB port enables data transfer between the device and the computer and usually powers the device as well. The speed of a USB device's data transfer depends on the version of the USB port

A computer can have a maximum of 127 USB devices. However, most computers are limited to a maximum of a dozen ports or so. To add devices beyond this, a USB hub can be used, but no more than five hubs can be in a series of USB devices. All cables connecting USB devices must comply with their standard's maximum clock of a computer or on the side of a laptop.

Type A and Type B connectors are commonly used for printers and other larger devices. Mini- and micro-connectors are often used for handheld computers, smartphones, mice, digital cameras, portable music players, and cell phones. However, some companies create proprietary cables and connectors for their devices based off of the USB specifications. These devices will not connect properly to Type A, Type B, and mini- or micro-connectors.



Activity 4

Aim: Connect SVGA/HDMI Cable to the system (1 Hr)

Learning outcome: Able to work with different cables, connectors and its Crimping techniques for PC.

Duration: 1 hour

List of Hardware/Software requirements:

Code/Program/Procedure (with comments):

There's a good chance that some day you'll want to connect your computer to your big-screen TV to make it easier to share either photos you've taken or Internet video with guests. HDMI has become the standard type of high-definition connector found on modern TV sets, and many new computers include an HDMI output. The problem is that older computers don't feature HDMI.

We'll approach this problem with two assumptions: one, that you have a desktop computer; and two, that you have a notebook computer.

If you have a desktop computer that does not have an HDMI output, you can install a new graphics card that has an HDMI output. But things will get complicated if the new graphics card doesn't have an output that matches your monitor (presumably VGA), in which case you'll simply be swapping one problem for another. To avoid the problem, you'll have to find a graphics card that has both HDMI and VGA outputs, and preferably an inexpensive one. Because if you set your sights on an expensive graphics card, and if you have to pay someone to install it, you might be better off just buying a new desktop system that already has an HDMI output.

Another way to connect an older desktop computer to the HDMI input of a TV is with an adapter. If your computer has just a VGA output you'll need a VGA to HDMI connectors This type of converter combines a VGA input and a stereo audio input into a single HDMI output that's compatible with your HDTV set. To use this converter, you'll need a male VGA to male VGA connectors and an audio cable; either a male stereo mini to male RCA or a male RCA to male RCA , depending on the output of your sound card. Of course, you'll also need an HDMI cable to connect the adapter to your HDTV. If your computer has a DVI output you'll need a DVI to HDMI cable; either that or a DVI to HDMI adapter and a standard HDMI cable.

Your options are more limited if you have a notebook computer that doesn't have an HDMI output because you can't change the graphics card, and even if you could, you wouldn't be able to add the HDMI output to the notebook's chassis.

Activity 5

Aim: Connect multimedia devices to AV Port (1 Hr)

Learning outcome: Able to work with different cables, connectors and its Crimping techniques for PC..

Duration: 1 hour

List of Hardware/Software requirements:

Code/Program/Procedure (with comments):

How to connect an AV Receiver

If you've ever tried to connect an AV receiver, it's fair to say you've probably got a bit lost. While the front of any device can seem pretty straightforward to navigate, the back is where the puzzle begins. Only one thing is clear, all cables have to be connected to the receiver. The receiver then transforms the audio and video data and sends it to the loudspeaker or TV. But now comes the question, which cables belong to which ports? Read on as we explain the multiple setups for various devices and ports.

Connecting a TV to a receiver via HDMI

When it comes to home entertainment HDMI (High Definition Multimedia Interface) is often the go-to. The transmission standard offers the necessary bandwidth for high-resolution images and transmits video and audio data. The first question when connecting an AV receiver is if both devices support HDMI. If yes, then the AC receiver's monitor output should be simply connected to the TV input for HDMI.

It's vital that with HDMI to know if ARC is supported. With modern TV sets that should be the case. The abbreviation means "Audio Return Channel" – and this feature makes it possible for the TV to transmit audio data via HDMI and not just receive it. In various connection scenarios, for example, an additional (previously often optical S/PDIF) audio cable becomes unnecessary, for example, when ...

- ... the audio signal is to be sent to the AV receiver via a DVB-T receiver integrated in the TV set so that a sound system can output the sound.

-
- ... a TV cable is connected to the television and the audio data for 5.1 surround sound is transmitted to the receiver.
 - ... a hard disk is connected to the TV set via USB or content can be played back via a USB stick, but you want to enjoy the high-quality sound of a surround sound system ● ... one likes to playback the sound of a game console connected to the TV externally.

Without ARC the additional cables running between the receiver and the TV set must be laid. Usually, a COAX-CABLE or TOSLINK is used. The HDMI ports that support ARC are often labelled accordingly. When there are more HDMI ports of your TV, usually only one supports reverse channel transmission.

Connecting your TV and receiver without HDMI

When the TV or receiver don't support HDMI, there's a Plan B. Many older TV models don't support HDMI, but in most cases have an analogue port. The disadvantage is that they can't achieve HD quality. These are the possible ports:

-
- Component-Video: this carries the signal via three separate [cinch cables](#). The colour of the socket is Green (Y) Blue (Pb/Cb) and Red (Pr/Cr). The standard supports analogue signals for HD playback.
 - S-Video: Colour and brightness values are transmitted via the cable. The quality of the transmitted signals is significantly lower than that of component video.
 - Composite-Video: This method of signal transmission happens via a SCART cable, as well as via a cinch port. The signals are only in PAL quality.

Analogue Plan B may also work if older input devices – such as a video recorder – are connected to the receiver. If the receiver cannot convert the analogue video signals into digital signals, these must be transmitted analogue to the television.

Connecting playback devices to a receiver

The same rule normally applies to Blu-ray and DVD players as it does by TVs. In the ideal situation, you would be able to connect via HDMI. The same for projectors or computer consoles. Whoever uses a DVD player or play a computer without HDMI has to connect to the receiver via analogue. By multiple playback devices, it can happen that there aren't enough HDMI ports on the receiver. In this case, it's possible to connect the video signal directly to the TV and connect just the audio via an audio cable to the receiver. The disadvantage of this setup is that more cables are needed. When the receiver has a USB port, you can connect external hard drivers, iPods and MP3 players.

Connecting a loudspeaker to a receiver

When it comes to surround-sound systems multiple speakers must all be simultaneously connected to the receiver. Each loudspeaker contains a cable with two wires (one for + and the other for -) that leads to the receiver. Small clamps attach the wires to the receiver. So newcomers shouldn't have any worries – the setup is not too technical.

It's just important that the copper cables are clean and that the copper ends are not frayed. As well as this, you must ensure that the plus and minus are correctly connected, nothing major happens when it's incorrectly connected, but the sound quality would be compromised. The labels on the receiver clearly state where each loudspeaker port is. Watch the video below to more about connecting to AV receiver.

References:

<Include at least 1 reference per activity where students can go and explore. Remove this part from your final document. >

- <https://www.ufsexplorer.com/articles/how-to/connect-sata-disks-instruction.php>
- <https://www.youtube.com/watch?v=7-2O6egqgSk>
- <https://www.make-it.ca/technical-notes/how-to-crimp-rj45-connector/>
- <https://www.groundcontrol.com/galileo/ch5-ethernet.htm>
- <https://www.pearsonitcertification.com/articles/article.aspx?p=2475566>
- <https://www.bhphotovideo.com/explora/computers/tips-and-solutions/how-connect-pc-hdmi-tv>

Learning Outcome 5 - Able to install and maintain software for a PC

After achieving this learning outcome, a student will be able to install and maintain software for a PC. In order to achieve this learning outcome, a student has to complete the following:

1. Prepare Hard disk for OS installation by making partitions (2 Hrs)
2. Setup CMOS with desired parameters for hard disk and set date and time (1 Hr)
3. Install Operating System Windows and Linux in two different partitions (3 Hrs)
4. Create user accounts as administrator and guest (2 Hrs)
5. Install/Uninstall Application software (Office, Multimedia and Antivirus) (1 Hr)

Activity 1

Aim: Prepare Hard disk for OS installation by making partitions (2 Hrs)

Learning outcome : Able to install and maintain software for a PC.

Duration: 2 hour

List of Hardware/Software requirements:

1.
2.
3.

CodeBy default, Windows will generate a system reserved partition (on MBR disk) or recovery partition (on GPT disk) and C: drive if you select an unallocated space to install Windows operating system (OS). Since GPT disks can have multiple primary partitions as you like, it is no big deal to have one or more extra small partitions on a GPT disk, but things will be different for MBR disks, because you can have at most 4 primary partitions on a MBR disk.

If your computer supports UEFI boot mode, you can convert MBR to GVT disk without data loss. Otherwise, for those people who want to install multiple OS on one MBR drive, the 4 primary partitions are really precious. Besides, you can only have three primary partitions if you have logical partition(s) on the same disk. Therefore, to make full use of the primary partitions is to allow Windows to be installed into one partition without generating a system reserved partition or system recovery partition. The only way to prevent Windows from creating another partition is to partition hard drive before installing

Partition a hard drive during windows setup

Windows build-in tool, Disk Management or Diskpart.exe can be used for hard drive partitioning. Disk Management can only be used when OS has been successfully loaded, so you can use Disk Management to create a new partition for another OS if you already have windows installed. If you want to create partition without Windows pre-

installed on the hard drive, you can use a Windows installation disc to run Diskpart. The specific steps listed below:

1. Insert the installation disc, and boot your computer from it.
2. At the Windows Setup screen, press Shift+F10 simultaneously to open a command line prompt. If you use the New button to create partitions, it will generate a system partition for an MBR disk.
3. Type “diskpart” and press Enter.
4. **At Diskpart>, run a few lines of commands to create a new partition:**

◆ List disk

◆ Select disk [disk number]

◆ Create partition primary [size=n]

For example, the following command is to create a 30000 MB primary partition on disk 0:

◆ List disk

◆ Select disk 0

◆ Create primary partition size=30000

5. Then you will have created a partition around 30GB. You can use this command to create more partitions or exit.

If your hard drive has enough space, then it is recommended to allocate more than 100GB to the system drive because Windows update, installed programs, and other system files will keep consuming space on system partition. If you don't have a Windows installation disc, then you can use third-party free partition manager software to create partition without operating system.

Create partitions without OS pre-installed with free partition manager

AOMEI Partition Assistant Standard is a freeware for disk and partition management that provides the ability to create bootable media, so you can partition a hard drive with or without OS pre-installed. If you have Windows installed on your hard drive, you can just free download this software and start to partition your hard drive without losing data. Let's see how it work

2. Right-click on unallocated space or a partition that is big enough to create a new partition, and then choose Create Partition button.

3. At the next screen, drag the slider or enter the amount of space to specify the partition size.

You can also click Advanced option to see more options. Click OK when settings are done.

4. The program allows you to preview the partition layout without making any changes to your hard drive. If no problem, click Apply to run the operations.

It is really a good shot to create partition before installing another OS on your hard drive. Besides NTFS, AOMEI Partition Assistant also supports many other file systems including FAT32, FAT16, FAT12, exFAT, ReFS, and Ext2/Ext3/Ext4. The paid edition provides even more advanced features like enabling you to migrating OS to GPT disk, converting dynamic disk into basic, etc.

<Paste your output/results screenshots here with a single line comment/description for each if there are multiple. Remove this part from your final document.>

References:

<Include at least 1 reference per activity where students can go and explore. Remove this part from your final document.>

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Activity 2

Aim: Setup CMOS with desired parameters for hard disk and set date and time (1 Hr)

Learning outcome: Able to install and maintain software for a PC.

Duration: 1 hour

List of Hardware/Software requirements:

4.
5.
6.

Code/Program/Procedure (with comments):

After a hard disk drive has been installed physically, the geometry of the drive must be entered into the CMOS through the CMOS setup program before the PC will recognize the new device. This information must be entered exactly as specified by the manufacturer. Figure 8.11 shows hard disk drive configuration information in a typical CMOS. Figure 8.12 shows a subscreen of the main hard drive setup screen.

Figure 8.11 CMOS main screen

Originally, CMOS would allow for only two drives. Later versions allow up to four drives, because most new PCs have two IDE channels.

The CHS (cylinders, heads, sectors per track), along with write precompensation and landing zone, determine how the hard disk drive controller accesses the physical hard drive. The creators of the first CMOS routines for the 286 AT believed that the five different geometry numbers would be too complicated for the average user to configure, so they established 15 preset combinations of hard drive geometries. These preset combinations are called types. With types, the user simply enters a hard drive type number into the CMOS.

Figure 8.12 Hard disk drive setup screen

This system worked well for a period of time, but with each new hard disk drive that manufacturers designed, a new type also had to be created and added to the list. BIOS makers continued to add new types until there were more than 45 variations. To deal with this issue, Setup routines now include a user type. This allows manual entry of the geometry values, increasing both the flexibility and complexity of hard drive installation.

CMOS setup is easy with IDE drives. Most CMOS chips today have a setting known as IDE autodetection, which runs the identify drive command, gathering and setting the proper geometry values. To use it, simply connect the drive to the computer, turn it on, and run the CMOS. The identify drive command instructs the drive to transmit a 512-byte block of data containing the following information:

- Manufacturer
- Model and serial numbers
- Firmware revision number
- Buffer type indicating sector buffering or caching capabilities
- Number of cylinders in the default translation mode
- Number of heads in the default translation mode

- Number of sectors per track in the default translation mode
- Number of cylinders in the current translation mode
- Number of heads in the current translation mode
- Number of sectors per track in the current translation mode Be sure to save your settings before you exit the setup program.

What happens if wrong data is entered into the CMOS? For example, what if a 1.2-GB hard disk drive is installed and the CMOS is set up to make it a 504-MB hard drive? When you boot the computer, you will see a perfect 504-MB hard drive. You will need to correct the entry to obtain proper use of the drive. It should not be left improperly entered, and it might not be accessible by the system.

If the computer you are working on does not support autodetection, you must be able to determine the geometry of a drive in order for it to be installed.

There are many ways to determine the geometry of a hard disk drive:

- Check the label. The geometry or type of many hard drives will be labeled directly on the hard drive itself.
- Check the documentation that came with the hard drive. All drives have a model number that can be used to obtain the geometry parameters either from the manufacturer or a third party. The hard drive manufacturers usually reserve a section of their Web site for providing configuration data and the setup utilities available for download.
- Contact the manufacturer. Many manufacturers have toll-free phone numbers.

After a drive is installed, it must be assigned a drive name or letter that is unique. There are several drive-naming conventions that help identify this unique name. If only one hard disk drive is installed, it must be configured as drive 0, or master. If a second drive is installed, it is recognized as hard drive 1, or slave. Many CMOS configurations use the terms C: and D:. Under all versions of MS-DOS and Windows, hard drive 0 is recognized as C; hard drive 1 is recognized as D.

As more drives are added to a system, (including tape, CD-ROM, and network drives), the names of existing drives might change. For example, installing a portable drive such as an Iomega Zip drive can change a CD-ROM from the D drive to the E drive. When the portable drive is removed, the CD-ROM will once again be the D drive. Keep in mind the difference between logical and physical drives. A physical drive is the hardware-it can be divided into two or more logical drives. (See the "Partitioning" section later in this lesson.) Drives on a network server are also logical drives. Write down the configuration and keep track as changes in the system are made. The only drive letters that are fixed are the A and B drives, which are always the floppy disk drives, and the C drive, the boot drive where the MS-DOS operating system resides.

This confusion in drive letters can also confuse the operating system, making it hard or impossible for it to locate drivers. In such cases, you might need to reinstall the drivers before the system can make use of the affected hardware, and a Windows 95, 98, or 2000 machine might automatically start in Safe Mode. Check the System/Device manager option in the Control Panel after the PC is operational and look for duplicate hardware items or items with flags noting missing or inoperable conditions.

Activity 3

Aim: Install Operating System Windows and Linux in two different partitions (3 Hrs)

Learning outcome: Able to install and maintain software for a PC.

Duration: 3 hour

List of Hardware/Software requirements:

7.

8.

9.

Code/Program/Procedure (with comments):

Even though Linux is a great operating system with widespread hardware and software support, the reality is that sometimes you have to use Windows, perhaps due to key apps that won't run under Linux. Thankfully, dual-booting Windows and Linux is very straightforward—and I'll show you how to set it up, with Windows 10 and Ubuntu 18.04, in this article.

Before you get started, make sure you've backed up your computer. Although the dual-boot setup process is not very involved, accidents can still happen. So take the time to back up your important files in case chaos theory comes into play. In addition to backing up your files, consider taking an image backup of the disk as well, though that's not required and can be a more advanced process.

Prerequisites

To get started, you will need the following five items:

1. Two USB flash drives (or DVD-Rs)

I recommend installing Windows and Ubuntu via flash drives since they're faster than DVDs. It probably goes without saying, but creating bootable media erases everything on the flash drive.

Therefore, make sure the flash drives are empty or contain data you don't care about losing.

If your machine doesn't support booting from USB, you can create DVD media instead. Unfortunately, because no two computers seem to have the same DVD-burning software, I can't walk you through that process. However, if your DVD-burning application has an option to burn from an ISO image, that's the option you need.

2. A Windows 10 license

If Windows 10 came with your PC, the license will be built into the computer, so you don't need to worry about entering it during installation. If you bought the retail edition, you should have a product key, which you will need to enter during the installation process.

3. Windows 10 Media Creation Tool

Download and launch the Windows 10 [Media Creation Tool](#). Once you launch the tool, it will walk you through the steps required to create the Windows media on a USB or DVD-R. Note: Even if you already have Windows 10 installed, it's a good idea to create bootable media anyway, just in case something goes wrong and you need to reinstall it.

4. Ubuntu 18.04 installation media

5. Etcher software (for making a bootable Ubuntu USB drive)

For creating bootable media for any Linux distribution, I recommend Etcher. Etcher works on all three major operating systems (Linux, MacOS, and Windows) and is careful not to let you overwrite your current operating system partition.

Once you have downloaded and launched Etcher, click Select image, and point it to the Ubuntu

ISO you downloaded in step 4. Next, click Select drive to choose your flash drive, and click

Flash! to start the process of turning a flash drive into an Ubuntu installer. (If you're using a DVD-R, use your computer's DVD-burning software instead.)

Install Windows and Ubuntu

You should be ready to begin. At this point, you should have accomplished the following:

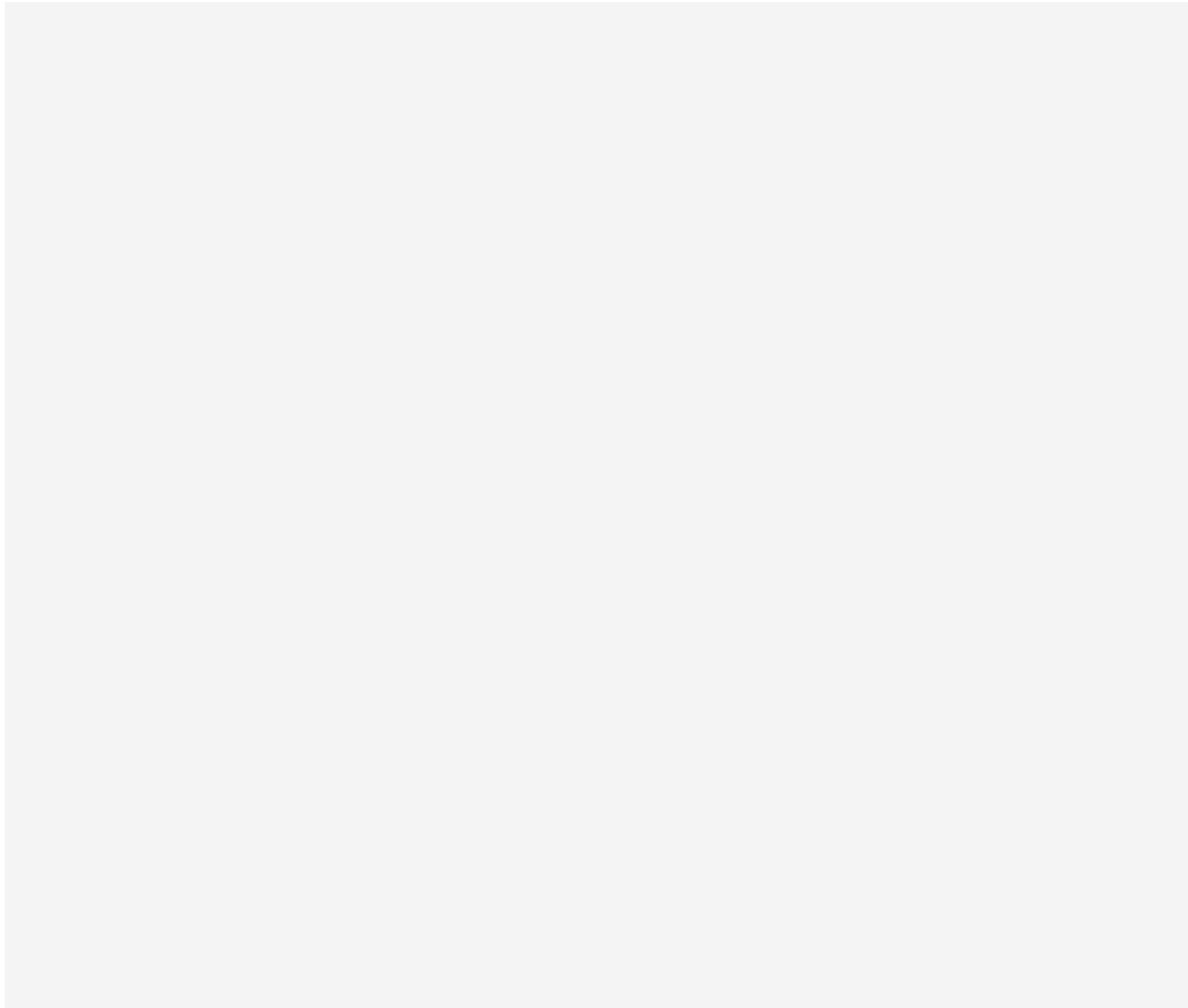
- Backed up your important files
- Created Windows installation media
- Created Ubuntu installation media

There are two ways of going about the installation. First, if you already have Windows 10 installed, you can have the Ubuntu installer resize the partition, and the installation will proceed in the empty space. Or, if you haven't installed Windows 10, install it on a smaller partition you can set up during the installation process. (I'll describe how to do that below.) The second way is preferred and less error-prone. There's a good chance you won't have any issues either way, but installing Windows manually and giving it a smaller partition, then installing Ubuntu, is the easiest way to go.

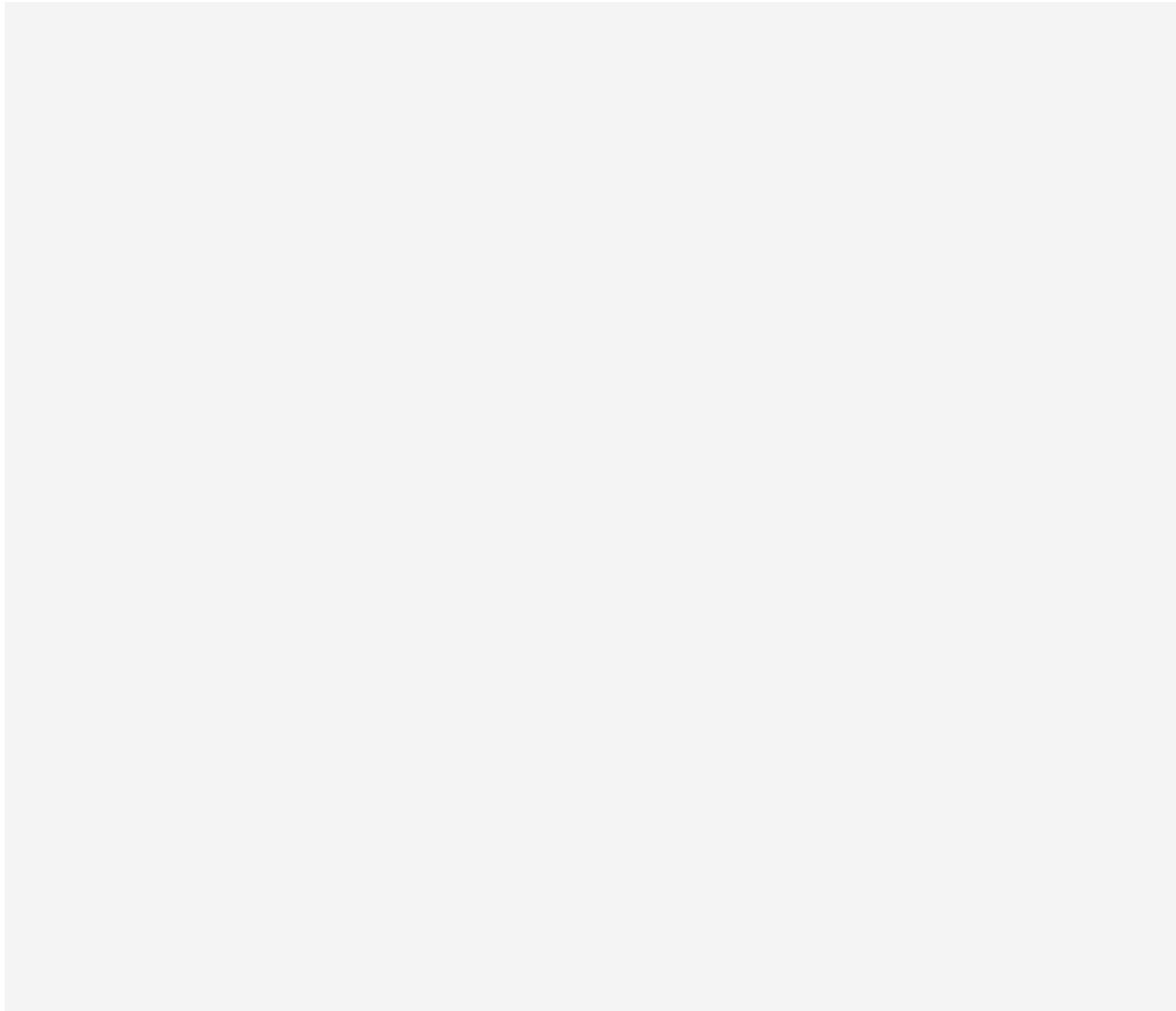
If you already have Windows 10 on your computer, skip the following Windows installation instructions and proceed to Installing Ubuntu

Installing Windows

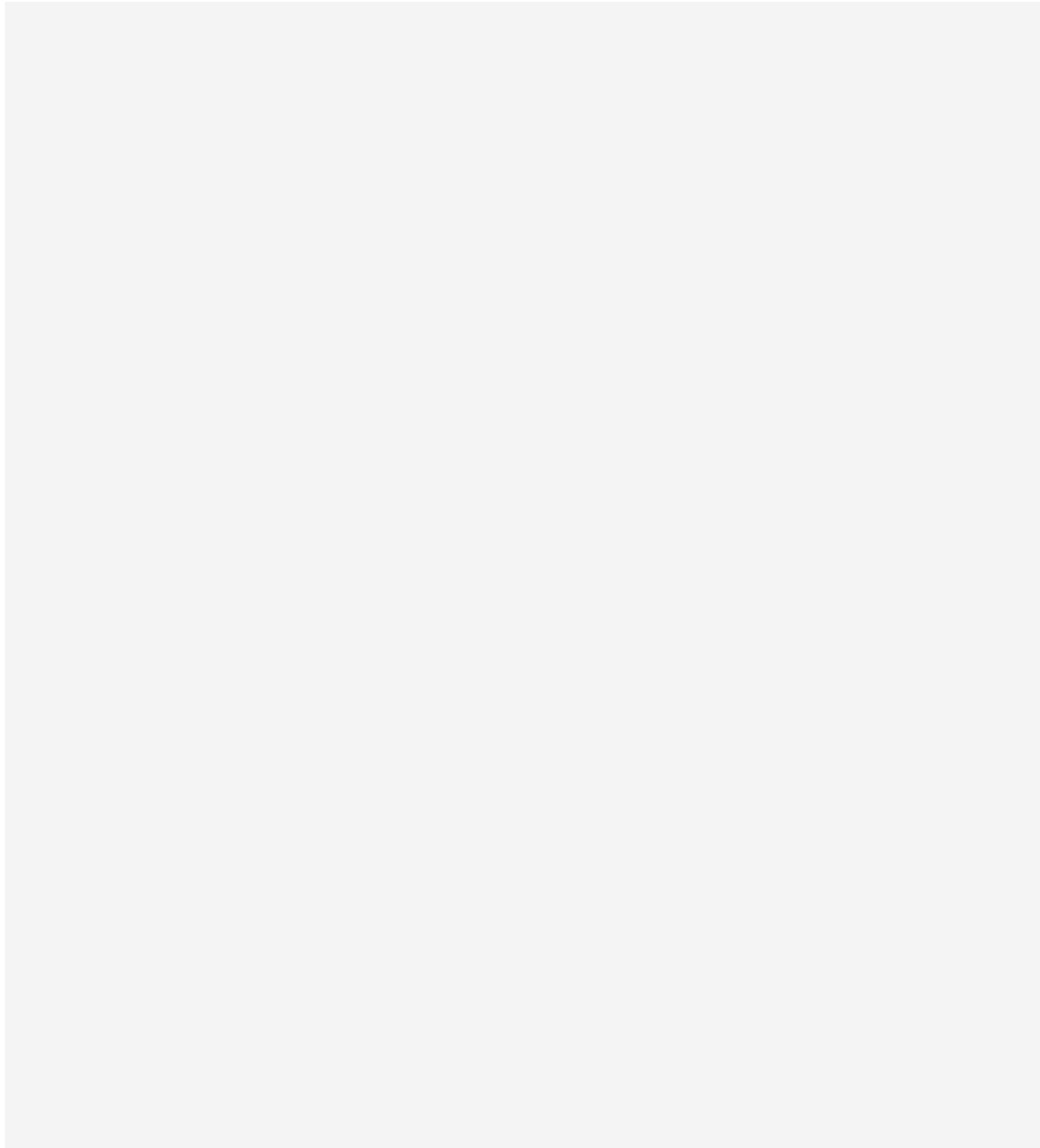
Insert the Windows installation media you created into your computer and boot from it. How you do this depends on your computer, but most have a key you can press to initiate the boot menu. On a Dell PC for example, that key is F12. If the flash drive doesn't show up as an option, you may need to restart the computer. Sometimes it will show up only if you've inserted the media before turning on the computer. If you see a message like, "press any key to boot from the installation media," press a key. You should see the following screen. Select your language and keyboard style and click Next.



Click on Install now to start the Windows installer.



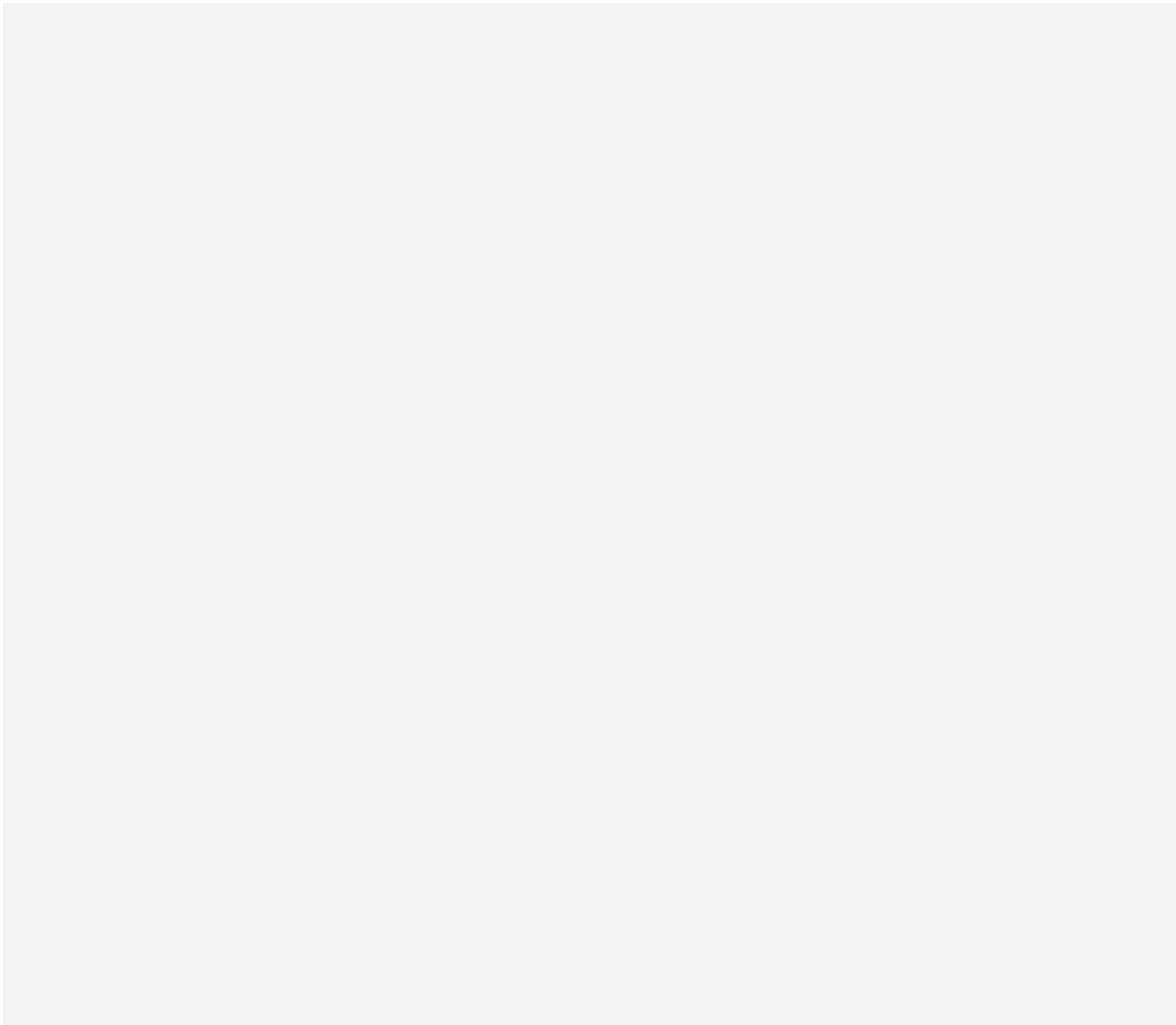
On the next screen, it will ask for your product key. If you don't have one because Windows 10 came with your PC, select "I don't have a product key." It should automatically activate after the installation once it catches up with updates. If you do have a product key, type that in and click Next.



Select which version of Windows you want to install. If you have a retail copy, the label will tell you what version you have. Otherwise, it is typically located with the documentation that came with your computer. In most cases, it's going to be either

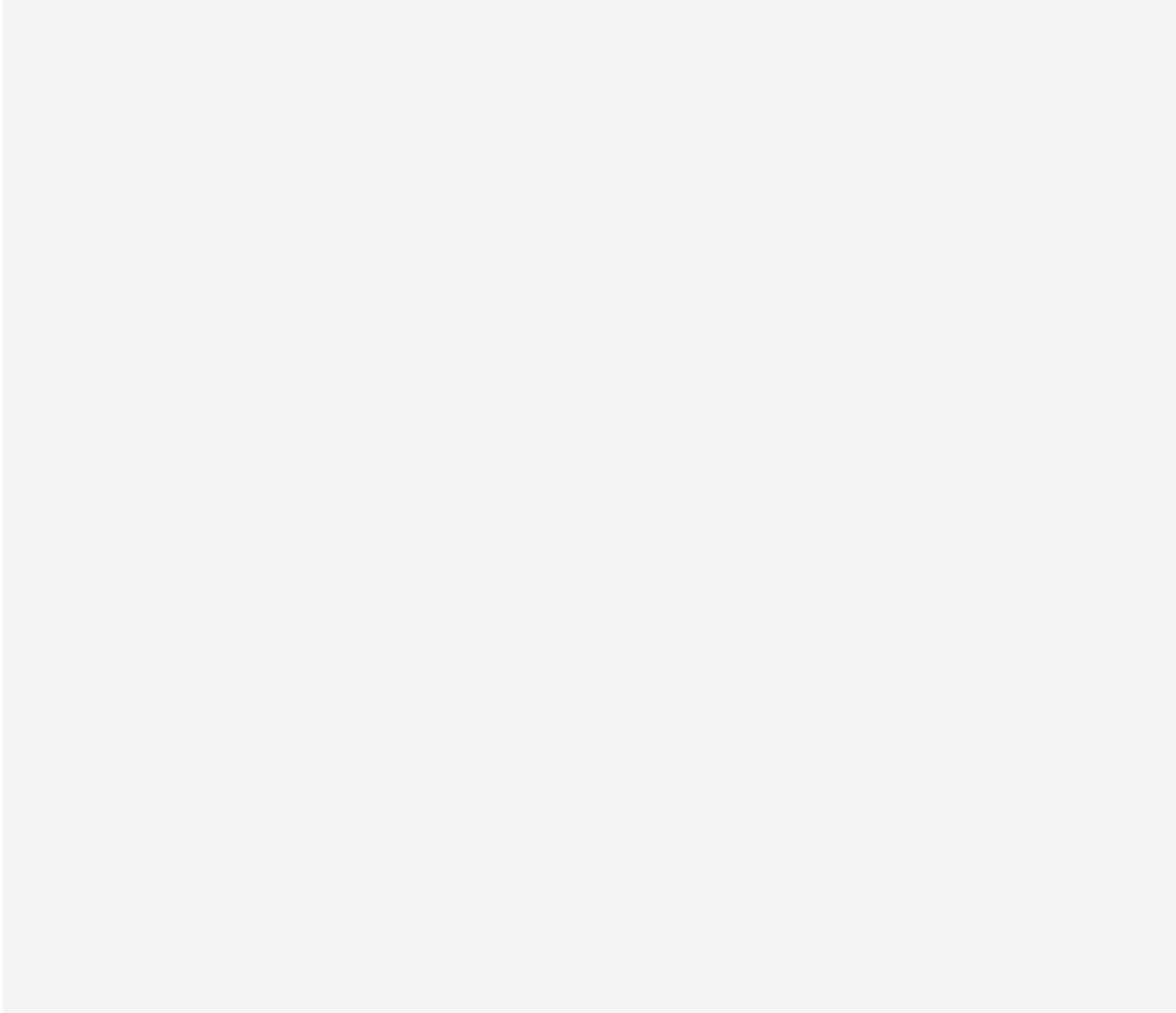
Windows 10 Home or Windows 10 Pro. Most PCs that come with the Home edition have a label that simply reads "Windows 10," while Pro is clearly marked.

After accepting the agreement, you have two installation options available. Choose the second option, Custom: Install Windows only (advanced).



Your results will probably look different than mine. I have never used this hard disk before, so it's completely unallocated. You will probably see one or more partitions for your current operating system. Highlight each partition and remove it.

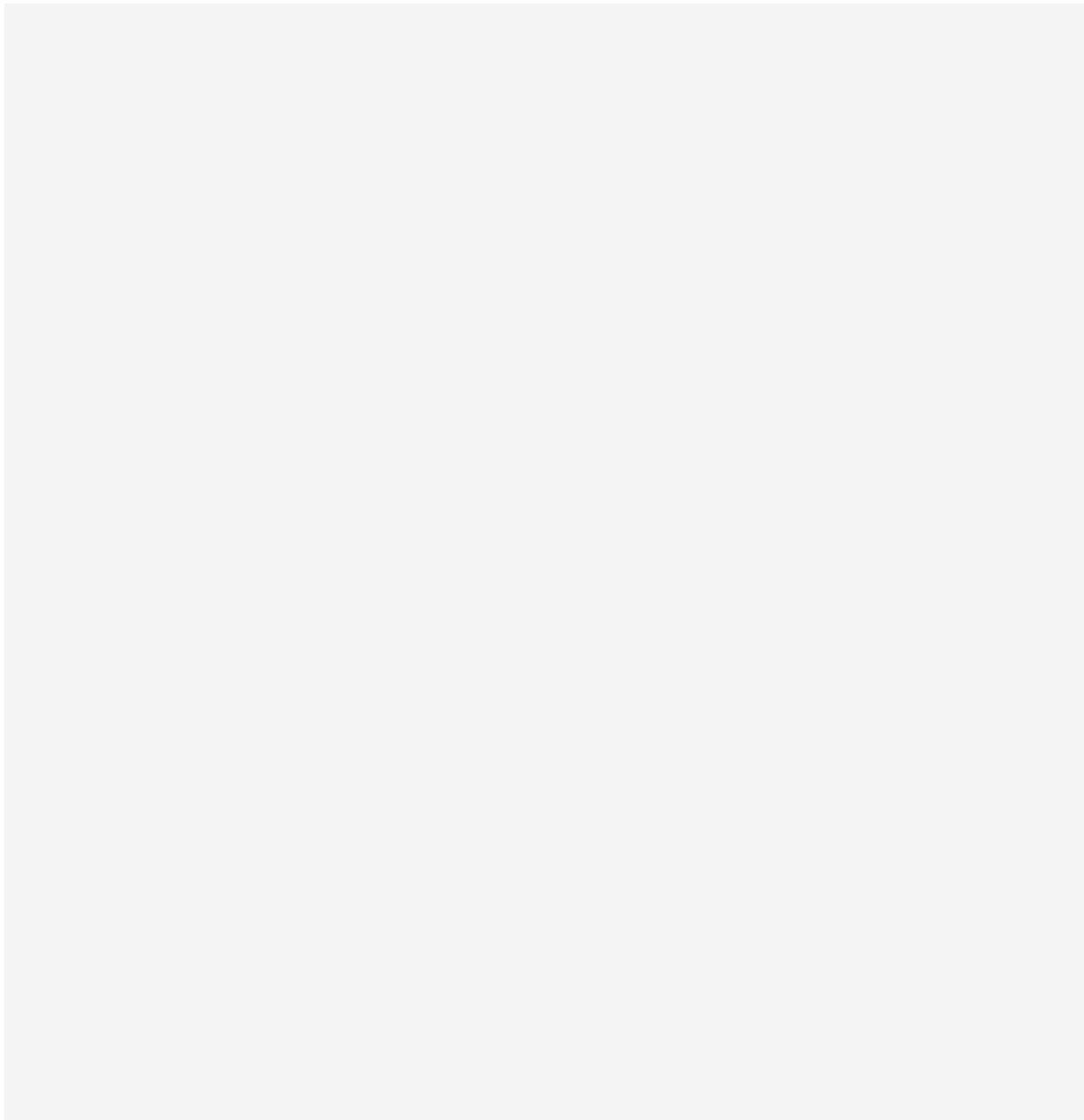
At this point, your screen will show your entire disk as unallocated. To continue, create a new partition.



Here you can see that I divided the drive in half (or close enough) by creating a partition of 81,920MB (which is close to half of 160GB). Give Windows at least 40GB, preferably 64GB or more. Leave the rest of the drive unallocated, as that's where you'll install Ubuntu later.

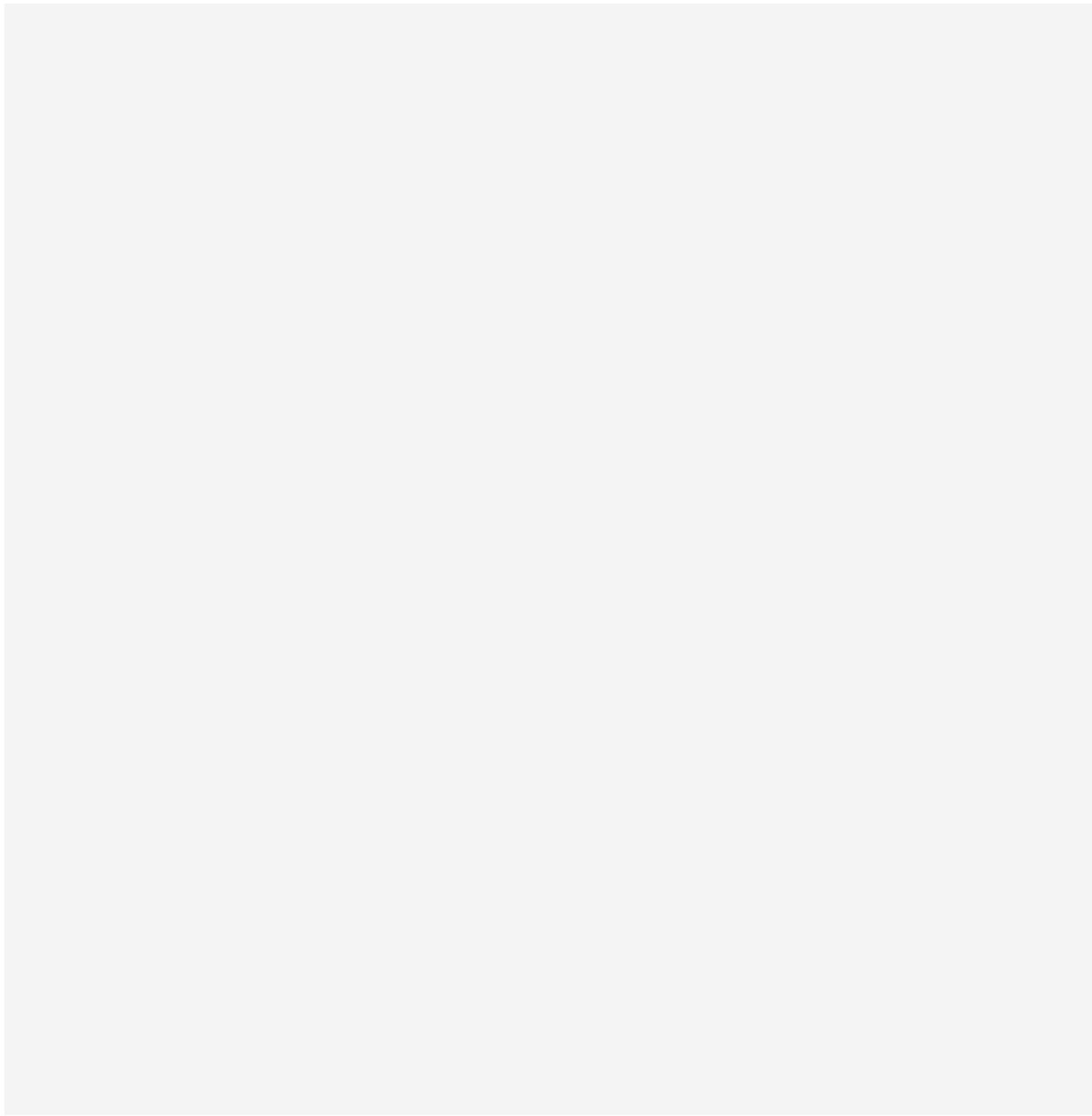
Your results will look similar to this:

Confirm the partitioning looks good to you and click Next. Windows will begin installing.



Installing Ubuntu

Whether it was already there or you worked through the steps above, at this point you should have Windows installed. Now use the Ubuntu installation media you created earlier to boot into Ubuntu. Go ahead and insert the media and boot your computer from it. Again, the exact sequence of keys to access the boot menu varies from one computer to another, so check your documentation if you're not sure. If all goes well, you see the following screen once the media finishes loading



Here, you can select between *Try Ubuntu* or *Install Ubuntu*. Don't install just

yet; instead, click *Try Ubuntu*. After it finishes loading, you should see the Ubuntu desktop.

By clicking *Try Ubuntu*, you have opted to try out Ubuntu before you install it.

Here, in Live mode, you can play around with Ubuntu and make sure everything works before you commit to the installation. Ubuntu works with

most PC hardware, but it's always better to test it out beforehand.

Make sure

you can access the internet and get audio and video playback. Going to

YouTube and playing a video is a good way of doing all of that at once. If you

need to connect to a wireless network, click on the networking icon at the

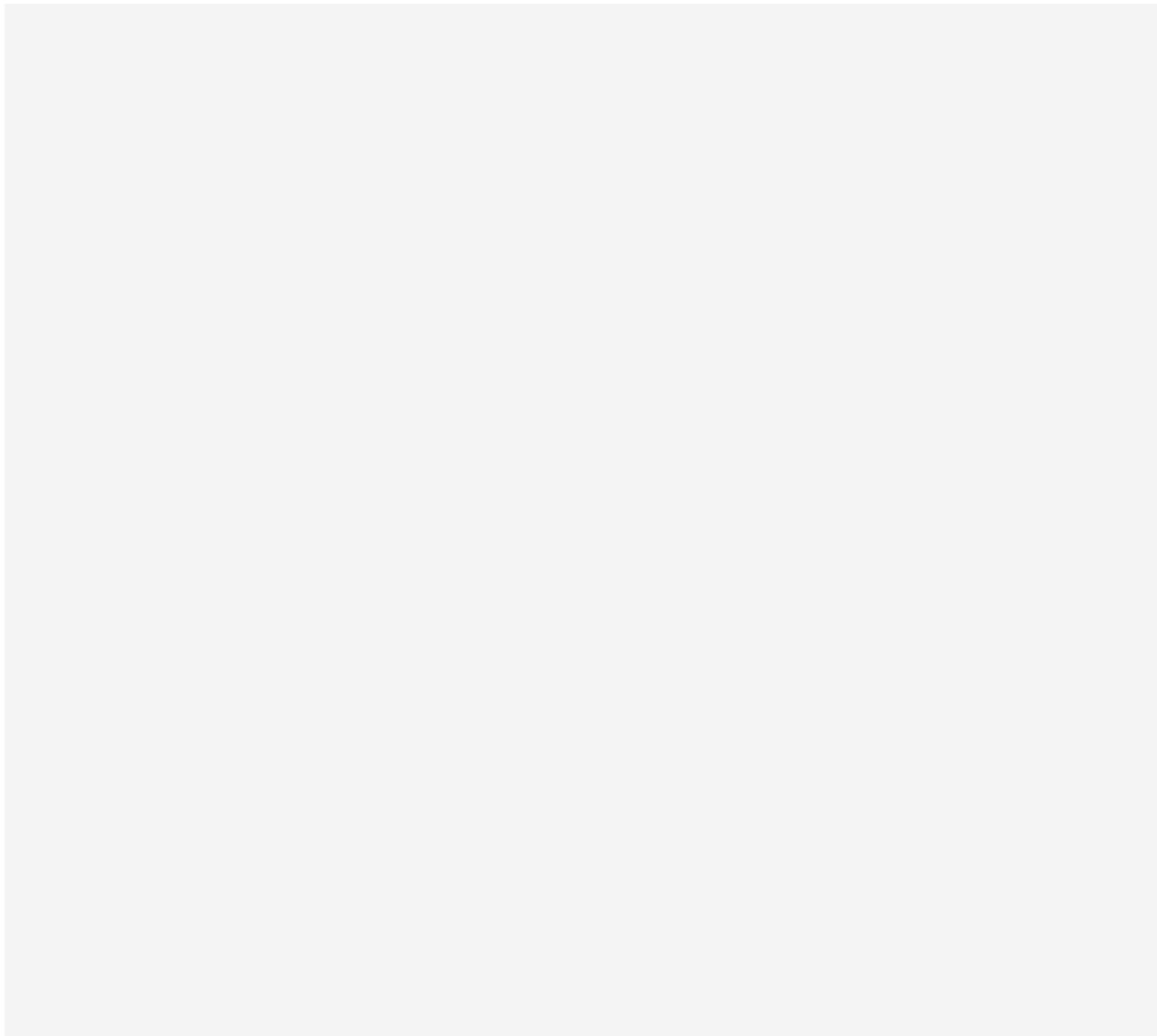
top-right of the screen. There, you can find a list of wireless networks and

connect to yours.

Once you're ready to go, double-click on the *Install Ubuntu 18.04 LTS* icon on

the desktop to launch the installer.

Choose the language you want to use for the installation process, then click
Continue.



Next, choose the keyboard layout. Once you've made your selection,
click

Continue .

You have a few options on the screen below. One, you can choose a Normal

or a Minimal installation. For most people, the Normal installation is ideal.

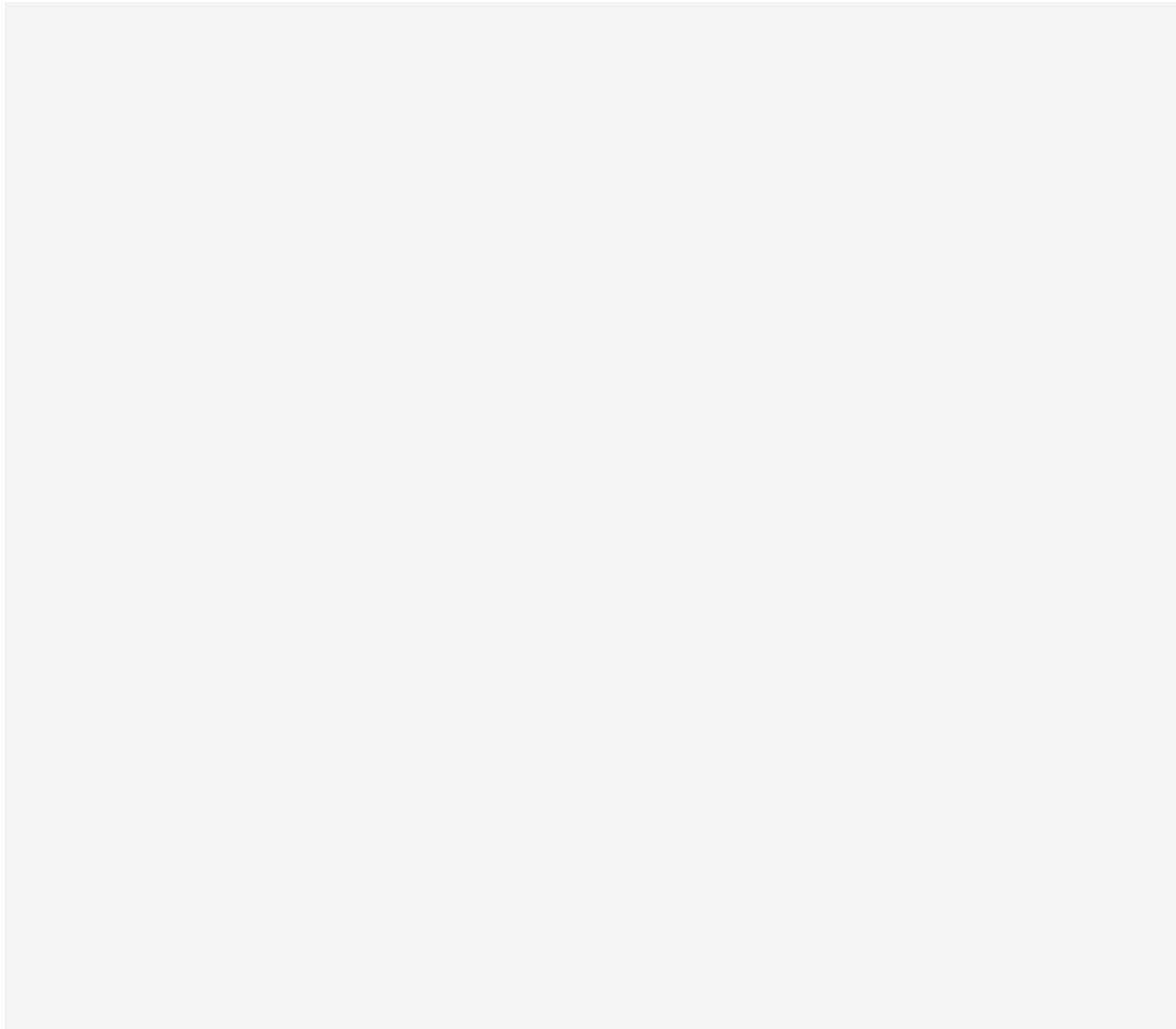
Advanced users may want to do a Minimal install instead, which has fewer

software applications installed by default. In addition, you can choose to

download updates and whether or not to include third-party software and

drivers. I recommend checking both of those boxes. When done, click

Continue .



The next screen asks whether you want to erase the disk or set up a dual-boot. Since you're dual-booting, choose *Install Ubuntu alongside Windows 10*. Click *Install Now*.

The following screen may appear. If you installed Windows from scratch and left unallocated space on the disk, Ubuntu will automatically set itself up in the

empty space, so you won't see this screen. If you already had Windows 10 installed and it's taking up the entire drive, this screen will appear and give

you an option to select a disk at the top. If you have just one disk, you can choose how much space to steal from Windows and apply to Ubuntu. You can drag the vertical line in the middle left and right with your mouse to take space away from one and gives it to the other. Adjust this exactly the way you want it, then click *Install Now*

You should see a confirmation screen indicating what Ubuntu plans on doing.

If everything looks right, click *Continue*.

Ubuntu is now installing in the background. You still have some configuration

to do, though. While Ubuntu tries its best to figure out your location, you can

click on the map to narrow it down to ensure your time zone and other things are set correctly.

Next, fill in the user account information: your name, computer name,

username, and password. Click *Continue* when you're done

There you have it! The installation is complete. Go ahead and reboot the PC.

If all went according to plan, you should see a screen similar to this when your computer restarts. Choose Ubuntu or Windows 10; the other options are for troubleshooting, so I won't go into them.

Try booting into both Ubuntu and Windows to test them out and make sure

everything works as expected. If it does, you now have both Windows and Ubuntu installed on your computer.

Activity 4

Aim: Create user accounts as administrator and guest (2 Hrs)

Learning outcome: Able to install and maintain software for a PC.

Duration: 2 hour

List of Hardware/Software requirements:

10.

11.

12.

Code/Program/Procedure (with comments):

Create a local user account

- Select the Start button, select Settings > Accounts and then select Family & other users. (In some editions of Windows you'll see Other users.)
- Select Add someone else to this PC.

- Select I don't have this person's sign-in information, and on the next page, select Add a user without a Microsoft account.
- Enter a user name, password, password hint or choose security questions, and then select Next.

Change a local user account to an administrator account

- Under Settings > Accounts > Family & other users, select the account owner name, then select Change account type.
- Under Account type, select Administrator and OK.
- Sign in with the new administrator account.

Activity 5

Aim: Install/Uninstall Application software (Office, Multimedia and Antivirus) (1 Hr)

Learning outcome: Able to install and maintain software for a PC.

Duration: 1 hour

List of Hardware/Software requirements:

13.

14.

15.

Code/Program/Procedure (with comments):

Resolution

Uninstall program

Almost all current applications for Windows 7 use an installation program such as Windows Installer to install and anchor the application in the system.

Windows Installer is an installation and configuration service for Windows. It also ensures that already installed programs can be easily removed from the system. Under no circumstances should you simply delete the program folder of the application to uninstall it, because this could leave numerous files and entries in the system, which could threaten the stability of the system.

1. To uninstall an application, use the uninstall program provided by Windows 7. Start by clicking on the Windows icon.
 2. In the right pane, click on Control Panel.
 3. Under Programs click on the item Uninstall a program.

4. Windows then lists all programs that were installed using Windows Installer. Select the program you want to uninstall by clicking on it.

5. Click at the top on Uninstall/Change.

6. In the next message box, confirm the uninstall process by clicking on Yes.

7. Windows now starts the uninstall process. After completion you'll receive a status message, which you confirm by selecting OK.

References:

<Include at least 1 reference per activity where students can go and explore. Remove this part from your final document. >

- <https://www.diskpart.com/articles/create-partition-before-windows-installing-4348.html#:~:text=Insert%20the%20installation%20disc%2C%20and,partition%20for%20an%20MBR%20disk>.
- <https://pureinfotech.com/create-custom-partition-install-windows-10/>
- <https://smallbusiness.chron.com/access-cmos-setup-program-68141.html>
- <https://www.informit.com/articles/article.aspx?p=130913&seqNum=5>
- <https://opensource.com/article/18/5/dual-boot-linux>
- <https://www.pcworld.com/article/2899088/how-to-install-two-or-more-operating-systems-on-one-pc.html>
- <https://support.microsoft.com/en-in/help/4026923/windows-10-create-a-local-user-or-administrator-account>
- <https://www.wikihow.com/Change-a-Guest-Account-to-an-Administrator-in-Windows>
- <https://support.microsoft.com/en-in/help/17588/windows-fix-problems-that-block-programs-being-installed-or-removed>
- <https://www.oreilly.com/library/view/windows-xp-cookbook/0596007256/ch04.html>

Learning Outcome 6 - Able to manage files effectively in Windows and Linux environment

After achieving this learning outcome, a student will be able to manage files effectively in Windows and Linux environments. In order to achieve this learning outcome, a student has to complete the following:

1. Draw sketches using paint for practice on mouse/touchpad (2 Hrs)
2. Draft a document using Notepad for practice on Keyboard (3 Hrs)
3. Create, save, rename, move, copy and delete files and folders.(2 Hrs)
4. Transfer files and folders from/to external storage devices (1 Hr)

5. Create zip file (1 Hr)
6. Extract the zip file (1 Hr)
7. Create automatic backup (2 Hrs)
8. Hide/unhide files/folders (1 Hr)
9. Create password for individual files (2 Hrs)

Activity 1

Aim: Draw sketches using paint for practice on mouse/touch pad (2 Hrs)

Learning outcome : Able to manage files effectively in Windows and Linux environment.

Duration: 2 hour

List of Hardware/Software requirements:

1.
2.

3.

Code/Program/Procedure (with comments):

Windows Live Paint, Windows 7's improved drawing program, has been expanded to include a ribbon panel that makes drawing a picture easier than ever. Using the new Scenic Ribbon in Paint, you can access a variety of virtual pens and brushes for drawing whatever you can dream up.

Although there's an added hassle to obtain Paint, the program includes several new features to enhance your ability to draw and edit photos.

- Click the Start button, type paint, and click Paint in the search results.

The Paint window opens. Maximize the window, if it isn't already.

- Click and drag your mouse over the white canvas to draw a black squiggle using the default brush and color; then release the mouse button. The canvas is the area you draw on, below the Ribbon.
- If your computer uses a pen or has a touch screen, you may be able to draw directly on your screen.
- Click the down arrow on the Brushes button in the Ribbon to see a panel of brushes. Select one you like.

Hover your mouse pointer over each brush to see a tooltip that describes it.

- Click one of the small color boxes at the right end of the Ribbon to select that color.
- Click and drag your mouse over the canvas again.

The new line will reflect the new brush and color you chose.

You can also use Paint's premade Shapes tools. Click the Shapes button on the Ribbon; click a shape on the panel that drops down; and click and drag in the canvas to draw that shape. Then click the paint-bucket icon on the Tools panel to change the inside (or fill color) of the shape.

- To add text to your drawing, click the A button on the Tools panel; then click the canvas and start typing in the text box that appears.

Notice that a new Text tab opens above the Ribbon.

- Select the text you just typed and choose options in the Text tab to size and format your text.

- You can change fonts, colors, sizes, and so on.
- Save your drawing by pressing Ctrl+S.

You can also save the drawing by clicking the Save button — the tiny disk icon in the Paint title bar.

References:

<Include at least 1 reference per activity where students can go and explore. Remove this part from your final document. >

-
-

2

Aim: Draft a document using Note Pad for practice on Key Board (3 Hrs)

Learning outcome: Able to manage files effectively in Windows and Linux environment.

Duration: 3 hour

List of Hardware/Software requirements:

4.

5.

6.

Code/Program/Procedure (with comments):

Notepad is a very basic text-editing program that comes as an included application on Windows operating systems. Notepad is great for writing short documents that you want to save in plain text. Notepad has some additional features to take advantage of as well. However, Notepad is just a text editor, so images are not compatible. Because Notepad is basically the same on both Windows 7 and Windows 8.1, the only difference is how you open the program. Learning the basics of Notepad is quick and easy!

1. Open Notepad. On Windows 7, open your Start Menu and type “Notepad” in the search box. Select Notepad to open the application. You can also navigate

Activity

to the "Accessories" folder in the Start Menu and select Notepad from the list of applications

◦On Windows 8.1, type “Notepad” into the Start screen search box.

2. Explore the Notepad user interface. Once Notepad is open, you will see a simple screen with a limited set of text editing options. Notice menu options for File, Edit, Format, View, and Help.

3. Open the File Menu. You will see a drop down list with New, Open, Save, Save As,

Page Setup, and Print. These are the basic options for word editing. Select “New” to create a document.

- Whenever you save a file with either Save or Save As, Windows will automatically save the file in .txt format, which will launch it in Notepad. ● You can choose to save Notepad documents in HTML by choosing Save

As and selecting All Files from the list of choices, then saving the file with .htm or .html as its extension. Type your HTML code directly into your document as if you would plain text.

- In order to properly save a document in HTML, you will need to have Word Wrap enabled. You will find instructions on how to enable this feature a little later.

3

Aim: Create, save, rename, move, copy and delete files and folders.(2 Hrs)

Learning outcome: Able to manage files effectively in Windows and Linux environment.

Duration: 2 hour

List of Hardware/Software requirements:

7.

8.

9.

Code/Program/Procedure (with comments):

Copy, Move, Rename, Delete Files and folders

Description of basic operations in Altap Salamander

- Basic commands Copy, Move, Rename Delete of selected files and Directories.
- Configurable Overwrite, Skip, Delete confirmations.
- Multiple operations performed on background.
- Operations queue (only one operation performed at a moment).
- Pause and Resume option.

Activity

- Speed limits.
- Advanced filters based on file date, time, attributes, size.
- Retry command when operation fails (for example due broken network connection).

4

Aim: Transfer files and folders from/to external storage devices (1 Hr)

Learning outcome: Able to manage files effectively in Windows and Linux environment.

Duration: 1 hour

List of Hardware/Software requirements:

10.

11.

12.

Code/Program/Procedure (with comments):

Transferring data from one external hard drive to another allows you to move to a larger drive, backup existing data or copy client files to your business computer. Normally, this is a simple drag-and-drop procedure, but you first need to consider the file system used on the destination drive. FAT32 limits individual file sizes to just 4GB. This in itself won't be a problem, but if the source drive uses the NTFS system, it can potentially hold files greater than 4GB, which you wouldn't be able to copy.

1.Power on both external hard drives.

2.Plug the source drive into an available USB port, wait until the AutoPlay window appears, and click "Open Folder to View Files." Hold the "Win" key and press the right arrow key to place the Windows Explorer window on the right side of the screen.

Activity

3. Plug the destination drive into another USB port, preferably one that ties into a different USB motherboard controller, but if you're not sure, don't worry about it. Click "Open Folder to View Files." Hold the "Win" key and press the left arrow key. You should now have both Windows Explorer windows in split-screen mode.
4. Right-click the destination drive letter and select "Properties." Look for "File System" to determine the file system used. If it says "FAT32," you should check the source drive for files greater than 4GB. Alternatively, you can check the source drive's file system; If it also uses FAT32, there's no problem, but if it uses NTFS, you'll still have to search for large files.

5

Enter "size:>4gb" without quotes in the right-side Windows Explorer Search bar to search for files greater than 4GB. If no files are found, you don't have to worry about anything. If a file is found, the drive uses NTFS and has files that will not copy. You can exclude these files, save them to an NTFS volume or convert the destination drive to the NTFS file system.

6

Locate the files in the source drive. Click and drag them to any folder on the destination drive to begin copying. If there is insufficient space, Windows will tell you. You can then decide to exclude files or choose a supplemental storage location.

Activity 5

Aim: Create zip file (1 Hr)

Learning outcome: Able to manage files effectively in Windows and Linux environment.

Duration: 1 hour

List of Hardware/Software requirements:

13.

14.

15.

Code/Program/Procedure (with comments):

Zip your file using WinZip

1. Open WinZip.
2. In the Files pane, find and select files to zip from your PC, network or cloud services.

3. Click Add to Zip.
4. In the Actions pane, click Save as.
5. Choose to save your zip file to any local, network or cloud location.
6. Or, you may choose to email it; share it in an instant message; or share it via a supported social media service.

Note: If you turn on a Convert and Protect option after you add files to your Zip, you can still apply your Encryption and Conversion settings for all or just some of the files in your Zip by choosing “Apply to selected files in the Zip” from the Options button in the Actions panel.

Zip your files from a Windows Explorer folder

1. Open a folder window.
2. Find and select the files and/or folders you want to zip.
3. Right-click the highlighted area.
4. In the WinZip sub-menu, choose either:
 - Add to [filename].zip(x)
 - Add to Zip file... – this option lets you specify your own Zip file name, compression type, encryption, conversion options, and destination folder

How to zip files with WinZip Express

WinZip Express works with commonly used applications so you don't need to launch WinZip separately to zip, encrypt and share your files. Instead, you get quick access to a single dialog that combines many popular WinZip features in one place.

Using WinZip Express for Explorer

Simply click a file, folder, or selection of files and folders. Select Zip and Share (WinZip Express) from the Explorer context menu to open a WinZip Express dialog. Then select zipping, encrypting, sharing and other features.

Using WinZip Express for Office

To zip and share your Office file, just click the File tab in the Office application you're using to find the familiar Zip and Share (WinZip Express) button in the left column of the tab. If you click this, but have not yet saved the file that is in use, the Save As dialog will open and you can save the file. Once this is done, the WinZip Express dialog will display.

Activity 6

Aim: Extract the zip file (1 Hr)

Learning outcome: Able to manage files effectively in Windows and Linux environment.

Duration: 1 hour

List of Hardware/Software requirements:

16.

17.

18.

Code/Program/Procedure (with comments):

- Step 1 : Open WinZip
- Step 2: Using WinZip's file pane select the file(s) you want to unzip
- Step 3:Click Unzip
- Step 4 :Choose where you want to save the files to



Activity 7

Aim: Create automatic backup (2 Hrs)

Learning outcome: Able to manage files effectively in Windows and Linux environment.

Duration: 2 hour

List of Hardware/Software requirements:

19.

20.

21.

Code/Program/Procedure (with comments):

As a PC user, you should know it is necessary to back up files or folders on a regular basis to keep them safe.

It is well known that it is just a matter of time that the hard drive stops working. In addition, laptop stolen, virus attack, a critical error, etc. may lead to data loss. To protect those valuable documents, photos, etc. and avoid data loss, performing auto file backups is the best way.

However, the files or folders may change at any time. When you modify it or add some comment on it, you need to back it up again. Therefore, the best way to back up files Windows 10 is to set up a scheduled backup to prevent you from forgetting to back up files.

Besides, automatic file backup is helpful for those people who don't have a habit of backing up.

Well then, how to automatically back up files in Windows 10 to protect them from unexpected data loss disaster when you have stored many important files on your PC? Is there any tool that allows you to do this work?

Of course! In the following part, you can find it is easy to set up Windows 10 automatic backup for data protection by using 3 tools.

How to Automatically Back up Files to an External Hard Drive

Before you start, you should decide where to save the backup, and which tool to use for auto file backup in Windows 10.

Preparation Work:

1. Where to store backup

For Windows automatic file backup, the choices: internal hard drive, external hard drive, and flash drive are available. In this part, we will show you how to automatically back up folders/files to external hard drive.

2. Windows Automatic Backup Tool

Which Windows tool lets you perform automatic backups at regular times? For regular backups, using third-party automatic file backup software is highly suggested. However, some of you choose to use Windows 10 File History or Windows Backup and Restore (Windows 7).

Now, let's get straight to the point: how to back up files Windows 10 regularly.

Automatically Back up Files to External Hard Drive Using MiniTool ShadowMaker

Which software is the best free backup software for Windows 10 automatic file backup?

When choosing backup program, you should consider the price, functions, and safety. MiniTool ShadowMaker is your best choice.

As the best free backup software, it is compatible with Windows 10/8/7 with advanced & flexible backup features.

It is not necessary to manually copy and paste files as long as you set a scheduled backup plan, it will help you automatically back up specific folders with important files to an external hard drive.

What's more, the operation can be performed periodically, for instance, daily, weekly, monthly, etc. By default, incremental backups are created.

Furthermore, this auto backup software supports not only file & folder backup but also system, partition and disk backup.

To automatically back up files to an external hard drive in Windows 10, you can download MiniTool ShadowMaker free on the Windows 10 PC to give a try. Or you may choose to get Pro edition for all time use.

Activity 8

Aim: Hide/unhide files/folders (1 Hr)

Learning outcome: Able to manage files effectively in Windows and Linux environment.

Duration: 1 hour

List of Hardware/Software requirements:

22.

23.

24.

Code/Program/Procedure (with comments):

1. Select the Start button, then select Control Panel > Appearance and Personalization.
2. Select Folder Options, then select the View tab.
3. Under Advanced settings, select Show hidden files, folders, and drives, and then select OK.

Activity 9

Aim: Create password for individual files (2 Hrs)

Learning outcome: Able to manage files effectively in Windows and Linux environment.

Duration: 2 hour

List of Hardware/Software requirements:

25.

26.

27.

Code/Program/Procedure (with comments)

finally offers an easy, safe, and officially supported way to access and work with your Linux files from within File Explorer and other applications. Here's how to get at your Window subsystem for Linux files.

Unlike previous methods, this is a safe way to work with Linux files! Windows does some magic in the background, making it possible to edit your Linux files from Windows applications without causing file permission issues. You still shouldn't modify the underlying files at their real location at your system.

There are two ways to access your Linux files. First, the easy one. From within the Windows Subsystem for Linux environment you want to browse, run the following command: explorer.exe .

This will launch File Explorer showing the current Linux directory—you can browse the Linux environment's file system from there.

You can also access them directly at a \\wsl\$ path. In File Explorer or any other Windows application that can browse files, navigate to the following path:

\\wsl\$

You'll see the folders for all your installed Linux distributions, which are exposed as if they were network shares. For example, Ubuntu 18.04 usually is available at \\wsl\$\\Ubuntu-18.04 .

Feel free to create a shortcut to this folder—for example, you could drag it to the Quick Access section in File Explorer's sidebar.

Again, you can modify these files normally as if they were any other type of file on your system. Modify files with Windows tools, create new files in the Linux folders, delete files, or do anything else you like. Windows will ensure nothing goes wrong and the file's permissions are updated properly.

References:

<Include at least 1 reference per activity where students can go and explore.

Remove this part from your final document. >

- <https://www.quora.com/How-can-I-learn-how-to-draw-well-with-a-computer-mouse>
- <https://www.adobe.com/in/creativecloud/illustration/discover/digital-pens-digital-tools.html>
- <https://www.wikihow.com/Use-Notepad>
- <https://copyblogger.com/keyboard-shortcuts/>
- https://flylib.com/books/en/2.406.1/objective_5_copy_move_rename_and_delete_files.html
- <https://www.altap.cz/salamander/features/copy-move-rename-delete-files-directories/>
- <https://www.psafe.com/en/blog/transfer-files-external-hard-drive/>
- <https://smallbusiness.chron.com/transfer-between-2-hard-drives-69302.html>
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-
- <https://www.windowscentral.com/how-backup-windows-10-automatically>
 - <https://www.minitool.com/backup-tips/automatic-file-backup.html>
 - <https://support.microsoft.com/en-in/help/4028316/windows-view-hidden-files-and-folders-in-windows-10>
 - <https://www.howtogeek.com/howto/windows-vista/show-hidden-files-and-folders-in-windows-vista/>
 - <https://www.crucial.in/articles/pc-users/how-to-password-protect-a-folder>
 - <https://www.computerhope.com/issues/ch000705.htm>

Learning Outcome 7 - Able to work with Linux environment by using Linux Commands

After achieving this learning outcome, a student will be able to work with Linux environment by using Linux Commands. In order to achieve this learning outcome, a student has to complete the following:

1. Read terminal ID using TTY command to know which terminal we are working (1 Hr)
2. Execute the following Linux commands: TTY Command, uname command, Date, cal, Whoami, Man, Pwd, Whatis, Fdisk, Sudo, Ifconfig, Chmod, Umask, Adduser, Ping, Hostname, Dpkg –i (7 Hrs)
3. Execute the following Linux commands: Touch, echo, clear, ls, Dir, Mkdir, Cat, Rmdir, Rm, Cp, Mv, Find, Head, Tail, Tar, Gzip, Bzip2, Alias, Sed, wc, sort. (7 Hrs)

Activity 1

Aim: Read terminal ID using TTY command to know which terminal we are working (1 Hr)

Learning outcome: Able to work with Linux environment by using Linux commands.

Duration: 1 hour

List of Hardware/Software requirements:

1. Computer Desktop/Laptop
2. Linux Operating system

Code/Program/Procedure (with comments):

```
~$ tty [-s, --silent, --quiet]          # print nothing, only return an exit  
                                         status  
~$ tty [--help]                      # display this help and exit  
~$ tty [--version]                   # output version information and exit  
~$ tty
```

Output/Results snippet:

References:

- <https://www.howtoforge.com/linux-tty-command/>

Activity 2

Aim: Execute the following Linux commands: TTY Command, uname command, Date, cal,

Whoami, Man, Pwd, Whatis, Fdisk, Sudo, Ifconfig, Chmod, Umask, Adduser, Ping, Hostname, Dpkg –i (7 Hrs)

Learning outcome: Able to work with Linux environment by using Linux commands.

Duration: 7 hours

List of Hardware/Software requirements:

1. Computer Desktop/Laptop
2. Linux Operating system

Code/Program/Procedure (with comments):

```
~$ tty      # prints the file name of the terminal connected to standard input  
~$ uname    # prints information about the system  
~$ date     # display the system date and time  
~$ cal      # shows current month calendar as output  
~$ whoami   # displays the username of the current user  
~$ pwd      # print the full system path of the current working directory to standard output  
~$ umask    # set permissions mask  
~$ hostname # obtain the DNS name and set the system's hostname or NIS domain name  
             # contains the amount of time it takes for every packet to reach its destination  
~$ ping     and  
             return
```

```
~$ man      # It shows the manual pages of the command  
~$ whatis   # used to get a one-line manual page descriptions  
~$ fdisk    # It is a command-line partition table editor for Linux  
~$ sudo     # For any command to be done with administrative or root privileges  
~$ ifconfig # Configure the kernel-resident network interfaces  
~$ chmod   # To make a file executable and to change the permissions granted to it  
           in Linux  
~$ adduser # add/create a new user  
~$ dpkg -i # sorts through a tree of Debian binary packages and creates a Packages  
           file
```

Output/Results snippet:

References:

- <https://maker.pro/linux/tutorial/basic-linux-commands-for-beginners>

Activity 3

Aim: Execute the following Linux commands: touch, echo, clear, ls, Dir, Mkdir, Cat, Rmdir,

Rm, Cp, Mv, Find, Head, Tail, Tar, Gzip, Bzip2, Alias, Sed, wc, sort. (7 Hrs)

Learning outcome: Able to work with Linux environment by using Linux commands.

Duration: 7 hours

List of Hardware/Software requirements:

1. Computer Desktop/Laptop
2. Linux Operating system

Code/Program/Procedure (with comments):

```
~$ touch          # create a file without any content  
~$ echo           # display line of text/string that are passed as an argument  
~$ clear          # keep screen tidy from filled up commands and outputs of those commands  
  
~$ ls              # what files are in the directory you are in  
~$ dir             # lists the files and folders in columns  
~$ mkdir           # create a folder or a directory  
~$ cat             # create a file with any content and display the contents  
~$ rmdir           # delete an empty directory  
~$ rm               # delete files and directories  
~$ cp               # copy files through the command line
```

```
~$ mv          # move files through the command line  
~$ find        # find files and directories and perform subsequent operations  
               on them  
~$ head        # output the first part of files given to it via standard input  
~$ tail        # output the last part of files given to it via standard input  
~$ tar          # work with tarballs (or files compressed in a tarball archive)  
               in the Linux    command line  
  
~$ Gzip         # compresses and decompresses files  
~$ Bzip2        # compresses and decompresses files  
~$ alias        # instructs the shell to replace one string with another string  
               while    executing the commands.  
  
~$ sed          # perform functions on file like searching, find and replace,  
               insertion or    deletion  
  
~$ wc          # used for word counting purpose  
~$ sort        # sort a file, arrange the records in a particular order
```

Output/Results snippet:

References:

- <https://www.geeksforgeeks.org/linux-commands/>

Learning Outcome 8 - Able to create document, spreadsheets and make presentations using open office

After achieving this learning outcome, a student will be able to create documents, spreadsheets and make presentations using open office. In order to achieve this learning outcome, a student has to complete the following:

1. Draw sketches using paint (2 Hrs)
2. Create your resume using edit commands in document (3 Hrs)
3. Create purchase order using tables and images (5 Hrs)
4. Create magazine using columns page borders, header footers (2 Hrs)
5. Create an invitation letter using mail merge for n invitees (3 Hrs)
6. Create mark sheet using spread sheet with data validation (3 Hrs)
7. Create chart for mark sheet (2 Hrs)
8. Create Pay slip using functions and formulae (5 Hrs)
9. Create Pivot table/chart for inventory management (5 Hrs)
10. Create Presentation by inserting charts, tables and images about organization (5 Hrs)

Activity 1

Aim: Draw sketches using paint (2 Hrs)

Learning outcome: Able to create document, spread sheets and make presentations using open office.

Duration: 2 hours

List of Hardware/Software requirements:

1. Computer Desktop/Laptop
2. Windows Operating system

Code/Program/Procedure (with comments):

Open MS Paint Program and explore various options then draw an image to show any five basic hand tools. You can make use of appropriate paint tools in suitable colors.

Output/Results snippet:

References:

- <https://www.tutorialboneyard.com/microsoft-paint-tutorials/>

Activity 2

Aim: Create your resume using edit commands in document (3 Hrs)

Learning outcome: Able to create document, spread sheets and make presentations using open office.

Duration: 3 hours

List of Hardware/Software requirements:

1. Computer Desktop/Laptop
2. Windows Operating system

Code/Program/Procedure (with comments):

Open MS Word. Word displays a blinking cursor that points to where your text will appear if you type anything. To move the cursor, you can use the keyboard or the mouse. Use the toolbar to type your text.

Output/Results snippet:**References:**

- <https://sourcedaddy.com/ms-word/typing-text-in-word.html>

Activity 3

Aim: Create purchase order using tables and images (5 Hrs)

Learning outcome: Able to create document, spread sheets and make presentations using open office.

Duration: 5 hours

List of Hardware/Software requirements:

1. Computer Desktop/Laptop

2. Windows Operating system

Code/Program/Procedure (with comments):

Open MS Word.

Insert a table

1. Select **Insert > Table** .
2. Highlight the number of columns and rows you want, and then select them.
3. To create a larger table, select **Insert > Table > Insert Table** .
4. Choose the number or columns and rows you want.

Insert a picture

1. Select **Insert > Picture** .
2. There are two options to choose from:
 - Select **This Device** to insert a file from your PC.
 - Select **Bing** to use a photo from the web.
3. If you choose **Bing** , type what you're looking for, choose a photo, and select **Insert** .

Output/Results snippet:

References:

- <https://support.microsoft.com/en-us/office/insert-tables-and-pictures-9e2be863-fcb8-4f20-af24-905121643da8>

Activity 4

Aim: Create magazine using columns page borders, header footers (2 Hrs)

Learning outcome: Able to create document, spread sheets and make presentations using open office.

Duration: 2 hours

List of Hardware/Software requirements:

1. Computer Desktop/Laptop
2. Windows Operating system

Code/Program/Procedure (with comments):

Open MS-Word.

Choose Page Layout → Page Background → Page Borders to open the Borders and Shading box.

Go to Insert → Header & Footer → Header to open the Header menu.

Output/Results snippet:

References:

- <https://www.oreilly.com/library/view/word-2007-for/0596528302/ch04.html>

Activity 5

Aim: Create an invitation letter using mail merge for n invitees (3 Hrs)

Learning outcome: Able to create document, spread sheets and make presentations using open office.

Duration: 3 hours

List of Hardware/Software requirements:

1. Computer Desktop/Laptop
2. Windows Operating system

Code/Program/Procedure (with comments):

Step1: In a blank Microsoft Word document, click on the Mailings tab, and in the Start Mail Merge group, click Start Mail Merge.

Step 2: Click Step-by-Step Mail Merge Wizard.

Step 3: Select your document type. We will select Letters. Click Next: Starting document.

Step 4: Select the starting document. We will use the current (blank) document. Select Use the current document and then click Next: Select recipients.

Step 5: Select recipients. Select Type a new list and then click Create.

- Create a list by adding data in the New Address List dialog box and clicking OK.
- Save the list.
- Note that now that a list has been created, the Mail Merge Wizard reverts to **Use an existing list** and you have the option to edit the recipient list.
- Selecting Edit recipient list opens up the Mail Merge Recipients dialog box, where you can edit the list and select or unselect records. Click OK to accept the list as is.
- Click Next: Write your letter.

Step 6: Write the letter and add custom fields.

- Click Address block to add the recipients' addresses at the top of the document.
- In the Insert Address Block dialog box, check or uncheck boxes and select options on the left until the address appears the way you want it to.
- Note that you can use Match Fields to correct any problems. Clicking Match Fields opens up the Match Fields dialog box, in which you can associate the fields from your list with the fields required by the wizard.

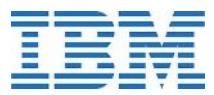
Step 7: Press Enter on your keyboard and click Greeting line... to enter a greeting.

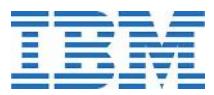
Step 8: In the Insert Greeting Line dialog box, choose the greeting line format by clicking the drop-down arrows and selecting the options of your choice, and then click OK.

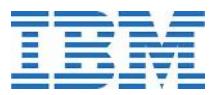
Step 9: Note that the address block and greeting line are surrounded by chevrons (« »). Write a short letter and click Next: Preview your letters.

Step 10: Preview your letter and click Next: Complete the merge.

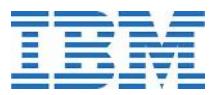
Output/Results snippet:







References: • <https://www.webucator.com/how-to/how-use-mail-merge-microsoft-word.cfm>



Activity

6

Aim: Create mark sheet using spread sheet with data validation (3 Hrs)

Learning outcome: Able to create document, spread sheets and make presentations using open office.

Duration: 3 hours

List of Hardware/Software requirements:

1. Computer Desktop/Laptop
2. Windows Operating system

Code/Program/Procedure (with comments):

1. First open microsoft excel from start menu in all programmes.
2. Click on new from file menu to create a new spreadsheet.
3. Fill the data/information in various rows and columns by selecting the rows and columns one by one.
4. If we need to find sum, average then enter various entries in columns and rows.
5. To find sum enter syntax [=sum] and select the cells of which we need to find sum.
6. Similarly for average we use syntax [=average] and the starting cell separated by colon and ending cell. This will find the average of cells.
7. After creating the worksheet we need to save it by clicking on file tab and save option in it.
8. Type the name we want to give to sheet and click on save button.
9. In this way we create a marksheets in excel.

Output/Results snippet:**References:**

- <https://brainly.in/question/12178427>

Activity

Aim: Create chart for mark sheet (2 Hrs)

Learning outcome: Able to create document, spread sheets and make presentations using open office.

Duration: 3 hours

List of Hardware/Software requirements:

1. Computer Desktop/Laptop
2. Windows Operating system

Code/Program/Procedure (with comments):

1. Select the data for which you want to create a chart.
2. Click INSERT > Recommended Charts.
3. On the Recommended Charts tab, scroll through the list of charts that Excel recommends for your data, and click any chart to see how your data will look.
4. If you don't see a chart you like, click All Charts to see all the available chart types.
5. When you find the chart you like, click it > OK.
6. Use the Chart Elements, Chart Styles, and Chart Filters buttons, next to the upper-right corner of the chart to add chart elements like axis titles or data labels, customize the look of your chart, or change the data that is shown in the chart.
7. To access additional design and formatting features, click anywhere in the chart to add the CHART TOOLS to the ribbon, and then click the options you want on the DESIGN and FORMAT tabs.

Output/Results snippet:**References:**

- <https://support.microsoft.com/en-us/office/video-create-a-chart-4d95c6a5-42d2-4cfcaede-0ebf01d409a8>

Activity

Aim: Create Pay slip using functions and formulae (5 Hrs)

Learning outcome: Able to create document, spread sheets and make presentations using open office.

Duration: 5 hours

List of Hardware/Software requirements:

1. Computer Desktop/Laptop
2. Windows Operating system

Code/Program/Procedure (with comments):

Step 1: Open a new blank excel spreadsheet. Go to Search Box. Type “Excel” and double click on the match found under the search box to open a blank excel file.

Step 2: Save the file on the location you want your payroll to be saved so that it does not get lost and you will always have it with you.

Step 3: In this newly created file where all your employee payroll information would be stored, therefore, create some column with names which can hold the values for the certain parameters/variables. Enter the column names in the following hierarchy.

- Employee Name (column A): Contains your employee name.
- Pay/Hour (column B): Contains per hour pay rate to the employee without any currency symbol.
- Total Hours Worked (column C): Contains total hours worked by an employee in a day.
- Overtime/Hour (column D): Overtime rate per hour without any currency symbol.
- Total Overtime Hours (Column E): Number of hours employees overtime in a day.
- Gross Pay (column F): Payable amount to the employee without any deductibles.

- Income Tax (column G): Tax payable on Gross Pay.
- Other Deductibles (If Any) (column H): Deductibles other than Income Tax.
- Net Pay (column I): Payment the employee will receive in hand after all the deductions.

Step 4: Add the details column-wise like Employee Name in column A, a number of hours worked and hourly paying rate, etc. I will say input the fields with no formula (From column A to column E). See the screenshot below for better understanding.

In this example, if you can see the Total Hours Worked and Total Overtime Hours are considered on a monthly basis (because we pay the employee on a monthly basis, right?). Therefore 160 means total hours worked during the month. Same is the case with total hours overtime. Also, the Pay/Hour and Overtime/Hour are in USD.

Step 5: Formulate Gross Pay. Gross Pay is nothing but the sum of the product of Pay/Hour, Total

Worked Hours and Overtime/Hour, Total Overtime Hours. ($\text{Pay}/\text{Hour} * \text{Total Hours Worked}$) + ($\text{Overtime}/\text{Hour} * \text{Total Overtime Hours}$). In the payroll sheet, it can be formulated under cell F4 as $=(\text{B2}*\text{C2})+(\text{D2}*\text{E2})$. It's a simple formula anyway. However, you can see the screenshot below for a better understanding.

Step 6: In order to calculate the Income Tax, you need to check how much percentage of tax your employee pays on the total gross pay. Income Tax is always calculated on Gross Pay. In this case, we will consider 15% of Income-tax on all the Gross Pay. The formula for Income Tax, therefore, becomes as – $0.15 * \text{Gross Pay}$.

Step 7: You have to mention other deductibles if any for a particular employee. These deductibles may contain the premium of health/life insurance, professional taxes, EMI amount if any loan is taken from an organization, etc. add these amount values under column H. If there is no other deductible for a particular employee, you can set the value under column H for that employee to zero.

Step 8: Now, finally we come towards Net Pay. Net Pay is nothing but the amount that gets credited into your employee's bank account after all the deductions from Gross Pay. Therefore, in this case, we will deduct (subtract) Income Tax (column G) and Other Deductibles (Column H) which can be formulated under cell I2 as $=\text{F2}-(\text{G2}+\text{H2})$. Here,

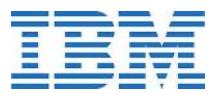
Activity

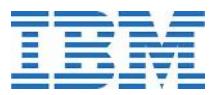
Income Tax and Other Deductibles are summed up and then subtracted from Gross Pay. See the screenshot below for better understanding.

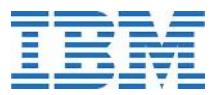
Step 9: Add all the employee names working for you in this payroll one by one and set their total worked hours, overtime hours, deductibles and charges accordingly. For Gross Pay, Income Tax

and Net Pay, just drag the 4th cell of respective columns to have the details formulated. Also, add some formatting to the cells and add total at the end of the sheet.

Output/Results snippet:







References:

- <https://www.educba.com/payroll-in-excel/>

Activity 9

Aim: Create Pivot table/chart for inventory management (5 Hrs)

Learning outcome: Able to create document, spread sheets and make presentations using open office.

Duration: 5 hours

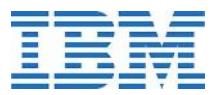
List of Hardware/Software requirements:

1. Computer Desktop/Laptop
2. Windows Operating system

Code/Program/Procedure (with comments):

1. Click 'Insert', Choose 'Tables', select 'PivotTable'. (click the arrow below PivotTable to create a chart).
2. Select the table range (I.E. 1A-21G) in the Create Pivot Table dialog box that pops up.
3. Choose the location of the new pivot table (new worksheet or existing one).
4. Click 'OK'.
5. Customize your Pivot Table as needed.

Output/Results snippet:



References:

- https://www.advanced-excel.com/inventory_management_system/
- [https://www.tradegecko.com/blog/inventory-management/7-tips-for-basic-inventory -management-using-excel](https://www.tradegecko.com/blog/inventory-management/7-tips-for-basic-inventory-management-using-excel)

Activity 10

Aim: Create Presentation by inserting charts, tables and images about organization (5 Hrs)

Learning outcome: Able to create document, spread sheets and make presentations using open office.

Duration: 5 hours

List of Hardware/Software requirements:

1. Computer Desktop/Laptop
2. Windows Operating system

Code/Program/Procedure (with comments):

To create an organization chart:

1. On the Insert tab, in the Illustrations group, click SmartArt.
2. In the Choose a SmartArt Graphic gallery, click Hierarchy, click an organization chart layout (such as Organization Chart), and then click OK.
3. To enter your text, do one of the following:
 - Click in a box in the SmartArt graphic, and then type your text.
 - Click [Text] in the Text pane, and then type your text.
 - Copy text from another location or program, click [Text] in the Text pane, and then paste your text.

To create an Excel Table:

1. Select a cell in the list of data that you prepared.
2. On the Ribbon, click the Insert tab.
3. In the Tables group, click the Table command. In the Create Table dialog box, the range for your data should automatically appear, and the *My table has headers* option is checked. If necessary, you can adjust the range, and check box.
4. Click OK to accept these settings.

To insert the image:

1. Click *where the image should go in the Excel spreadsheet.*
2. Click the “*Insert tab,*” then the “*Illustrations group,*” and then click “*Pictures.*”
3. A dialog box opens.
4. Locate the desired image and highlight it.
5. Click “*Insert.*”

Once completed, the image selected for upload should populate the desired cell.

Output/Results snippet:

References:

- <https://support.microsoft.com/en-us/office/create-an-organization-chart-9b51f667-11b7-4971-a757-a08a36684ee6>
- <https://www.contextures.com/xlExcelTable01.html>

- <https://smallbusiness.chron.com/embedding-images-excel-40034.html>

Learning Outcome 9 - Able to customize PC in Windows and Linux Environment

After achieving this learning outcome, a student will be able to customize PC in Windows and Linux Environment. In order to achieve this learning outcome, a student has to complete the following:

1. Set the system date and time (2 Hrs)
2. Change the display properties (8 Hrs)
3. Personalise Taskbar (5 Hrs)
4. Setting the control panel(10 Hrs)

Activity 1

Aim: Set the system date and time (2 Hrs)

Learning outcome: Able to customize PC in Windows and Linux Environment

Duration: 2 hours

List of Hardware/Software requirements:

1. PC/Laptop
2. Windows /Linux Operating System

Code/Program/Procedure (with comments):

Computers connected to the internet should automatically adjust for daylight savings time.

1. Right-click on the time in the bottom-right of the screen and select **Adjust Date/Time**.
2. A window will open. On the left side of the window select the **Date & time** tab. Then, under "Change date and time" click **Change**

Note: Both **Set time automatically** and **Set time zone automatically** must be **Off** to make this change.

3. Enter the time and press **Change**

4. The system time has been updated.

Output/Results snippet:**References:**

- <https://kb.wisc.edu/helpdesk/page.php?id=79027>
- <https://kb.wisc.edu/helpdesk/page.php?id=12540>

Activity 2

Aim: Change the display properties for - Back ground - Resolution - Screen saver - Desktop icons - Gadgets (8 Hrs)

Learning outcome: Able to customize PC in Windows and Linux Environment

Duration: 8 hours

List of Hardware/Software requirements:

3. PC/Laptop

4. Windows /Linux Operating System

Code/Program/Procedure (with comments):

How to change your desktop background in Windows 10

1. **Click on the Windows icon** in the lower left of your screen next to the search bar.

2. **Click on Settings** in the list on the left.

3. **Click on Personalization**, which is fourth from the bottom on the list.

4. **Click on Background**. The background page will come up which allows you to preview your background picture and lets you choose from several photos or your own photos for your desktop background.

5. **Click on the box underneath Background** to choose between a picture, solid color, or slideshow for your background.

6. Underneath Choose your picture, **click on one of the options** or **click Browse** to choose one from your computer. Click on whatever photo you want and it will appear as your desktop background.

7. If you don't like the layout of the photo, you can **click on the box underneath**. Under **Choose a fit**, pick between fill, fit, stretch, tile, or center options for your background.

8. Once you've made your selections, your **Windows 10 background will change automatically**, no manual submitting required.

How to set up screen savers on Windows 10

If you want to use the screen saver feature on Windows 10, use these steps:

1. Open **Settings** .
2. Click on **Personalization** .
3. Click on **Lock screen** .

4. Click the **Screen saver settings** link.

5. Under "Screen saver," use the drop-down menu, and select the screen saver you want to use.

Note: Depending on the screen saver you choose, you can click the **Settings** button to customize different options. For example, selecting "Photos", you get options to specify the collection of pictures to show when your PC is idle. Or selecting the "3D Text" option, you can show custom text or the current time.

6. Using the **Wait** option, you can set the number of minutes of inactivity before the screen saver turns on.

7. You can also check the **On resume, display the logon screen** option to lock your device automatically when the screen saver turns on.

8. Click the **Apply** button.
9. Click the **OK** button.

Change Desktop Icons on Windows 10

Step 1: Click *Start* > select *Settings* > choose *Personalization* click *Themes* .

Step 2: Slide the left pane and locate to Related Settings. Then choose *Desktop icon settings* .

Step 3: In the Desktop Icon Settings window, select the desktop icon you want to change and click *Change Icon* .

Step 4: Choose a new icon from the list or click *Browse* to input an icon and tap *OK* .

Tip: The icon type can be exe, dll, or ico.

Step 5: Click *OK* to confirm the change.

Add Desktop Gadgets and Widgets to Windows 10

If you have upgraded from Windows 7 and still want to use desktop gadgets, you'll be happy to know that desktop gadgets can be installed in Windows 10 with the help of this tutorial. Download GadgetsRevived click (<http://gadgetsrevived.com/download-sidebar/>). A zip file, will be downloaded. Extract the zip file and run the installer file. If you see a Smart Screen Notification, choose **Run Anyway**.

Click **Yes** if you get a **UAC notification**.

Follow the setup wizard and click Install and wait for the installer to finish installing. After the installation has finished, it will automatically show a small box with a couple of Desktop Gadgets you can choose from.

Double click on any of the widget to add it to the sidebar on your Desktop. Hover your mouse over to the gadget to view it or remove it by clicking the small x .

Once you've closed the initial desktop gadgets pane, you can get back to it by right-clicking anywhere on your Desktop and choosing the Gadgets option.

You can also hide gadgets by right-clicking on your **Desktop -> View -> Show Desktop Gadgets (uncheck it)**

References:

- [https://www.dummies.com/computers/operating-systems/windows-10/how-to-change-the - desktop-background-in-windows-10/](https://www.dummies.com/computers/operating-systems/windows-10/how-to-change-the-desktop-background-in-windows-10/)
- <https://www.windowscentral.com/how-enable-screen-savers-windows-10>
- <https://windows.gadgethacks.com/how-to/bring-desktop-gadgets-windows-10-0163567/>

Activity 3

Aim: Personalize Taskbar for - Hide and Lock - Pin and unpin applications (5 Hrs)

Learning outcome : Able to customize PC in Windows and Linux Environment

Duration: 5 hours

List of Hardware/Software requirements:

5. PC/Laptop
6. Windows /Linux Operating System

Code/Program/Procedure (with comments):

Pin Apps to the Taskbar

The simplest way to customize your taskbar is by pinning various apps and shortcuts to it so that you can access them more quickly in the future. There are two ways to do this. The first is to open the program, either from the Start menu or an existing shortcut. When the app's icon

appears on the taskbar to indicate it's running, right-click the icon and select the "Pin to taskbar"

option from the context menu.

The second way to pin an app to the taskbar does not require the app to be running first. Find the app on the Start menu, right-click the app, point to “More,” and then choose the “Pin to taskbar” option you find there. You could also drag the app icon to the taskbar if you prefer doing it that way.

This will immediately add a new shortcut for the app to the taskbar. To remove an app from the taskbar, right-click the pinned app and choose the “Unpin from taskbar” option.

Pin a File or Folder to Taskbar Jump Lists

Windows also provides an easy way to get access to folders—and individual files—on your taskbar. Jump lists are handy context menus associated with each pinned app that show certain actions you can perform with the app and, for apps where it's applicable, also show a list of recent files and folders you've accessed. You can view an app's jump list by right-clicking an icon. For example, the jump list for the File Explorer icon lets you open a new File Explorer window and shows recent folders you've viewed and folders you've pinned. Just point your

mouse at a recent item to reveal a pushpin icon to its right. Click the pushpin to pin the item to

the jump list.

By the way, if you want to view the conventional context menu for an icon on the taskbar, hold the Shift key while right-clicking the icon. This is particularly useful for

configuring any folder shortcuts you've pinned there. And this is just one of the many useful keyboard shortcuts you can use with the taskbar.

When you've pinned items to a jump list, those items appear separately from recent items. All you have to do is click one of them to open that folder. And of course, exactly what you see on a jump list depends on the app. Apps like Notepad or Microsoft Word show recently opened files. A jump list for your browser might show favorite sites and provide actions for opening new tabs

or windows.

By default, Windows 10 shows about 12 recent items in jump lists. In previous versions of Windows, you could increase or decrease that number easily through taskbar properties. Windows 10, for some reason, does not have this feature easily accessible. You can, however, change the number of items shown on jump lists with a quick Registry hack.

Configure or Remove Cortana and the Search Box

The Cortana icon and search box take up a lot of room on the taskbar, and you don't need either to do your searching. Even without them, if you press the Windows key and start typing, you'll get the same search experience. If you want to perform a voice search—normally accessed by clicking the microphone icon in the search box—you just have to press Windows+C on your keyboard instead.

You can remove the search box and leave just the icon, or you can remove both entirely. Right-click the taskbar and choose "Cortana > Show Cortana icon" from the pop-up menu.

Choose the "Hidden" option to remove both the search box and icon or choose "Show Cortana

icon” to have just the icon on the taskbar.

Remove the Task View Button

The “Task View” button provides access to a thumbnail view of all your open apps and windows.

It also lets you work with virtual desktops and shows you your Timeline if you enabled that.

But you don’t need a button to do this. Simply press Windows+Tab to access the same interface. To save a little taskbar space and get rid of the button, right-click the taskbar and turn off the “Show Task View button” option.

Hide System Icons in the Notification Area

The Notification Area (sometimes called the “System Tray”) holds system icons—like your Action Center and clock—and icons for various apps that run in the background. You can easily tweak which system icons appear in the Notification Area. Right-click any open area

on the taskbar and then click “Taskbar Settings.” On the taskbar settings page, scroll down a bit to the “Notification Area” section and click the “Turn system icons on or off” link.

You’ll see a list of system icons. Run through them and toggle each one on or off to suit your needs.

Hide Application Icons in the Notification Area

Many of the apps you install in Windows are designed to run in the background. They’re not things you need to interact with regularly, so instead of appearing directly on your taskbar, their icons are relegated to the Notification area. This lets you know they’re running and gives you quick access when you need it. A few of these appear right in the Notification Area to the left of

the clock. Others are hidden, but you can see them by clicking the up arrow to the left.

You can quickly customize where these icons appear by dragging them between these two locations. For example, you might prefer that your OneDrive icon is always visible, in which case you'd drag it to the main Notification Area. You can also hide less important icons by dragging them to the hidden area.

You can also work with these icons through the settings interface. Right-click any open area of the taskbar and choose the “Settings” option. Scroll down and click the “Select which icons appear on the taskbar” link.

If you want to remove the hidden area and see all the icons all the time, turn on the “Always show all icons in the notification area” option. If you leave that setting off, you can also run through the list and turn individual apps on or off. Just note that turning an app off here doesn’t remove it from the Notification Area altogether. When an app is turned off, it shows up in the hidden area. When it’s on, it shows up in the main Notification Area.

Move the Taskbar to a Different Edge of the Screen

The bottom edge of the screen is the default location of the taskbar in Windows 10, but you can move it. If you’ve got an extra-wide display—or multiple displays—you may find it nicer having the taskbar on the right or left edge of a display. Or maybe you prefer it at the top. You can move the taskbar in one of two ways. The first is just to drag it. Right-click the taskbar and turn off the “Lock the taskbar” option.

Then, you can grab the taskbar in an empty area and drag it to any edge of your display.

The other way to change the taskbar location is through the settings interface. Right-click on any empty area of the taskbar and choose “Taskbar Settings.” In the taskbar settings window, scroll down and find the “Taskbar location on screen” drop-down menu. You can choose any of the four sides of the display from this menu.

Change the Size of the Taskbar

You can also resize the taskbar to get a little additional space. This can be particularly handy if you moved it to the right or left edge of your screen, but it's also good if you just want space for loads of icons. Right-click the taskbar and turn off the “Lock the taskbar” option. Then place your mouse at the top edge of the taskbar and drag to resize it just like you would with a window.

You can increase the size of the taskbar up to about half your screen size.

Use Small Icons to Fit More on the Taskbar

If you want a few more icons on your taskbar, but aren't keen on resizing it, you can configure Windows 10 to show small taskbar icons. Right-click on any empty area of the taskbar and click

"Taskbar Settings." In the settings window, turn on the "Use small taskbar icons" option.

As you can see, almost everything is the same except that the icons are smaller and you can cram a few more into the space. One difference you should note is that when you're using the smaller icons, the taskbar itself shrinks a bit vertically. As a result, only the clock is shown and not the

date as well. But you can always hover your mouse over the clock or click it to check the date.

Show Labels for Taskbar Icons

By default, the taskbar groups icons for windows of the same app and doesn't show labels for those icons. This saves a lot of taskbar space but can make it difficult for newer users to

recognize icons. You can have Windows show text labels, but the downside is that you also lose the grouping of related icons. To do this, right-click on an empty area of the taskbar and click “Taskbar Settings.” In the settings window, look for the “Combine taskbar buttons” drop-down menu.

The menu gives you three choices:

- **Always, hide labels**. This is the Windows default setting. When it's selected, all windows for an app are grouped on the taskbar, and no labels are shown.
- **When taskbar is full**. This is a middle-range setting. When selected, windows are not grouped, and labels are shown unless the taskbar becomes full. When it fills up, it reverts to the “Always, hide labels” functionality.
- **Never**. When selected, windows are never grouped, and labels are always shown. You can see this setting in action below. Note that instead of a single File Explorer icon and a single Chrome icon, I now have two of each and the titles of the windows are displayed as labels.

Change the Color and Transparency of the Taskbar

In Windows 10, the default color of the taskbar is black. To change the color, press Windows+I to open the settings interface. In the main Settings window, click “Personalization.”

In the Personalization window, switch to the “Colors” tab. On the right, scroll down to the “More Options” section.

You’ll see two options for controlling the taskbar—along with the Action Center and Start menu. Use the “Transparency Effects” toggle to choose whether those items should be transparent or opaque. When the “Start, taskbar, and action center” option is turned off, those items use the default black color. When you turn that option on, those items use the color you’ve picked in the color chooser at the top or, if you have the “Automatically pick an accent color from my background” option turned on, the color Windows has chosen.

Enable the Peek Feature

The Peek feature was introduced back with Windows 7 to let users quickly peek through all open applications to view the desktop. In previous versions, it was turned on by default. In Windows 10, you have to turn it on. Right-click on any empty area of the taskbar and click “Settings.” In the settings window, turn on the cumbrosomely named “Use Peek to preview the desktop when you move your mouse to the Show desktop button at the end of the taskbar” option.

With the Peek option turned on, you can move your mouse to the tiny sliver of space at the far right of the taskbar to hide all your windows and show you your desktop. When you move the mouse away, your windows return to their previous state. You can also click this area to automatically minimize all your windows so that you can actually do things on the desktop. Click the area again to restore your windows. You can also use the Windows+D keyboard

shortcut to do the same thing as clicking the Peek area.

Add a Toolbar to the Taskbar

Windows also allows you to add toolbars to the taskbar. A toolbar is essentially a shortcut to a folder on your system, but the shortcut is displayed as the same kind of toolbar you might see in a browser or other app. You can access toolbars by right-clicking the taskbar and then pointing to the “Toolbars” submenu.

There are three toolbars built in:

- **Address** . The address toolbar adds a simple address box to your taskbar. Type an address in it just like you would in your browser and the resulting page will open in your default browser.
- **Links** . The links toolbar adds items found in your Internet Explorer favorites list.

- **Desktop**. The desktop toolbar provides access to items stored on your desktop.

Below, you can see what the Address and Desktop toolbars look like when they're turned on. Instead of expanding the Desktop toolbar to show any icons, I reduced its size and use the double arrow to open a pop-up menu with all the items.

You can also add a custom toolbar that points to any folder on your system. This can be a great way of adding quick, taskbar access to items you regularly need. To create a toolbar, all you have to do is select the “New toolbar” option from the Toolbars submenu and point it to a folder.

Configure the Taskbar for Multiple Displays

If you use multiple displays, you'll be happy to know that Windows 10 includes decent customization controls for using your taskbar across multiple monitors. You can have a taskbar shown on only one display, a single taskbar stretched across all displays and even a separate taskbar for each display that only shows the apps open on that display. To tweak all this, right-click any open area of the taskbar and choose “Taskbar Settings.”

In the settings window, scroll all the way to the bottom to find the controls for multiple displays.

If you leave the “Show taskbar on all displays” option turned off—which is the default setting—then you’ll see a single taskbar on your primary monitor only. All open windows for apps are shown on that taskbar, regardless of which display the windows are open on. Turn that

option on to have a taskbar shown on all your displays and also open up the other options below.

The “Show taskbar buttons on” drop-down menu contains three options:

- **All taskbars**. When you select this setting, the taskbar will be the same on every display. Each display’s taskbar will show all open windows, no matter which display they’re open on.

- **Main taskbar and taskbar where window is open**. When you select this setting, the taskbar on your primary display will always show all open windows from all displays. Each additional display's taskbar will only show windows open on that display.
- **Taskbar where window is open**. When you select this setting, each display—including your primary display—gets its own independent taskbar. Open windows are only shown on the taskbar on the display on which the window is open.

References:

- <http://howtogeek.com/225568/how-to-configure-and-customize-the-taskbar-in-windows-10/#:~:text=Right-click%20any%20open%20area,off%20to%20suit%20your%20needs> .

Activity 4

Aim: Setting the control panel for - Add/remove hardware - Install/uninstall software - Change properties of peripheral devices - Enable system security - Language and region - Change input methods using language and region (10 Hrs)

Learning outcome: Able to customize PC in Windows and Linux Environment

Duration: 10 hours

List of Hardware/Software requirements:

- 1.PC/Laptop
- 2.Windows /Linux Operating System

Code/Program/Procedure (with comments):

Adding hardware and peripherals

To add a new device to your computer (or view a list of the devices already connected), use these steps:

1. Open **Settings**.
2. Click on **Devices**.
3. Click on **Bluetooth & other** devices.
4. Click the **Add Bluetooth or other devices** button.

Quick Tip: If you're trying to connect a Bluetooth device, make sure to enable "Bluetooth" before trying to connect.

5. Select the device type that you're trying to add, including:

- **Bluetooth** — to set up a mouse, keyboard, pen, or wireless speakers.
 - **Wireless display or dock** — to set up a wireless display, Miracast, or a wireless dock station.
 - **Everything else** — to set up anything that doesn't fall in the first two options. Some of the devices can include, DLNA devices and Xbox controller with a wireless adapter.
6. Select the device from the discovery list.
7. Continue with the easy on-screen directions to complete the setup.

Once you've completed the steps, the system will install the correct driver and configure the device, and you should be able to use it without additional steps.

Adding printers

Although printers fall into the hardware and peripherals category, Windows 10 includes a separate experience to install printers and scanners.

To add a new printer or scanner, make sure the device is turned on and connected, and do the following:

1. Open **Settings**.
2. Click on **Devices**.
3. Click on **Printers & scanners**.
4. Click the **Add a printer or scanner** button.

5. Select the device from the list, and click the **Add device** button.

After completing the steps, the printer will install automatically, and you should be able to print from any application.

Removing hardware and peripherals

To remove a piece of hardware or peripheral from your computer, use these steps:

1. Open **Settings**.
2. Click on **Devices**.
3. Click on **Bluetooth & other devices**.
4. Select the device that you no longer need.
5. Click the **Remove device** button.

6. Click the **Yes** button to confirm.

Once you've completed the steps, Windows 10 will remove the device, and you'll no longer be

able to use it.

Removing printers

If you need to remove a printer, the steps are slightly different:

1. Open **Settings**.
2. Click on **Devices**.
3. Click on **Printers & scanners** devices.
4. Select the printer that you no longer need.
5. Click the **Remove device** button.

6. Click the **Yes** button to confirm.

After completing the steps, Windows 10 will remove the printer completely from your computer.

Install / Uninstall Software

1. Visit [**this Firefox download page**](#) in any browser, such as Microsoft Internet Explorer or Microsoft Edge.
2. Click the **Download Now** button. The Firefox Installer that downloads will automatically offer you the best available version of Firefox for your computer.

- If you use Microsoft Internet Explorer or Microsoft Edge, a notification bar will appear at the bottom of the page with the options to run the installer or save the file to your computer. Click **Run** to start the process.
- In other browsers, you may need to first save the Firefox installer to your computer, then open the file you downloaded.

Note: If you see an *Open File - Security Warning* dialog, click **Open** or **Run**.

3. The *User Account Control* dialog may open, to ask you to allow the Firefox Installer to make changes to your computer. If this dialog appears, click **Yes** to start the installation.

4. Wait for Firefox to finish installing.

Note : The Firefox Installer may contain an Update or Re-install button and an option to restore default settings and remove add-ons, if a very outdated Firefox version or very

old profile data is detected. Clear the checkbox to keep the old data and click **Update** or **Re-install** to start the installation.

5. When the installation is complete, Firefox will open.

Congratulations, you are done installing Firefox! Double-click on the Mozilla Firefox icon whenever you want to go online.

Uninstall Firefox

To uninstall Firefox, follow these steps:

During the uninstall of Firefox you will be given the option to Refresh Firefox, select this option if you are uninstalling Firefox to fix an issue you are experiencing.

1. Close Firefox (if Firefox is open): Click the Firefox menu and select Exit.
2. Click the Windows Start button or press the Windows key .
3. In the Start menu, select Settings.
4. In Settings, select System and then Apps & features.

5. From the list of currently installed programs, select **Mozilla Firefox** .
6. To begin the uninstall, click **Uninstall** .

If the Uninstall Wizard does not run, you can start it manually by running *helper.exe*, which is located in one of these locations by default:

C:\Program Files\Mozilla Firefox\uninstall\helper.exe

C:\Program Files (x86)\Mozilla Firefox\uninstall\helper.exe

7. In the Mozilla Firefox Uninstall Wizard that opens, click **Next** .
8. Click the **Uninstall** button.
 - If Firefox is still open, you must close Firefox to proceed with the uninstall.
9. Click **Finish** .
10. To remove other files and folders that may not be removed by the uninstall, you must manually delete the Firefox installation folder, which is located in one of these locations by default:

- *C:\Program Files\Mozilla Firefox*
- *C:\Program Files (x86)\Mozilla Firefox*

Remove user data and settings

The uninstaller does not remove any user data such as history or bookmarks. If you wish to completely remove this data, you must manually delete the Firefox folder containing your user profile:

1. Click the *Start* button or press the Windows key to open the Start Menu.
2. Type **%APPDATA%** (when you start typing, a Windows search will start) and press **enter** to open the hidden Roaming folder.
3. Open the *Mozilla* folder.
4. Delete the *Firefox* folder.

Alternatively, you can press the Windows key +**R** to open a Run dialog, type in **%APPDATA%\Mozilla** and click **OK** to open the *Mozilla* folder, then delete the *Firefox* folder.

Change properties of peripheral devices

1. Open **Device Manager**. Press the **Windows logo key** and the **R key** simultaneously. This should open a **Run Box (Figure 1)**.

2. Type **devmgmt.msc** and click **OK** or hit **Enter** .
3. **Device Manager** opens
4. Right click on the " **Unknown Device** " and select **Properties** .
5. Select the **Details** tab. In the drop-down box under property, select **Hardware Ids**

6. The top line should list something like: **PCI\VEN_8086&DEV_1916**
7. The numbers in **RED** are the **Vendor ID**, and the numbers in **Green** is the **Device ID**.

Example:

Vendor ID = 8086

Device ID = 1916

8. You can go to the following sites to search for the Vendor and Device.
 - o <https://www.pcilookup.com/>
 - o Catalog.Update.Microsoft.com

9. Once you find the Vendor and Device.

For example, 8086 and 1916 is the Intel Video driver.

You can then download the driver from Dell.com/Support and resolve the "Unknown Device."

Enable System Security

Step 1: Open System Protection Tab

1. Type **control panel** in the Search box, click the result to open this desktop app.
2. Click **System and Security > System > System protection**.

Step 2: Configure Restore Settings

1. Under the **System Protection** tab, choose the target drive.
2. Click the **Configure** button.

Step 3: Enable Windows 7/8/10 System Protection

1. Tick the option **Turn on system protection**.
2. Click the **Apply** and **OK** button.

How to change default system language on Windows 10

Disabling language sync

When you use a Microsoft account on Windows 10, the language settings will sync across devices. In the case that you're planning to change the region and language settings for only one computer, you should disable the option to sync these settings before making any changes to prevent the new configuration from overwriting the settings on your other devices.

To disable language syncing on Windows 10, use these steps:

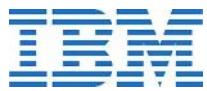
1. Open **Settings**.
2. Click on **Accounts**.
3. Click on **Sync your settings**.
4. Under the "Individual sync settings" section, turn off the "Language preferences" toggle switch.

Once you complete the steps, you can change the language settings without affecting the settings on other devices.

Changing system language

To change the system language on Windows 10, close any running app, and then use these steps:

1. Open **Settings**.
2. Click on **Time & Language**.
3. Click on **Language**.
4. Under the "Preferred languages" section, click the **Add a preferred language** button.
5. Search for the language you want on Windows 10.
6. Select the language package from the result.



13. Sign back into the Windows 10 account.

After you complete the steps, the language will change across the entire Windows 10 experience. The new changes will be reflected in the Sign-in screen, Settings app, File Explorer, Desktop, apps, browser, and websites you visit. Also, depending on your new settings, Windows 10 may prompt you to review your privacy settings again.

Changing region settings

If you're changing the system language because you're located in a different region, you'll also need to update the region settings.

To change the local region settings on Windows 10, use these steps:

1. Open **Settings**.
2. Click on **Time & Language**.
3. Click on **Region**.
4. Use the "Country or region" drop-down menu to select your geographical location if different from your current settings.
5. Under the "Regional format" section, use the drop-down menu to select the correct formats for dates and times if different from your region.

6. Click on **Language** on the left pane.
7. Under the "Related settings" section, in the right pane, click the **Administrative language settings** option.
8. In the "Administrative" tab, click the **Copy settings** button.
9. Under the "Copy your current settings to" section, check the **Welcome screen and system accounts** and **New user accounts** options.

10. Click the **OK** button.
11. Click the **OK** button again.
12. Click the **Restart now** button.

Once you complete the steps, the device will display the correct region settings according to your physical location.

Change input methods using language and region

1. Press the Windows logo key and type Control to search for the **Control Panel** app.
2. Click **Control Panel**.
3. Under **Clock, Language, and Region**, click **Change input methods**.
4. Click **Advanced settings**.
5. Under **Switching input methods**, select the **Use the desktop language bar when it's available** check box, and then click **Options**.
6. In the **Text Services and Input Languages** dialog box, click the **Language Bar** tab, and make sure that either the **Floating On Desktop** or the **Docked in the taskbar** option is selected.

References:

- <https://support.mozilla.org/en-US/kb/how-download-and-install-firefox-windows>
- <https://support.mozilla.org/en-US/kb/uninstall-firefox-from-your-computer>
- <https://www.windowscentral.com/how-add-or-remove-devices-using-settings-app-windows-10>
- <https://www.examcollection.com/certification-training/a-plus-install-configure-computer-peripheral-devices.html>
- <https://www.griffinuga.edu/oit/kb/install-local-printer-windows-7>

Learning Outcome 10 - Able to manage PC in Window/Linux environment

After achieving this learning outcome, a student will be able to manage PC in Window/Linux environment. In order to achieve this learning outcome, a student has to complete the following:

1. Create and format partitions, volumes, assigning drive letters using disk part command (3 Hrs)
2. Browse and Manage event logs using event viewer (2 Hrs)
3. Schedule and maintain automated tasks at specific time using task scheduler.
4. Install and update the drivers for hardware devices using device manager.
5. Stop/start service using SC config command.
6. Create file shares and set permission.

7. Share files to different users and manage.
8. Start/stop application using task manager.
9. Monitor PC performance using task manager.
10. Close programs which are not responding using task manager.
11. Install anti virus.
12. Run a full system scan.
13. Fix browser from redirecting to other websites (browser hijack).
14. Blocking un-trusted network.
15. Block social network websites

Activity 1

Aim: Create and format partitions, volumes, assigning drive letters using disk part command (3 Hrs)

Learning outcome: Able to customize PC in Windows and Linux Environment

Duration: 3 hours

List of Hardware/Software requirements:

1. PC/Laptop
2. Windows /Linux Operating System **Code/Program/Procedure (with comments):**

1. Open **Start**.
2. Search for **Command Prompt**, right-click the top result, and select the **Run as administrator** option.

3. Type the following command to launch DiskPart and press **Enter** :

```
diskpart
```

4. Type the following command to list all the active drives and press **Enter** :

```
list disk
```

5. Type the following command to select the drive that you want to clean and press **Enter** :

```
select disk 0
```

In the command, make sure to replace **0** for the drive number that you want to repair. If you don't perform this step correctly, you could end up wiping out the wrong drive.

Proceed with caution.

6. Type the following command to wipe out the drive and press **Enter** :

```
clean
```

7. Type the following command to confirm the drive still selected and press **Enter** : lisk

```
disk
```

Quick note: The output should include an asterisk (*) next to the selected drive.

8. Type the following command to create a new partition and press **Enter** :

```
create partition primary
```

Type the following command to select the new primary partition and press

Enter : select partition 1

9. Type the following command to make the partition active and press **Enter** :

active

10. Type the following command to format the partition using the NTFS file system, set a drive label, and press **Enter** :

format FS=NTFS label=Data quick

In the command, remember to replace **Data** for the name of the drive as you want to appear in

File Explorer. Also, the **quick** flag is optional for a faster format, and you should not use it if you're not sure the drive good to perform a bad sectors. The only downside about omitting the "quick" option is that formatting will take a very long time.

11. Type the following command to assign a letter and make the drive available in File Explorer and press **Enter** : assign letter=g

In the command, replace **g** with the drive letter that you want to use, which isn't currently assigned by another drive.

12. Type the following command to terminate DiskPart and press **Enter** :exit

13. Type the following command to close Command Prompt and press **Enter** :exit\|

To extend a partition:

1. Verify that contiguous free space is available on the same drive and that free space is next to the partition you intend on extending, with no partitions in between.
2. At a command prompt, type: *Diskpart.exe*
3. At the DISKPART prompt, type: *Select Disk 1* (Selects the disk.)
4. At the DISKPART prompt, type: *Select Volume 1* (Selects the volume.)
5. At the DISKPART prompt, type: *Extend Size=10000* (If you do not set a size, such as the above example for 10 GB, then all available space on the disk will be used.)
6. At the DISKPART prompt, type: *Exit*

Deleting a partition using Diskpart

1. At a command prompt, type: *Diskpart.exe*
2. At the DISKPART prompt, type: *Select Disk 1*
3. At the DISKPART prompt, type: *Select Partition 1*
4. At the DISKPART prompt, type: *DELETE partition*
5. At the DISKPART prompt, type: **Exit Output/Results snippet:**

References:

- <https://searchwindowsserver.techtarget.com/tip/Using-Diskpart-to-create-extend-or-delete-a-disk-partition>
- <https://www.diskpart.com/diskpart/create-partition-4125.html>

Activity 2

Aim: Browse and Manage event logs using event viewer (2 Hrs)

Learning outcome: Able to customize PC in Windows and Linux Environment

Duration: 2 hours

List of Hardware/Software requirements:

3. PC/Laptop

4. Windows /Linux Operating System **Code/Program/Procedure (with comments):**

1. Press  Win + R on the computer.

Result: The **Run** dialog is opened.

2. In the **Open** text field, type in eventvwr and click **OK**.

Result: Event Viewer is opened.

3. Expand the **Windows Logs** node.
4. Select the **Application** node.

Result: The application log is displayed:

5. Click **Filter Current Log...** on the **Actions** pane in the **Application** section to list only the entries that are related to Computer.

Result: The **Filter Current Log** dialog is opened.

6. In the **Event sources** drop-down menu, select all the applications related to Computer.
7. Click **OK** to close the **Filter Current Log** dialog.

Output/Results snippet:

References:

- [https://kb.blackbaud.com/articles/Article/75433#:~:text=To%20access%20the%20Event%20Viewer,\(ex%3A%20Application%2C%20System\)](https://kb.blackbaud.com/articles/Article/75433#:~:text=To%20access%20the%20Event%20Viewer,(ex%3A%20Application%2C%20System))
- <https://www.dummies.com/computers/operating-systems/windows-10/how-to-use-event-viewer-in-windows-10/>

Activity 3

Aim: Schedule and maintain automated tasks at specific time using task scheduler (1 Hr)

Learning outcome: Able to manage PC in Window/Linux environment.

Duration: 1 hour

List of Hardware/Software requirements:

1. Laptop/Computer with Windows OS

Procedure:

To create a task using basic settings on Windows 10, use these steps:

1. Open Start.
2. Search for Task Scheduler, and click the top result to open the experience.
3. Right-click the "Task Scheduler Library" branch, and select the New Folder option.

Image Source: <https://www.windowscentral.com/how-create-automated-task-using-task-scheduler-windows-10>

4. Type a name for the folder. For example, MyTasks. (This step isn't a requirement, but it's a recommended step to keep your tasks separate from the system and apps tasks.)
5. Click the OK button.
6. Expand the "Task Scheduler Library" branch, and select the MyTasks folder.
7. Click the Action menu.
8. Select the Create Basic Task option.

Image Source: <https://www.windowscentral.com/how-create-automated-task-using-task-scheduler-windows-10>

9. In the "Name" field, type a short descriptive name for the task. For example, Notepad Launcher.

Image Source: <https://www.windowscentral.com/how-create-automated-task-using-task-scheduler-windows-10>

10. (Optional) In the "Description" field, create a description for the task.
11. Click the Next button.
12. Select the Monthly option.

Image Source: <https://www.windowscentral.com/how-create-automated-task-using-task-scheduler-windows-10>

Task Scheduler allows you to select from a number of triggers, including on a specific date, during startup, or when you or a particular user signs in. Depending on your requirements, you'll need to configure additional parameters. In this case, we'll be selecting the option to run a task every month.

13. Click the Next button.
14. Using the "Start" settings, specify when the task should start running and the time (very important).
15. Use the "Monthly" drop-down menu to the months of the year that you want to run the task.

Image Source: <https://www.windowcentral.com/how-create-automated-task-using-task-scheduler-windows-10>

16. Use the "Days" or "On" drop-down menu to specify the days that the task will run.

Image Source: <https://www.windowcentral.com/how-create-automated-task-using-task-scheduler-windows-10>

Quick Tip: Using the "On" setting may be your best option if you're planning to run a task during a specific day of the week.

17. Click the Next button.
18. Select the Start a program option to launch an app, run a command, or execute a script file.

Image Source: <https://www.windowscentral.com/how-create-automated-task-using-task-scheduler-windows-10>

You can select the Send an e-mail or Display a message option, but these are deprecated features, which means that they may or may not work because Microsoft is no longer maintaining them.

- a. Send an e-mail: Triggers an email notification with a custom message on schedule, but it requires to specify an email server to work.
 - b. Display a message: Allows to display a text message on the screen on schedule.
19. In the "Program/script" field, specify the path for the application.

Image Source: <https://www.windowcentral.com/how-create-automated-task-using-task-scheduler-windows-10>

Quick Tip: If you don't know the path of the app, click the Browse button to find it.

20. (Optional) In the "Add arguments" field, you can specify arguments to run the task with special instructions.
21. (Optional) In the "Start in" field, specify the folder in which the program will start. (Usually, you can leave this setting empty.)
22. Click the Finish button.

Image Source: <https://www.windowscentral.com/how-create-automated-task-using-task-scheduler-windows-10>

Once you've completed the steps, the task will be saved, and it'll run automatically on the schedule you specified.

Activity 4

Aim: Install and update the drivers for hardware devices using device manager (3 Hrs)

Learning outcome: Able to manage PC in Window/Linux environment.

Duration: 3 hours

List of Hardware/Software requirements:

1. Laptop/Computer with Windows OS.

Procedure:

1. Open Start.
2. Search for the Device Manager and click the top result to open the tool.
3. Double-click the branch with the hardware you want to update.
4. Right-click the hardware and select the Update driver option.

Image Source: <https://www.windowscentral.com/how-properly-update-device-drivers-windows-10#update-drivers-using-device-manager>

5. Click the Search automatically for updated driver software option.

Image Source: <https://www.windowcentral.com/how-properly-update-device-drivers-windows-10#update-drivers-using-device-manager>

After you complete the steps, if a newer update is available, Device Manager will download and install the package automatically similar to Windows Update using the Microsoft servers.

Installing driver from manufacturer:

In the case that the driver isn't available through Windows Update, because it's too recent or available only in beta, you'll need to download and install the package from the manufacturer's support website manually.

When getting an update from a manufacturer support website, you should always attempt to follow their instructions first.

1. Open Start.
2. Search for the Device Manager and click the top result to open the tool.
3. Double-click the branch with the hardware you want to update.
4. Right-click the hardware and select the Update driver option.

Image Source: <https://www.windowscentral.com/how-properly-update-device-drivers-windows-10#update-drivers-using-device-manager>

Click the

5. Browse my computer for driver software option.

Image Source: <https://www.windowcentral.com/how-properly-update-device-drivers-windows-10#update-drivers-using-device-manager>

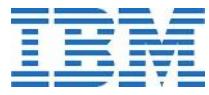
6. Browse button.

Click the

Image Source: <https://www.windowcentral.com/how-properly-update-device-drivers-windows-10#update-drivers-using-device-manager>

7. Select the main folder with the driver files you have extracted earlier.
8. Click the OK button.
9. Check the Include subfolders option to allow the wizard to find the correct ".inf" file with the instructions to update the driver.
10. Next button.

Once you complete the steps, the wizard will detect and install the new driver on your computer to improve the overall experience with fixes, new functionalities, or new support depending on the update and device.



Click the

Activity 5

Aim: Stop/start service using SC config command (1 Hr)

Learning outcome: Able to manage PC in Window/Linux environment.

Duration: 1 hours

List of Hardware/Software requirements:

1. Laptop/Computer with Windows 10 OS

Procedure:

Command Prompt offers the "net" command (older) to stop or start, or the "sc" command (newer) to stop, start, disable, or enable services on Windows 10.

Start service

To start a service with the command line, use these steps:

1. Open Start.
2. Search for Command Prompt, right-click the top result, and select the Run as administrator option.
3. Type the following command to start a service and press Enter:
`net start "SERVICE-NAME"`

In the command, replace "SERVICE-NAME" for the name or display name of the service. You only need the quotation marks if there's a space within the name.

For example, this command starts the printer spooler using the service name:

```
net start "spooler"
```

Image Source: <https://www.windowscentral.com/how-start-and-stop-services-windows-10>

Alternatively, you can also use the "sc" command:

```
sc start "SERVICE-NAME"
```

For example, this command starts the printer spooler using the service name:

```
sc start "spooler"
```

Image Source: <https://www.windowscentral.com/how-start-and-stop-services-windows-10>

Once you complete the steps, the command will execute and start the service you specified.

Stop service

To stop a Windows 10 or app service with Command Prompt, use these steps:

1. Open Start.
2. Search for Command Prompt, right-click the top result, and select the Run as administrator option.
3. (Optional) Type the following command to view a list of all the services and press Enter:
`sc queryex state=all type=service`

Image Source: <https://www.windowscentral.com/how-start-and-stop-services-windows-10>

4. Type the following command to stop a service and press Enter:

```
net stop "SERVICE-NAME"
```

In the command, replace "SERVICE-NAME" for the name or display name of the service. You only need the quotation marks if there's a space within the name.

For example, this command stops the printer spooler using the service name:

```
net stop "spooler"
```

Image Source: <https://www.windowscentral.com/how-start-and-stop-services-windows-10>

Alternatively, you can also use the more advanced "sc" command:

```
sc stop "SERVICE-NAME"
```

For example, this command stops the printer spooler using the service name:

```
sc stop "spooler"
```

Image Source: <https://www.windowscentral.com/how-start-and-stop-services-windows-10>

After you complete the steps, the command will stop the specified service on Windows 10.

Activity 6

Aim: Create file shares and set permission (1 Hr)

Learning outcome: Able to manage PC in Window/Linux environment.

Duration: 1 hour

List of Hardware/Software requirements:

1. Laptop/Computer with Windows 10 OS.

Procedure:

1. Create a local folder on your server computer. For example, create a folder called Edunet on the C:\ drive.
2. Right click the folder, and then click Properties.
3. Click the Sharing tab, and then click Share.
4. Enter the name of your Windows user, and click Add.
5. In the Permission level column, select Read/Write, then click Share.

Image Source: <https://www.businessnewsdaily.com/11020-create-file-share-windows-server-2016.html>

Ensure that permissions on the folder, subfolders, and files are set to full control for the user account you selected.

To do this:

1. Click the Security tab.
2. Select the user account you want to use for the installation.
3. Click Advanced and check that your user has full control and that this permission applies to the folder, subfolders, and files.
4. Click the Effective Access tab and then click Select a user and enter your user account name.
5. Click View effective access and check in the Permission column that your user has full control.

Activity 7

Aim: Share files to different users and manage (1 Hr)

Learning outcome: Able to manage PC in Window/Linux environment.

Duration: 1 hour

List of Hardware/Software requirements:

1. Laptop/Computer with Windows 10 OS

Procedure:

Create a New Folder

In many cases you will need to create a new folder. If you are using an existing folder and do not wish to create a new folder, continue with Accessing the Properties Dialog Box.

1. Click on the Start menu.
2. Click Computer.
3. From the Computer window, select the shared drive for your area or department (S Drive or W Drive).
4. Navigate to the location you want the new folder to appear (e.g., within one of your existing folders).
5. On the menu bar, select New Folder.

OR

Right click » select New » select Folder.

A new folder is created which inherits the security permissions of its "parent."

6. In the newly created folder, type the desired folder name.
7. Press [Enter] or click off of the folder.

Accessing the Properties Dialog Box

When working with permissions in Windows 7, you are required to work from the Properties dialog box. This dialog box for the file or folder you are working with can be accessed in a few steps.

1. Click on the Start menu.
2. Click Computer.
3. Select the folder or file you wish to adjust/view permissions for.
4. Right-click the folder or file.
5. Select Properties.

The Properties dialog box appears.

Granting Access to a File or Folder

After creating a new folder, or even if you will use an existing folder, you will need to determine who will have access to it. Also, keep in mind that by default the same persons who have access to the "parent" (original) folder also have access to the new folder, and vice versa. This may not be ideal. It is a simple process to grant access to specific users for any folder you have created.

1. Access the Properties dialog box.
2. Select the Security tab.

Image Source: <https://www.uwec.edu/kb/article/drives-establishing-windows-file-and-folder-level-permissions/>

3. Click Edit.
The security tab opens in a new window.
4. Click Add...
The Select Users, Computers, or Groups dialog box appears.

Image Source: <https://www.uwec.edu/kb/article/drives-establishing-windows-file-and-folder-level-permissions/>

5. In the Enter the object names to select the text box, type the name of the user or group that will have access to the folder (e.g., 2125.engl.498.001 or username@uwec.edu).

HINT: You may type the beginning of the name and then click **Check Names**. The name will either be resolved or a list of users beginning with those characters will display for you to select from.

6. Click **OK**.
The Properties dialog box reappears.
7. Click **OK** on the Security window.

8. Continue with Setting Permissions below.

Setting Permissions

Once you have granted a group or individual user access to a folder, you will need to set permissions for the new user(s). When you set permissions, you are specifying what level of access a user(s) has to the folder and the files within it. Be careful about checking Deny for any permissions, as the Deny permission overrides any other related to Allow permissions.

Folder permissions can be changed only by the owner of the folder (i.e., the creator) or by someone who has been granted permission by the owner. If you are not the owner of the folder or have not been granted permission by the owner, all checkboxes will be gray. Therefore, you will not be able to make any changes until the owner grants you permission.

1. Access the Properties dialog box.
2. Select the **Security** tab.

The top portion of the dialog box lists the users and/or groups that have access to the file or folder.

3. Click **Edit**

Image Source: <https://www.uwec.edu/kb/article/drives-establishing-windows-file-and-folder-level-permissions/>

4. In the Group or user name section, select the user(s) you wish to set permissions for
5. In the Permissions section, use the checkboxes to select the appropriate permission level
6. **Click Apply**
7. **Click Okay**

The new permissions are added to the file or folder.

Activity 8

Aim: Start/stop application using task manager (1 Hr)

Learning outcome: Able to manage PC in Window/Linux environment.

Duration: 1 hour

List of Hardware/Software requirements:

1. Laptop/Computer with Windows 10 OS

Procedure:

Opening Task Manager:

Here are a few ways to open Task Manager:

- Right-click the Taskbar and click on Task Manager.
- Open Start, do a search for Task Manager and click the result.
- Use the Ctrl + Shift + Esc keyboard shortcut.
- Use the Ctrl + Alt + Del keyboard shortcut and click on Task Manager.
- Use the Windows key + X keyboard shortcut to open the power-user menu and click on Task Manager.

Image Source: <https://www.windowscentral.com/how-identify-and-terminate-high-resource-processes-using-task-manager-windows-10>

Image Source: <https://www.windowscentral.com/how-identify-and-terminate-high-resource-processes-using-task-manager-windows-1>

Right-click the process, and select End task to terminate it. Alternatively, you can simply select the item and click the End task button in the bottom-right corner.

Activity 9

Aim: Monitor PC performance using task manager (1 Hr)

Learning outcome: Able to manage PC in Window/Linux environment.

Duration: 1 hour

List of Hardware/Software requirements:

1. Laptop/Computer with Windows 10 OS.

Procedure:

Opening Task Manager

On Windows 10, you can use Task Manager for an array of tasks, including to view real-time data on your computer's performance, but first, you need to know how to open the tool. Below are a few ways to open Task Manager:

- Right-click the Taskbar and click on Task Manager.
- Open Start, do a search for Task Manager and click the result.
- Use the Ctrl + Shift + Esc keyboard shortcut.
- Use the Ctrl + Alt + Del keyboard shortcut and click on Task Manager.
- Use the Windows key + X keyboard shortcut to open the power-user menu and click on Task Manager.

If you never open this tool before, you're likely to see Task Manager in compact mode. To get to Performance, you need to click the More details button, and then click on the Performance tab.

Image

Source: <https://www.windowscentral.com/how-use-windows-10-task-manager-monitor-system-performance>

How to monitor system performance

In the Performance tab, you can monitor four main components, including processor, memory, hard drive, network (and Bluetooth).

On the left pane by default, you'll see all the components with small graphs displaying their current activity in percentage for CPU, Memory, and Disk, and Kilobits per second for network adapters and Bluetooth devices providing visuals to quickly identify any spikes on resources.

Image Source: <https://www.windowscentral.com/how-use-windows-10-task-manager-monitor-system-performance>

You can always right-click below the components to access the context menu to change the view and hide the graphs or only to show a summary, which can come in handy if you want to keep Task Manager open at all times.

Image Source: <https://www.windowscentral.com/how-use-windows-10-task-manager-monitor-system-performance>

Also, in any section, you can double-click or right-click a graph and select Graph summary view to see only a compact graph with the component activity information.

Image Source: <https://www.windowscentral.com/how-use-windows-10-task-manager-monitor-system-performance>

Quick Tip: If you need to document any information, instead of taking a screenshot, you can right-click anywhere in a section and click Copy from the context menu. Then simply paste the information in a text file for later use.

Here's the breakdown of each section in the Performance tab:

CPU

The CPU section provides details about the processor and resource utilization. In the top-right corner you'll see exactly which processor your computer is using and the clock speed it was designed to run.

Image Source: <https://www.windowscentral.com/how-use-windows-10-task-manager-monitor-system-performance>

The graph shows the overall utilization of the processor over a 60 second period. In addition, you can right-click anywhere inside the section, select Change graph to, and click Logical processors to view a graph for each core of your processor.

Image Source: <https://www.windowscentral.com/how-use-windows-10-task-manager-monitor-system-performance>

The context menu also offers an option to show kernel times, which you would typically use to troubleshoot devices with poorly written drivers or failing hardware that is causing too many interruptions.

Image Source: <https://www.windowscentral.com/how-use-windows-10-task-manager-monitor-system-performance>

At the bottom, you'll see more details about the processor resources, including percentage utilization, processes, threads, handles, and your computer up time.

On the right, you can see the processor specifications, such as speed, the number of cores (virtual processors), if it's capable of running virtual machines, and cached memory information if applicable.

Image Source: <https://www.windowscentral.com/how-use-windows-10-task-manager-monitor-system-performance>

Memory

Memory offers a view of the RAM usage by the system and applications. In the top-right corner, you'll see the total amount and type (e.g. DDR3) of memory installed on your device.

Image Source: <https://www.windowscentral.com/how-use-windows-10-task-manager-monitor-system-performance>

In this section, you'll notice that there are two graphs. The first one on the top shows total memory usage over a 60 second period, and the graph below shows the amount of memory is currently allocated.

The memory composition has four parts:

- In use (Compressed): Amount of RAM currently being used by applications, drivers, or the operating system.
- Modified: Memory content that has to be saved to the hard drive before it can be used for something else.
- Standby: Amount of memory that contains cached data and code not being used by the system.
- Free: Shows memory currently not in use.

You can always see these details by hovering with the mouse over each section of the graph.

Image Source: <https://www.windowscentral.com/how-use-windows-10-task-manager-monitor-system-performance>

At the bottom, you'll also find detailed information about your computer's memory usage, including "In use (Compressed)," "Committed," "Cached," "paged pool" and "non-paged pool" memory.

On the right, you can also see memory specifications, such as speed (e.g. 1600MHz), slots available, memory form factor (e.g. SODIMM), and memory reserved for hardware on the right side. The details provided on this page not only give you an overview of memory usage in real-time, but you can use this information at the time you need to upgrade your system.

For example, the "Slots used," tells you whether or not your computer has slots available to add more memory. "Speed," "Form Factor," and memory type are important information at the time to purchase the correct memory sticks to upgrade your computer.

Image Source: <https://www.windowscentral.com/how-use-windows-10-task-manager-monitor-system-performance>

Disk

The Disk section provides important information about hard drive usage. Task Manager doesn't group multiple hard drives into a single view, which means that you'll get a Disk section for each hard drive installed on your computer.

On the top-right corner, you'll see exactly the hard drive your computer is using, the interface type (e.g. mSATA), and capacity in Gigabytes.

This section includes two graphs. The first graph from the top shows you the hard drive activity over a 60 second period. The second graph shows you the transfer speeds in Kilobytes per second over a 60 second period.

Image Source: <https://www.windowscentral.com/how-use-windows-10-task-manager-monitor-system-performance>

At the bottom of the section, you'll also find detailed information, including the percentage of drive active time, the average speed that it takes the hard drive to respond to a request, and read and write speeds.

Image Source: <https://www.windowscentral.com/how-use-windows-10-task-manager-monitor-system-performance>

Additionally, you get information on actual usable capacity after the drive is formatted, and "System disk" displays whether the drive is where Windows 10 is installed, or if it's a secondary drive.

Ethernet/Wi-Fi

Task Manager doesn't group multiple network adapters into a single view, which means that you'll get a section for each Ethernet or Wi-Fi adapter installed on your computer. Even virtual network adapters will list separately.

When you select a network adapter, you'll notice the name of your Wi-Fi or Ethernet adapter in the top-right corner.

There is only one graph in this section that shows you the throughput of the adapter over a 60 second period.

Below the main graph, you also get information about data sent and received in Kilobits per second. Additional details include adapter name, connection type, and your current IPv4 and IPv6 addresses.

Image Source: <https://www.windowscentral.com/how-use-windows-10-task-manager-monitor-system-performance>

Advanced users can also right-click the graph and select "View network details" to see more network details that can help troubleshoot network problems, such as link speed, state, bytes generated, sent and received, along with unicast packets information.

Image Source: <https://www.windowscentral.com/how-use-windows-10-task-manager-monitor-system-performance>

Bluetooth

In the Performance tab, you'll also notice that there is a Bluetooth section, which is probably showing as "Not connected," even though you have connected a Bluetooth device to your computer. The reason is that this is actually a network adapter, and it's not meant for peripherals like speakers, keyboard, and mouse.

You will see additional information in the Bluetooth section when you connect your phone or another device, and you begin transferring data.

Activity 10

Aim: Close programs which are not responding using task manager (1 Hr)

Learning outcome: Able to manage PC in Window/Linux environment.

Duration: 1 hour

List of Hardware/Software requirements:

1. Laptop/Computer with Windows 10 OS.

Procedure:

1. Press **Ctrl** + **Shift** + **Esc**. This will open Task Manager.

Alternatively, press **Ctrl** + **Alt** + **Delete**, then click on "Start Task Manager."

Image Source: <https://www.wikihow.com/Close-a-Program-That-Is-Not-Responding-in-Windows-7>

2. Click on the unresponsive program. It should become highlighted.

If there are additional unresponsive programs, Ctrl +Click on the additional programs. Any action you initiate will be performed on all the highlighted items and only on the highlighted items.

Image Source: <https://www.wikihow.com/Close-a-Program-That-Is-Not-Responding-in-Windows-7>

3. Click End Task. The computer will try to shut down the selected program(s).

Activity 11

Aim: Install anti virus (2 Hrs)

Learning outcome: Able to manage PC in Window/Linux environment.

Duration: 2 hours

List of Hardware/Software requirements:

1. Laptop/Computer with Windows 10 OS.
2. Any Anti Virus

Procedure:

1. Choose the anti virus you want to install in your PC/Laptop.

2. Search that choosed anti virus name in google search and navigate to its website.
3. In that website lookout for the download option.
4. Once you find the download option download that anti virus in your machine.
5. After downloading, right-click the downloaded setup file (.exe) and select Run as administrator from the context menu.

In our example anti virus is **Avast**

Image Source: <https://support.avast.com/en-us/article/Install-Free-Antivirus/>

6. If prompted for permission by the **User Account Control** dialog, click **Yes**

Image Source: <https://support.avast.com/en-us/article/Install-Free-Antivirus/>

7. To change the default setup language, click the current language in the top-right corner of the screen. Then, click **Install** to proceed with default installation, or click **Customize** if you need to make changes to the default setup.

Image Source: <https://support.avast.com/en-us/article/Install-Free-Antivirus/>

8. Wait while setup installs Avast Free Antivirus on your PC.

Image Source: <https://support.avast.com/en-us/article/Install-Free-Antivirus/>

9. Once the installation is complete, click **Continue** on the **You're protected** screen.

Image Source: <https://support.avast.com/en-us/article/Install-Free-Antivirus/>

10. Review the Avast Privacy Policy and click **I Agree** if you are happy to share anonymous user data with Avast and other third-parties. If you do not want to share user data, click **No, Thanks**.

Image Source: <https://support.avast.com/en-us/article/Install-Free-Antivirus/>

11. Click **Run First Scan** to trigger a comprehensive Smart Scan to detect viruses, malware, bad browser add-ons, and other issues on your PC.

Image Source: <https://support.avast.com/en-us/article/Install-Free-Antivirus/>

Avast Free Antivirus is now installed on your PC and ready to use, but some components may not fully function until you restart your PC.

Activity 12

Aim: Run a full system scan (2 Hrs)

Learning outcome: Able to manage PC in Window/Linux environment.

Duration: 2 hours

List of Hardware/Software requirements:

1. Laptop/Computer with Windows 10 OS.

2. Any Anti Virus **Procedure:**

Run a Full Computer Scan

The 'Full System Scan' scans every local drive, folder and file on your system. Any external devices like USB drives, digital cameras and so on are also scanned.

You can customize the items scanned during a 'Full System Scan' and set-up a scan schedule from the 'Advanced Tasks' interface.

In our example anti virus is Comodo Internet Security

Click 'Scan' from the General Tasks interface and click 'Full System Scan' from the 'Scan' interface.

Image Source: <https://help.comodo.com/topic-72-1-451-4710-.html>

The scanner will start and first check whether your virus signature database is up-to-date

Image Source: <https://help.comodo.com/topic-72-1-451-4710-.html>

If the database is outdated, CIS will first download and install the latest database before commencing the virus scan.

Image Source: <https://help.comodo.com/topic-72-1-451-4710-.html>

You can Pause, Resume or Stop the scan by clicking the respective buttons. If you want to run the scan in the background, click 'Send to Background'.

Image Source: <https://help.comodo.com/topic-72-1-451-4710-.html>

You can still view scan progress by clicking 'Task Manager' on the home screen.

Image Source: <https://help.comodo.com/topic-72-1-451-4710-.html>

On completion of scanning, if any threats are found, an alert screen will be displayed. The alert will display the number of threats/infections discovered by the scanning and provide you the options for cleaning.

Image Source: <https://help.comodo.com/topic-72-1-451-4710-.html>

- If you wish to have a skilled professional from Comodo to access your system and perform an efficient disinfection, click 'Yes, I want an expert to clean it'. If you are a first-time user, you will be taken to Comodo GeekBuddy webpage to sign-up for a GeekBuddy subscription. If you have already signed-up for GeekBuddy services, the GeekBuddy chat session will start and a skilled technician will offer to clean your system.

For more details on GeekBuddy, refer to the section Comodo GeekBuddy .

- If you wish to clean the infections yourself, select 'No, I will try to clean it myself'. The scan results screen will be displayed.

Image Source: <https://help.comodo.com/topic-72-1-451-4710-.html>

The scan results window displays the number of objects scanned and the number of threats (Viruses, Rootkits, Malware and so on). You can choose to clean, move to quarantine or ignore the threat based on your assessment. Refer to Processing the infected files for more details.

Activity 13

Aim: Fix browser from redirecting to other websites (browser hijack) (2 Hrs)

Learning outcome: Able to manage PC in Window/Linux environment.

Duration: 2 hours

List of Hardware/Software requirements:

1. Laptop/Computer with Windows 10 OS.

Procedure:

Well, many hijacking software does not leave the system quite quickly. Even after uninstalling this hijacking software, some settings might be difficult to revoke. So you will need to set your browser setting to default in such cases. This will bring it back to its normal state.

Follow the steps below to reset your chrome browser settings to

default.

- A) Open chrome browser.
- B) Go to setting menu.
- C) Click reset setting.
- D) A box will appear.
- E) Reset the settings from there.

Activity 14

Aim: Blocking un-trusted network (2 Hrs)

Learning outcome: Able to manage PC in Window/Linux environment.

Duration: 2 hours

List of Hardware/Software requirements:

1. Laptop/Computer with Windows 10 OS.

Procedure:

A computer network enables users to share information and devices between computers and other users within the network. Obviously, there are certain computer networks that you need to 'trust' and grant access to - for example your home or work network. Unfortunately, there may be other, untrustworthy networks that you want to restrict communication with - or even block entirely.

The 'Blocked Network Zones' area allows you to:

Deny access to a specific network by selecting a pre-existing network zone and designating it as blocked

Deny access to a specific network by manually defining a new blocked zone

To access the Blocked Zones interface

- 1.Click the 'Blocked Zones' tab from Firewall Tasks > Network Security Policy interface.

Image Source: <https://help.comodo.com/topic-72-1-284-3020-.html>

Note 1: You must create a zone before you can block it. There are two ways to do this;

1. Using 'Network Zones' to name and specify the network you want to block.
2. Directly from this interface using 'New blocked address...'

Note 2: You cannot reconfigure pre-existing network zones from this interface. (e.g., to add or modify IP addresses). You need to use 'Network Zones' if you want to change the settings of existing zones.

To deny access to a specific network by selecting a pre-existing network zone and designating it as blocked

1. Click the 'Add' button at the top right and select 'Network Zones' then the particular zone you wish to block.

Image Source: <https://help.comodo.com/topic-72-1-284-3020-.html>

The selected zone appears in the main interface.

Image Source: <https://help.comodo.com/topic-72-1-284-3020-.html>

2. Click 'Apply' to confirm your choice. All traffic intended for and originating from computers or devices in this zone are now blocked.

To deny access to a specific network by manually defining a new blocked zone

1. Click the 'Add' button at the top right and select 'A New Blocked Address' (Default = Any Address). The Exclude checkbox will be enabled only if any other choice is selected from the drop-down box. This launches the following dialog where you can select the IP address(es), IP Subnet Masks, Host Name or MAC address that you wish to block from the Type drop-down box.

Image Source: <https://help.comodo.com/topic-72-1-284-3020-.html>

2. Enter the IP address that you wish to block.

Image Source: <https://help.comodo.com/topic-72-1-284-3020-.html>

After clicking 'Apply' to confirm your choice, the address(es) you blocked appears in the main interface. You can modify these addresses at any time by selecting the entry and clicking 'Edit'.

Image Source: <https://help.comodo.com/topic-72-1-284-3020-.html>

3. Click 'OK' to confirm your choice. All traffic intended for and originating from computers or devices in this zone are now blocked.

Activity 15

Aim: Block social network websites (2 Hrs)

Learning outcome: Able to manage PC in Window/Linux environment.

Duration: 2 hours

List of Hardware/Software requirements:

1. Laptop/Computer with Windows 10 OS.
2. Anti Virus

Procedure:

Block / Allow Specific Websites to Specific Users

Define website categories

1. Click 'Settings' on the CIS home screen
2. Click 'Website Filtering' > 'Categories'
3. Click 'Add' > 'Add Category':

Image Source: <https://help.comodo.com/topic-72-1-766-9082-.html>

4. Enter a name for the category and click 'OK'. The new category will be listed in the categories tab.
5. Select the new category > Click 'Add' from the options at the top > Choose 'Add Website' from the drop-down. The 'Add Website' dialog will open:

Image Source: <https://help.comodo.com/topic-72-1-766-9082-.html>

6. Type the website or text string you wish to add to the category. See the following notes for advice on this:
 - Enter a FQDN to filter a specific domain. For example, www.example.com
 - Place an asterisk in front of the URL to include all subdomains of the website. For example, *.friskywenches.com will cover friskywenches.com, pictures.frisky wenches.com, videos.friskywenches.com and so on. The asterisk is also known as a wildcard character
 - Place an asterisk before a keyword to cover all URLs that start with a specific string. For example, "pizza*" will cover 'pizzahut.com', pizzacorner.com, and so on
 - Place asterisks before and after the keyword to cover all sites that contain the string. For example, "*pizza*" will cover hotpizzanow.com, spicypizzadishes.net and so on
7. Repeat the process to add more websites to the category.
8. Repeat the process to add more website categories
9. Click 'OK' in the 'Advanced Settings' interface to save your settings

Create rules to block or allow websites to specific users

1. Click 'Settings' on the CIS home screen.
2. Click 'Website Filtering' on the left.
3. Ensure that the 'Enable Website Filtering' checkbox is selected.
4. Click the 'Rules' tab and click 'Add' from the options at the top. The 'Website Filtering Rule' dialog will be opened.

Image Source: <https://help.comodo.com/topic-72-1-766-9082-.html>

5. Enter a name for your new filter in the 'Website Filtering Rule' dialog.
6. Select the categories that should be added to the filter:
 - Click 'Add' under the Categories'.

Image Source: <https://help.comodo.com/topic-72-1-766-9082-.html>

The 'categories' window contains a list pre-defined Comodo categories and any user created categories. Comodo categories cannot be modified.

- Safe Sites - Websites that are considered safe according to the global whitelist
- Phishing Sites - Fake copies of popular banking, shopping and social media websites that intend to steal customer data
- Malware Sites - The URL leads to a direct malware download. Malware is designed to damage your computer, steal sensitive information or gain unauthorized access to your system.
- Exclusions - Websites you have decided to trust and allow connections to for the current session and future sessions.
- PUA Sites - Sites that host 'Potentially Unwanted Applications' (PUA). While not strictly speaking malware, a PUA is a piece of software that has functionality that may not have been made clear to a user. An example is a browser toolbar which tells you the weather forecast, but which also tracks your online activity or serves you adverts.
- Malicious Sites - Sites that are known to host or contain links to malware, malicious scripts or deceptive content. These are intended to cause damage to your computer or steal personal data.
- Suspicious Sites - Sites which have shown strong evidence of suspicious behavior but have not yet hosted content which would warrant placing them in the 'Malware' or 'Malicious' categories. Users are advised to be on high alert should they visit these sites.
- Select a category and click 'OK' to add it to your rule. Repeat the process to add more categories.

7. Add Users or User Groups to whom the rule should be applied:

- Click 'Add' from the options at the top beneath the 'Restrictions' pane. The 'Select User or Group' dialog will appear:

Image Source: <https://help.comodo.com/topic-72-1-766-9082-.html>

- Enter the names of users to whom the filter should apply in the 'Enter the object name to select' box. Use the format [domain name]/[user/group name] or [user/group name]@[domain name]. Alternatively, click 'Advanced' then 'Find Now' to locate specific users.

Image Source: <https://help.comodo.com/topic-72-1-766-9082-.html>

- After adding users or groups, you need to specify what restriction will apply to them. You can allow or block them from viewing the websites in the category or ask them if they want to continue. This is done by modifying the link in the 'Restrictions' column:

Image Source: <https://help.comodo.com/topic-72-1-766-9082-.html>

- Allow - The websites in the categories can be accessed by the user.
- Block - The websites in the categories cannot be accessed by the user.
- Ask - An alert will be displayed in the browser if the user tries to access any of the websites in the category. The user can decide whether or not to continue.
- Use the 'Logging' switch to choose whether or not attempts to access a categorized website are logged.

8. Click 'OK' to save your new rule. The new rule will be added to the list of rules under the 'Rules' tab

9. Ensure that the rule is enabled using the toggle switch under the 'Enable Rule' column for the rule to take effect.

You can disable or enable rules at any time using the switch under the 'Enable Rule' column.

Block/allow Websites Selectively to Users of Your Computer

To define website categories

1. Open the 'Tasks' interface by clicking the green curved arrow at top right of the 'Home' screen.
2. Open 'Firewall Tasks' by clicking 'Firewall Tasks' from the Tasks interface and click 'Open Advanced Settings'.
3. Click 'Website Filtering' under Firewall from the left hand side pane.
4. Ensure that the 'Enable Website Filtering' checkbox is selected.
5. Click the 'Categories' tab from the 'Website Filtering' interface.

Image Source: <https://help.comodo.com/topic-72-1-522-6408-.html>

6. Click the handle from the bottom center of the 'Categories' pane, click 'Add' from the options and choose 'Add Category' from the drop-down. The 'Edit Property' dialog will open.

Image Source: <https://help.comodo.com/topic-72-1-522-6408-.html>

7. Enter a name for the category and click OK. The new category will be created and added under the 'Categories' tab.

8. Select the category, click the handle at the bottom of the 'Categories' pane, click 'Add' then choose 'Add Website' from the drop-down menu. The 'Add Website' dialog will open:

Image Source: <https://help.comodo.com/topic-72-1-522-6408-.html>

9. Enter the full URL or a part of URL with a wildcard character '*' of the website(s) to be included in the category.
 - To add a specific website/webpage, enter the full URL of the website/webpage
 - To include all subdomains of a website, add a wildcard character and a period in front of the URL. For example, *.friskywenches.com will cover friskywenches.com, login.friskywenches.com, pictures.frisky wenches.com, videos.friskywenches.com and so on.
 - To include all the websites with URLs that start with a specific string, add a wildcard character after the string. For example, “pizza*” will cover 'pizzahut.com', pizzacorner.com, and so on.
 - To include all the websites with URLs that contain a specific string, add the wildcard character before and after the string. For example, “*pizza*” will cover hotpizza.com, spicypizza.com and so on.

The website(s) will be added to the category.

10. Repeat the process to add more websites.
11. Click OK in the 'Advanced Settings' interface to save your settings

To create rules for selectively blocking or allowing websites to users

1. Open 'Firewall Tasks' by clicking 'Firewall Tasks' from the Tasks interface and click 'Open Advanced Settings'.
2. Click 'Website Filtering' under Firewall from the left hand side pane.
3. Click the 'Rules' tab from the 'Website Filtering' interface.
4. Click the handle at the bottom of the Rules interface and select 'Add':

Image Source: <https://help.comodo.com/topic-72-1-522-6408-.html>

5. Enter a name for your new filter in the 'Website Filtering Rule' dialog.

Image Source: <https://help.comodo.com/topic-72-1-522-6408-.html>

6. Select the categories that should be added to the filter:

- Click the handle at the bottom of the 'Category' pane and choose 'Add'.

Image Source: <https://help.comodo.com/topic-72-1-522-6408-.html>

- Select a category and click 'OK' to add it to your rule. Repeat the process to add more categories.

The 'categories' window contains a list predefined Comodo categories and any user created categories. Comodo categories cannot be modified.

- Comodo Safe Sites - Websites that are considered safe according to global whitelist
- Comodo Phishing Sites - Websites that lead to phishing websites, as per dynamically updated Comodo Blacklist
- Comodo Malware Sites - Websites that may inject malware into your system, as per dynamically updated Comodo Blacklist

7. Add Users or User Groups to whom the rule should be applied:

- Click the handle at the bottom of the 'Restrictions' pane and click 'Add'.
The 'Select User or Group' dialog will appear:

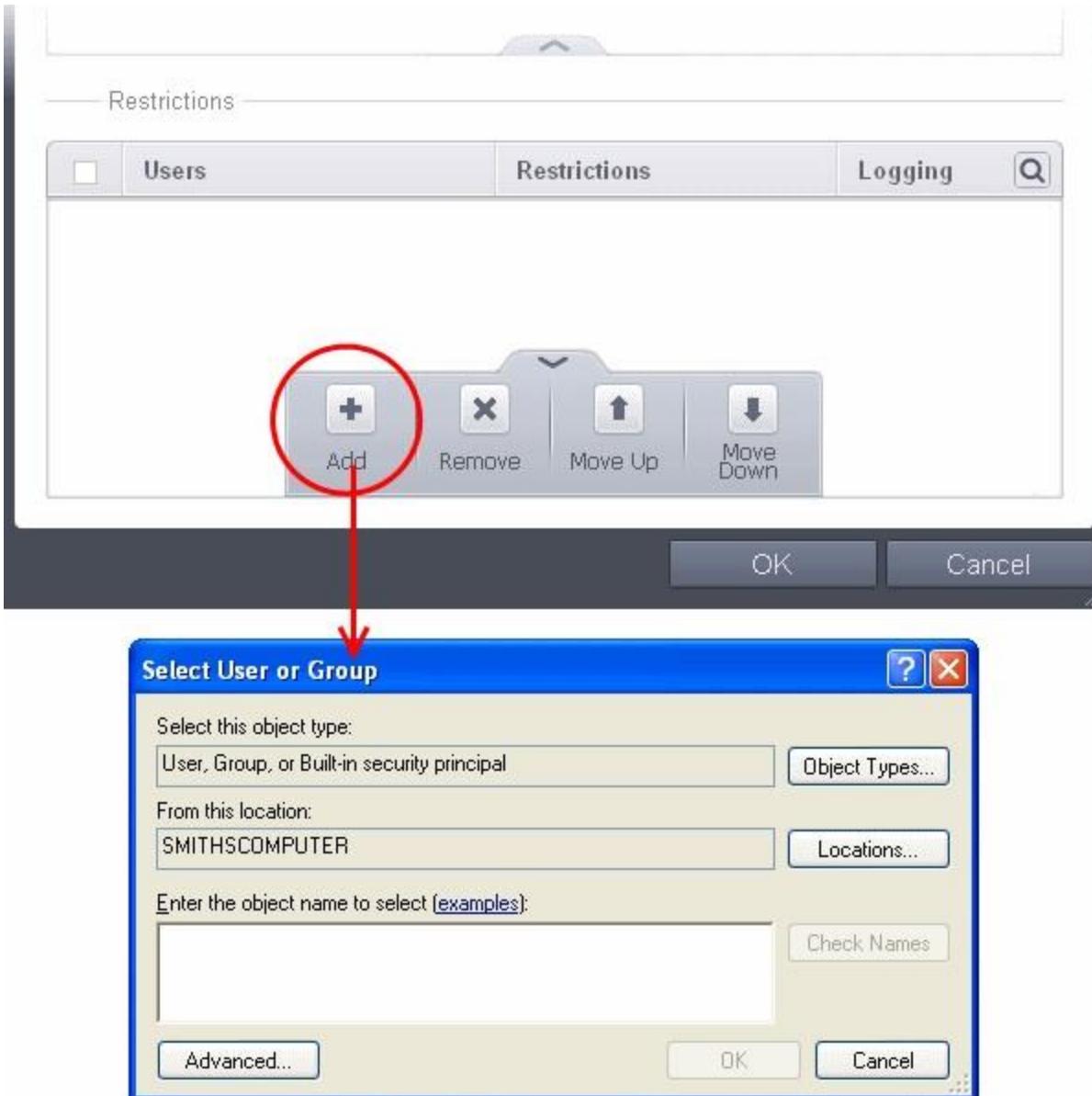


Image Source: <https://help.comodo.com/topic-72-1-522-6408-.html>

- Enter the names of the users to whom the filter is to be applied in the 'Enter the object name to select' text box with the format or @. Alternatively, click 'Advanced' then 'Find Now' to locate specific users. Click 'OK' to confirm the addition of the users.

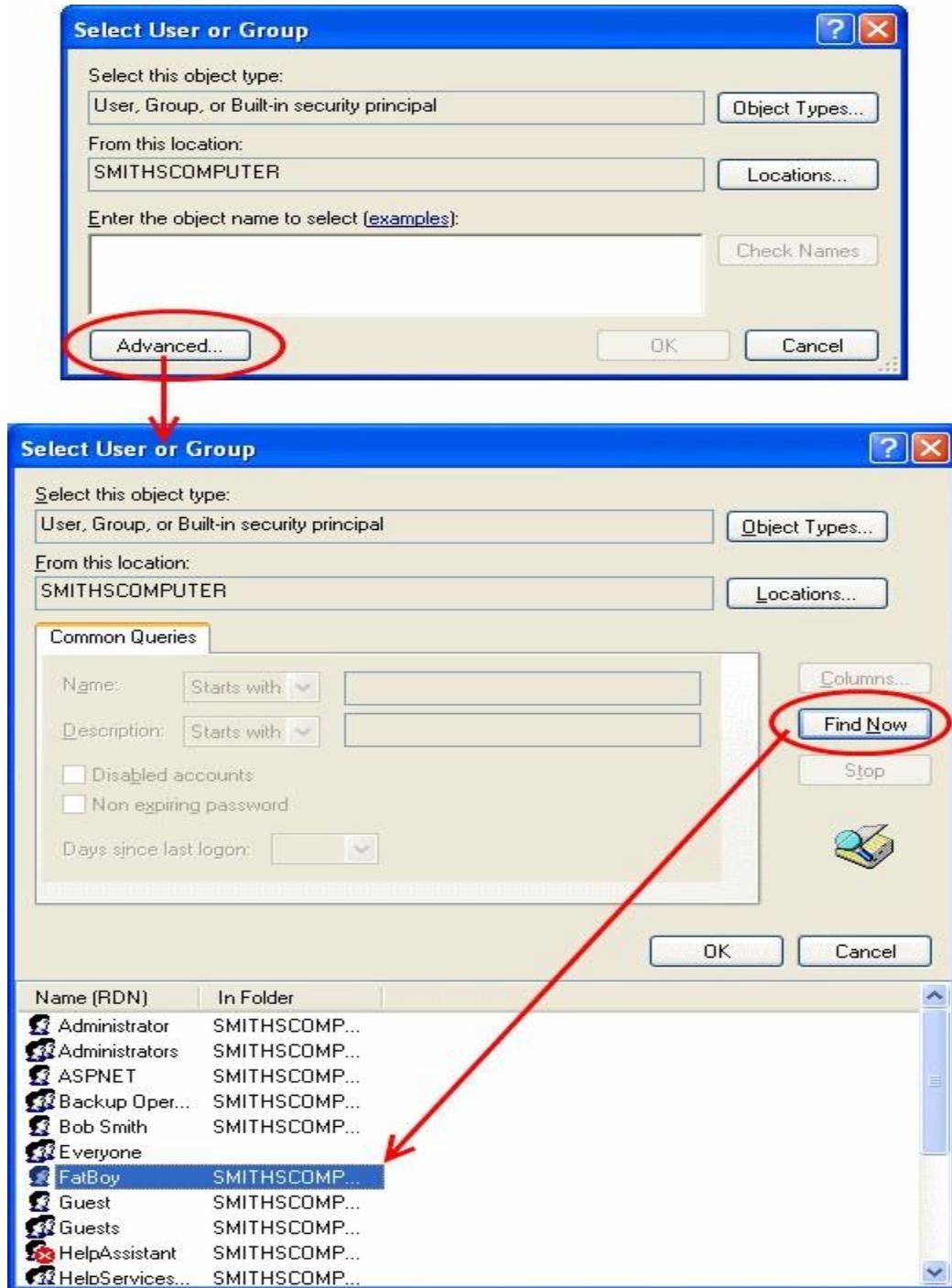


Image Source: <https://help.comodo.com/topic-72-1-522-6408-.html>

- After adding target users or groups, you next need to specify whether those users should be allowed or blocked from viewing the websites in the category or they should be asked if they want to continue. This is done by modifying the link in the 'Restrictions' column:

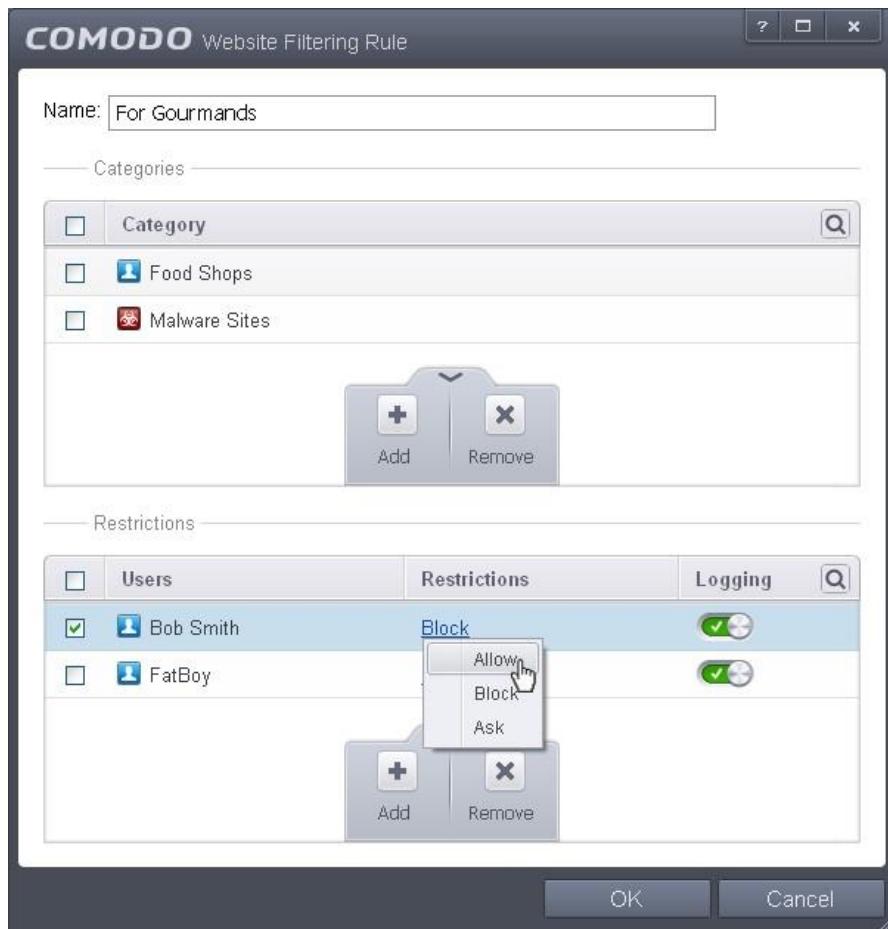


Image Source: <https://help.comodo.com/topic-72-1-522-6408-.html>

Allow - The websites in the categories can be accessed by the user.

Block - The websites in the categories cannot be accessed by the user.

Ask - An alert will be displayed in the browser if the user tries to access any of the websites in the category. The user can decide whether or not to continue.

- Use the 'Logging' switch to choose whether or not attempts to access a categorized website are logged.
8. Click 'OK' to save your new rule. The rule will become effective immediately.

You can disable or enable rules at any time using the switch under the 'Enable Rule' column.

Learning Outcome 11 - Able to perform troubleshooting and maintenance of PC based on the faulty condition

After achieving this learning outcome, a student will be able to perform troubleshooting and maintenance of the PC based on the faulty condition. In order to achieve this learning outcome, a student has to complete the following:

1. Service of Dead PC (5 Hrs)
2. Service CPU ON and no display (5 Hrs)
3. Service if system is frequently restarting (5 Hrs)
4. Service if system gives continuous beep sound (5 Hrs)
5. Service if System not Booting (10 Hrs)
6. Service if OS not loading (5 Hrs)
7. Service if system gets frequently hanging (5 Hrs)
8. Service if system is very slow (5 Hrs)
9. Troubleshoot if paper is jam in printer (5 Hrs)

Activity 1

Aim: Service of Dead PC (5 Hrs)

Learning outcome: Able to perform troubleshooting and maintenance of the PC based on the faulty condition.

Duration: 5 hour

List of Hardware/Software requirements:

- PC with Complete Hardware Setup
- PC with Pre- Installed Operating System (Windows)

Code/Program/Procedure (with comments):

Troubleshooting the power supply basically means isolating the supply as the cause of problems within a system and, if necessary, replacing it.

It is rarely recommended that an inexperienced user open a power supply to make repairs because of the dangerous high voltages present. Even when unplugged, power supplies can retain dangerous voltage and must be discharged (like a monitor) before service. Such internal repairs are beyond the scope of this book and are specifically not recommended unless the technician knows what he is doing.

Many symptoms lead me to suspect that the power supply in a system is failing. This can sometimes be difficult for an inexperienced technician to see because, at times little connection seems to exist between the symptom and the cause—the power supply.

For example, in many cases a parity check error message can indicate a problem with the power supply. This might seem strange because the parity check message specifically refers to memory that has failed. The connection is that the power supply powers the memory, and memory with inadequate power fails.

It takes some experience to know when this type of failure is power related and not caused by the memory. One clue is the repeatability of the problem. If the parity check message (or other problem) appears frequently and identifies the same memory location each time, I would suspect that defective memory is the problem. However, if the problem seems random, or if the memory location the error message cites as having failed seems random, I would suspect improper power as the culprit. The following is a list of PC problems that often are related to the power supply:

- Any power-on or system startup failures or lockups.
- Spontaneous rebooting or intermittent lockups during normal operation.
- Intermittent parity check or other memory-type errors.
- Hard disk and fan simultaneously failing to spin (no +12v).
- Overheating due to fan failure.

- Small brownouts cause the system to reset.
- Electric shocks felt on the system case or connectors.
- Slight static discharges disrupt system operation.

In fact, just about any intermittent system problem can be caused by the power supply. I always suspect the supply when flaky system operation is a symptom. Of course, the following fairly obvious symptoms point right to the power supply as a possible cause:

- System is completely dead (no fan, no cursor)
- Smoke
- Blown circuit breakers

If you suspect a power supply problem, some of the simple measurements and the more sophisticated tests outlined in this section can help you determine whether the power supply is at fault. Because these measurements might not detect some intermittent failures, you might have to use a spare power supply for a long-term evaluation. If the symptoms and problems disappear when a known good spare unit is installed, you have found the source of your problem.

Following is a simple flowchart to help you zero in on common power supply-related problems:

1. Check AC power input. Make sure the cord is firmly seated in the wall socket and in the power supply socket. Try a different cord.
2. Check DC power connections. Make sure the motherboard and disk drive power connectors are firmly seated and making good contact. Check for loose screws.
3. Check DC power output. Use a digital multimeter to check for proper voltages. If it's below spec, replace the power supply.
4. Check installed peripherals. Remove all boards and drives and retest the system. If it works, add back in items one at a time until the system fails again. The last item added before the failure returns is likely defective.

Many types of symptoms can indicate problems with the power supply. Because the power supply literally powers everything else in the system, everything from disk drive problems to memory problems to motherboard problems can often be traced back to the power supply as the root cause.

Overloaded Power Supplies

A weak or inadequate power supply can put a damper on your ideas for system expansion. Some systems are designed with beefy power supplies, as if to anticipate a great deal of system add-ons and expansion components. Most desktop or tower systems are built in this manner. Some systems have inadequate power supplies from the start, however, and cannot adequately service the power-hungry options you might want to add.

The wattage rating can sometimes be very misleading. Not all 300-watt supplies are created the same. People familiar with high-end audio systems know that some watts are better than others. This goes for power supplies, too. Cheap power supplies might in fact put out the rated power, but what about noise and distortion? Some of the supplies are under-engineered to just barely meet their specifications, whereas others might greatly exceed their specifications. Many of the cheaper supplies provide noisy or unstable power, which can cause numerous problems with the system. Another problem with under-engineered power supplies is that they can run hot and force the system to do so as well. The repeated heating and cooling of solid-state components eventually causes a computer system to fail, and engineering principles dictate that the hotter a PC's temperature, the shorter its life. Many people recommend replacing the original supply in a system with a heavier-duty model, which solves the problem. Because power supplies come in common form factors, finding a heavy-duty replacement for most systems is easy, as is the installation process.

Inadequate Cooling

Some of the available replacement power supplies have higher-capacity cooling fans than the originals, which can greatly prolong system life and minimize overheating problems—especially for the newer, hotter-running processors. If system noise is a problem, models with special fans can run more quietly than the standard models. These power supplies often use larger-diameter fans that spin more slowly, so they run more quietly but move the same amount of air as the smaller fans. PC Power and Cooling specializes in heavy-duty and quiet supplies; Astec has several heavy-duty models as well.

Ventilation in a system is also important. You must ensure adequate airflow to cool the hotter items in the system. Many processors today use passive heatsinks that require a steady stream of air to cool the chip. If the processor heatsink has its own fan, this is not much of a concern. If you have free expansion slots, you should space out the

boards in your system to permit airflow between them. Place the hottest running boards nearest the fan or the ventilation holes in the system. Make sure that adequate airflow exists around the hard disk drive, especially for those that spin at high rates of speed. Some hard disks can generate quite a bit of heat during operation.

If the hard disks overheat, data can be lost.

Always be sure to run your computer with the case cover on, especially if you have a loaded system. Removing the cover can actually cause a system to overheat. With the cover off, the power supply fan no longer draws air through the system. Instead, the fan ends up cooling the supply only, and the rest of the system must be cooled by simple convection. Although most systems do not immediately overheat for this reason, several of my own systems, especially those that are fully expanded, have overheated within 15–30 minutes when run with the case cover off.

In addition, be sure that any empty slot positions have the filler brackets installed. If you leave these brackets off after removing a card, the resultant hole in the case disrupts the internal airflow and can cause higher internal temperatures.

If you experience intermittent problems that you suspect are related to overheating, a higher-capacity replacement power supply is usually the best cure. Specially designed supplies with additional cooling fan capacity also can help. At least one company sells a device called a fan card, but I am not convinced these are a good idea. Unless the fan is positioned to draw air to or from the area outside the case, all it does is blow hot air around inside the system and provide a spot cooling effect for anything it is blowing on. In fact, adding fans in this manner contributes to the overall heat inside the system because the fan consumes power and generates heat.

CPU-mounted fans are an exception because they are designed only for spot cooling of the CPU. Many newer processors run so much hotter than the other components in the system that a conventional, finned aluminum heatsink can't do the job. In this case, a small fan placed directly over the processor provides a spot cooling effect that keeps the processor temperatures down. One drawback to these active processor cooling fans is that the processor overheats instantly and can be damaged if the fans fail. Whenever possible, try to use the biggest passive (finned aluminum) heatsink you can find and purchase a CPU fan from a reputable vendor.

Using Digital Multimeters

One simple test you can perform on a power supply is to check the output voltages. This shows whether a power supply is operating correctly and whether the output voltages are within the correct tolerance range. Note that you must measure all voltages with the power supply connected to a proper load, which usually means testing while the power supply is still installed in the system and connected to the motherboard and peripheral devices.

Selecting a Meter

You need a simple digital multimeter (DMM) or digital volt-ohm meter (DVOM) to perform voltage and resistance checks on electronic circuits (see image). You should use only a DMM instead of the older needle-type multimeters because the older meters work by injecting 9v into the circuit when measuring resistance, which damages most computer circuits.



A DMM uses a much smaller voltage (usually 1.5v) when making resistance measurements, which is safe for electronic equipment. You can get a good DMM with many features from several sources. I prefer the small, pocket-size meters for computer work because they are easy to carry around.

Some features to look for in a good DMM are as follows:

- *Pocket size.* This is self-explanatory, but small meters are available that have many, if not all, of the features of larger ones. The elaborate features found on some of the larger meters are not really necessary for computer work.
- *Overload protection.* This means that if you plug the meter into a voltage or current beyond the meter's capability to measure, the meter protects itself from damage. Cheaper meters lack this protection and can easily be damaged by reading current or voltage values that are too high.

- *Autoranging.* This means that the meter automatically selects the proper voltage or resistance range when making measurements. This is preferable to the manual range selection; however, really good meters offer both autoranging capability and a manual range override.
- *Detachable probe leads.* The leads easily can be damaged, and sometimes a variety of differently shaped probes are required for different tests. Cheaper meters have the leads permanently attached, which means you cannot easily replace them. Look for a meter with detachable leads that plug into the meter.
- *Audible continuity test.* Although you can use the ohm scale for testing continuity (0ohms indicates continuity), a continuity test function causes the meter to produce a beep noise when continuity exists between the meter test leads. By using the sound, you quickly can test cable assemblies and other items for continuity. After you use this feature, you will never want to use the ohms display for this purpose again.
- *Automatic power off.* These meters run on batteries, and the batteries can easily be worn down if the meter is accidentally left on. Good meters have an automatic shutoff that turns off the unit when it senses no readings for a predetermined period of time.
- *Automatic display hold.* This feature enables you to hold the last stable reading on the display even after the reading is taken. This is especially useful if you are trying to work in a difficult-to-reach area single-handedly.
- *Minimum and maximum trap.* This feature enables the meter to trap the lowest and highest readings in memory and hold them for later display, which is especially useful if you have readings that are fluctuating too quickly to see on the display.

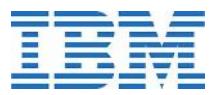
Output/Results snippet:

Desktop is ready to use



References:

- <https://www.informit.com/articles/article.aspx?p=31105&seqNum=12>



Activity 2

Aim: Service CPU ON and no display (5 Hrs)

Learning outcome: Able to perform troubleshooting and maintenance of the PC based on the faulty condition.

Duration: 5 hour

List of Hardware/Software requirements:

- PC with Complete Hardware Setup
- PC with Pre- Installed Operating System (Windows)

Code/Program/Procedure (with comments):

There can be 8 possibilities when your system is on without display. These are as follows:

1. Test your monitor.
2. Make sure your computer has completely restarted.
3. Verify that the power supply voltage switch is set correctly.
4. Perform a hard reset.
5. Clear the BIOS memory.
6. Reseat the memory modules.
7. Understand LED lights.
8. Check Hardware.

There are 8 solutions to help you fix the PC turns on but the screen remains black issue.

Method 1. Test your monitor.

If your computer starts but the screen is black, you should first make sure your monitor is working properly before you begin more complicated and time-consuming troubleshooting.

It's possible that your computer is working fine and your monitor is your only problem. If not, keep reading to find other solutions to fix this issue.

Method 2. Make sure your computer has completely restarted.

Ensure that your PC is coming from a completely powered-off state.

Sometimes, your computer will appear to "not be on" when actually it's just having problems resuming from either the Standby/Sleep or Hibernate power saving mode in Windows, resulting in your computer being turned on but having no display on the monitor or keyboard.

Note: While in a power saving mode, you can hold the power button down for 3 to 5 seconds to completely power off this computer. After that, turn on this PC to check whether it can boot normally.

Method 3. Verify that the power supply voltage switch is set correctly.

If the input voltage for the power supply is not correct (based on your country), your computer turns on but no display on monitor or keyboard.

If this switch is wrong, it is very possible that your PC wouldn't power on at all. Therefore, an incorrect power supply voltage might prevent your computer from starting properly.

Method 4. Perform a hard reset.

If your computer is still having no display even after checking the monitor and verifying that your PC has fully power cycled, you can try booting into safe mode and then repairing Windows either using System Restore/Automatic Repair or resetting your computer.

However, sometimes, Windows Automatic Repair not working issues will happen. Thus, most users will try resetting the PC. Resetting is very often a "magic" fix to problems like PC turns on but no display.

Importance: Do you know how to perform a hard reset? What should you do if you find your data is missing after factory resetting?

If the hard reset doesn't solve the problem, proceed to the following troubleshooting solutions.

Method 5. Clear the BIOS memory.

Your computer problems might sometimes be caused by some BIOS (an acronym for Basic Input/Output System) misconfigurations.

In this case, try clearing the BIOS memory on your motherboard, which will return the BIOS settings to their factory default levels.

Note: If this method solves your issue - computer starts but screen remains blank, make sure any future changes you make in BIOS are completed one at a time so that when the problem returns, you will know which change caused the issue.

Method 6. Reseat the memory modules.

If a memory module is loose, the computer might not display an image. In other words, your computer starts but the screen is black.

Now, you can try resetting the memory modules to fix the "PC turns on but no display" issue. Remove the memory module from the memory slot, and then put it back into the slot to get a better connection so that the computer can recognize the memory.

Method 7. Understand LED lights.

If your computer makes one or two short beeps before starting, it is telling you that the BIOS startup was successful.

If your computer beeps and does not start, there might be a more serious hardware issue. Now, you'll probably need to seek professional help from a computer repair service or from your computer manufacturer's technical support.

Method 8. Check Hardware.

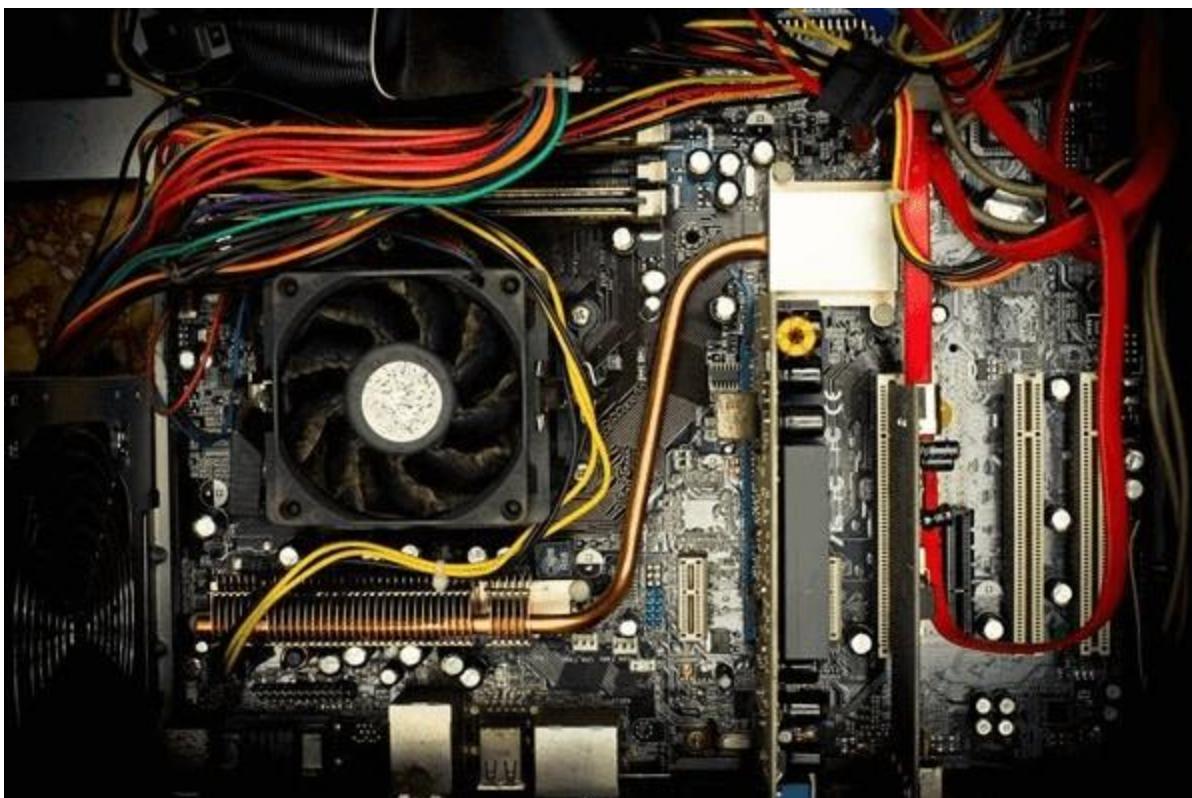
Take a look at the actual hardware.

Try disconnecting all devices and peripherals like the mouse, external hard drive, speakers, printers, scanners, etc from the computer. Then, try turning on your computer again.

If that doesn't work, you might need to check the actual port connectors on the computer and on the monitor for damage.

Sometimes, the video port on the computer could be damaged or bent if a cable connected to it wasn't properly taken out. Additionally, some people might try to connect a cable into a connection that doesn't match, which can also end up damaging the gold or silver connectors that you see inside the port.

In this case, you should take your computer to a repair shop in order to fix the bent or damaged ports.



Output/Results snippet:

Desktop is ready to use with proper working of Display (Monitor)



References:

- <https://www.minitool.com/data-recovery/fix-pc-turns-on-but-no-display.html>

Activity 3

Aim: Service if system is frequently restarting (5 Hrs)

Learning outcome: Able to perform troubleshooting and maintenance of the PC based on the faulty condition.

Duration: 5 hour

List of Hardware/Software requirements:

- PC with Complete Hardware Setup
- PC with Pre- Installed Operating System (Windows)

Code/Program/Procedure (with comments):

Troubleshooting the RAM Problem

Defective RAM can cause all sorts of problems. If you're suffering from frequent crashes, freezes, reboots, or Blue Screens of Death, a bad RAM chip could be the cause of your travails. If these annoyances tend to happen when you're using a memory-intensive application or game, bad RAM is a very likely culprit.

But that doesn't mean it's a sure one. You still need to make sure that the problem is with your RAM, and if it is, you need to identify the bad module. The best diagnostic tool I know for the job is the free, bootable MemTest86. Since it's bootable, you need to put it onto removable media. You can download separate versions for installing the program onto a CD or on a USB flash drive.

The CD version comes as an .iso file. The USB version comes with a program that prepares a flash drive, so that it can boot your PC and automatically run MemTest86. If you go with the USB version, you'll have to launch an .exe program in Windows, which brings up a busy and possibly intimidating little program. Don't worry; just go through the four steps onscreen. And don't use a flash drive with files that you need on it. Once you've prepared the boot media, shut down your PC. Then unplug it, open it up, and remove all but one RAM module. If you're not sure how, check your manual. You may want to wear an anti-static bracelet for this job.

Then plug in your computer, insert the CD or flash drive (if it's not already inserted), and boot. You may be told to go into Setup because of the RAM change. Do so. Once there, check to make sure that it's showing the right amount of RAM, correct it if it isn't, then save and exit.

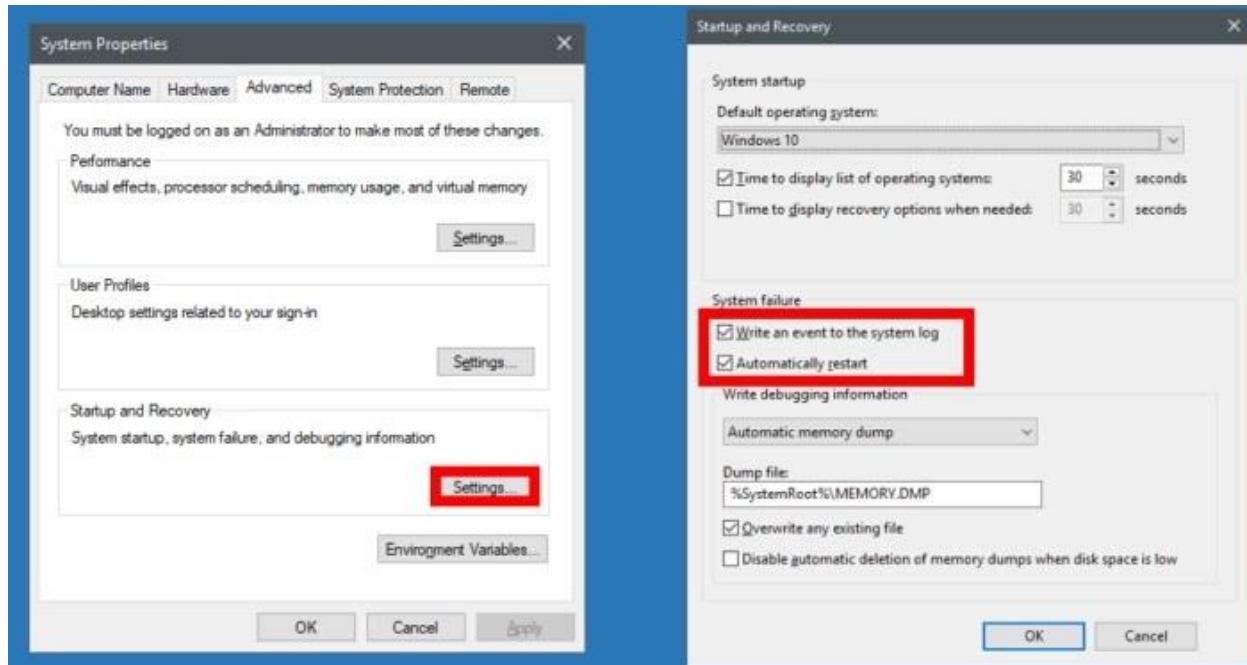
The PC will reboot again, and MemTest86 will start automatically. It will test all of your RAM, and when it's done (which could be an hour or more), it will start all over with a second pass. Just to be safe, I recommend three passes. Or you could start it before going to bed, and let it run all night.

If it finds something wrong, you know you have to replace that RAM module.

There's a setting you can change that will give you at least a hint of the problem. But the hard part starts after you get that hint.

So let's get you to a point where your crashes contain some useful information.

1. Go to the Search tool in your version of Windows, type **sysdm.cpl**, and select the program of the same name.
2. Click the *Advanced* tab.
3. Click the *Settings* button under Startup and Recovery (as opposed to the dialog box's other two Settings buttons).
4. Uncheck *Automatically restart*.
5. You might also want to check *Write an event to the system log* if it's not already checked.



System Properties windows in Windows 10.

From now on, your system won't simply reboot when it can't keep going. Assuming you're not yet running Windows 10, you'll get a blue screen filled with intimidating text. Microsoft calls this a Stop Error, but everyone else prefers a more descriptive term: The Blue Screen of Death (BSOD).

With all that text on the screen, what should you look at? First and foremost, the second paragraph on the screen, which will be in all caps. Make a note of that. Also note the "Technical information" at the bottom of the screen. But that second paragraph near the top contains the most useful clues.

Output/Results snippet:

Desktop is ready to use without restarting problem



References:

- [https://www.pcworld.com/article/2974060/when-your-computer-reboots-itself-over-and-o ver-again.html](https://www.pcworld.com/article/2974060/when-your-computer-reboots-itself-over-and-over-again.html)
- <https://www.pcworld.com/article/2048282/how-to-find-out-if-your-ram-is-defective.html>

Activity 4

Aim: Service if system gives continuous beep sound (5 Hrs)

Learning outcome: Able to perform troubleshooting and maintenance of the PC based on the faulty condition.

Duration: 5 hour

List of Hardware/Software requirements:

- PC with Complete Hardware Setup
- PC with Pre- Installed Operating System (Windows)

Code/Program/Procedure (with comments):

The POST (power on self-test) is a set of procedures that a computer runs through each time it is turned on. It ensures that all of the system's hardware is working properly before trying to load the operating system. If the computer does not pass POST, it will not boot.

Remove new hardware

If any new hardware was recently added to the computer, remove that hardware to make sure it is not causing your issue. If your computer works after removing the new hardware, it can mean a few things. Either the new hardware is not compatible with your computer, a system setting needs to be changed, or the new hardware is defective.

Remove any disks or USB devices

Remove any disks, CDs, or DVDs that are in the computer. If any USB devices (iPods, drives, phones, etc.) are connected, disconnect all of them as well. Reboot the computer and see if anything change

Disconnect external devices

Remove everything from the back of the computer, except the power cable. Turn on the computer and see if it beeps normally. If the computer has never beeped, keep the monitor or display connected to see if any change occurs.

Identify beep code

If you are receiving a sequence of beeps. You can also check your motherboard or computer documentation for information on the beep codes. These beep codes are meant to help identify which computer component is failing or bad. If your beep code is not listed, continue troubleshooting.

Check all fans

Make sure all fans are running on the computer. If a fan has failed (especially the heatsink fan for the CPU), your computer could be overheating or detecting the fan failure, causing the computer not to boot.

Check all cables

Verify all the cables are securely connected to the computer and that there are no loose cables by firmly pressing in each cable.

- All disk drives should have a data cable and power cable connected to them.
- Your power supply should have at least one cable going to the motherboard. Many motherboards may also have additional cables connected to them to supply power to the fans.

Disconnect all expansion cards

If the above recommendations still have not resolved the irregular POST, disconnect the riser board (if applicable) and each of the expansion cards. If this fixes the problem or allows the computer to POST, connect one card at a time until you determine which card is causing the problem.

Disconnect all drives

If you cannot diagnose the problem by the beep code (or you do not hear a beep code), power off the computer. Then, disconnect any IDE, SATA, SCSI, or other data cables from the motherboard. When they are disconnected, try booting the computer again.

If this resolves your irregular POST or generates error messages, reconnect each device until you determine which device or cable is causing the issue. In some situations, it can also be a loose cable connection that causes the issue.

Remove the RAM

If you continue to experience the same problem with all the above hardware removed, remove the RAM from the motherboard and turn on the computer. If the computer has a different beep code or was not beeping but is now, turn off your computer and try the suggestions below. Make sure to turn off the computer before adding and removing the memory and then turning it back on to see if the suggestion resolves the issue.

1. Re-insert the memory into the same slot.
2. If you have more than one stick of memory, remove all but one stick of memory and try rotating through each stick.
3. Try one stick of memory in each slot.

If you can get the computer to boot with one or more of the sticks of memory installed, you are likely dealing with some bad memory. Try to identify which stick of memory is bad and replace it.

If you can get the memory to work in one slot but not another slot, the motherboard is likely defective. You can either workaround the issue by running the memory in a different slot that does work or replace the motherboard.

Power cycle the computer

In some situations, a computer may have power related issues often caused by either the power supply or the motherboard. To help determine if this is the issue, try turning the computer on, off, and back on as fast as possible, making sure the computer power light goes on and off. In some situations, you may be able to temporarily get the computer to boot.

Output/Results snippet:

Desktop is ready to use without beep Sound problem

**References:**

- <https://www.computerhope.com/issues/ch000607.htm>

Activity 1

Aim: Service if System not Booting

Learning outcome: Able to perform troubleshooting and maintenance of PC based on the faulty condition.

Duration: 2 Hours

List of Hardware/Software requirements:

1. Hand Tools
 - a. Flat-head screwdriver
 - b. Phillips-head screwdriver
 - c. Torx screwdriver
 - d. Hex driver
 - e. Needle-nose pliers
 - f. Wire cutters
 - g. Tweezers
 - h. Part retriever
 - i. Flashlight
 - j. Wire stripper
 - k. Crimper
 - l. Punch-down tool
2. Cleaning Tools
 - a. Soft cloth
 - b. Compressed air
 - c. Cable ties 3.
3. Diagnostic Tools
 - a. A digital millimetre
 - b. A loopback adapter
4. Software Tools
 - a. Disk Management Tools
 - b. Protection Software Tools

Procedure:**Check SATA/IDE cable and SMPS**

Step 1: Identification of the drive interface type.

Most modern PCs use the SATA interface for physical connection of hard drives to the computer's system bus, while the IDE (PATA) standard may be found on older machines. To identify the interface type, you should disassemble the device and examine the drive:

Open the case to access the hard drive. If the device uses removable hard drives in special bays, simply eject the drive from the bay;

Examine the holder of the hard drive: if the back panel is covered with an enclosure, remove it and then check the back panel.

The following examples will acquaint you with what different hard drive interfaces look like:



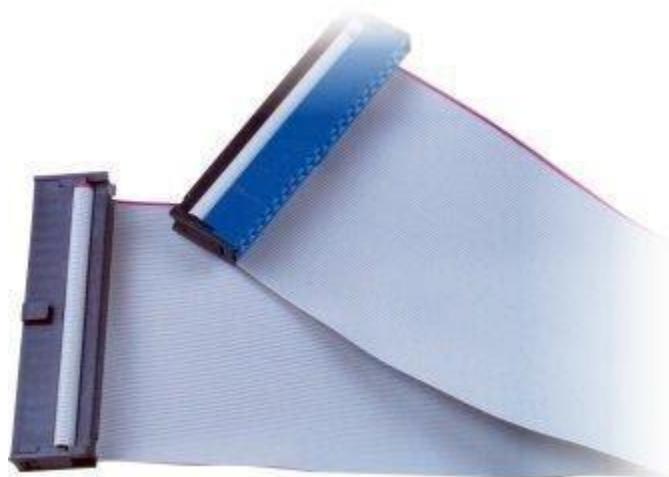
Pic. 1. Back panel of an IDE (PATA) drive.

In this picture:

IDE data port. Please pay attention to the small hollow in the top center. It is used as an index for correct cable connection. Incorrect cable connection can damage the connector and the drive.

Power supply port. It also has a "key" form for correct connection of the power cable. Incorrect cable connection can damage the connector and the drive.

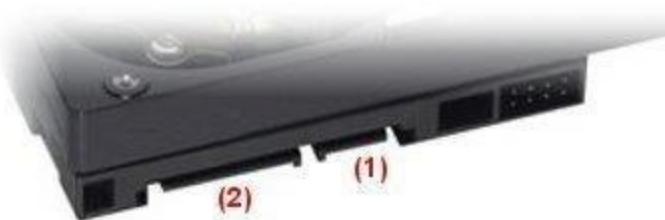
These are used for identification of the order of the drives in a paired IDE cable as well as for additional IDE settings.



Pic. 2. IDE (PATA) data cable.

In this picture, the blue connector is used to connect the cable to the mainboard of the computer/device, while the black one is used to connect the drive. Please pay attention to the "key" on the cable connector that matches the slot of the drive.

IDE cables usually have two drive connectors: a "master" connector (at the end of the cable) and a "slave" connector (in the middle of the cable, closer to the "master" connector).



Pic. 3. Back panel of a SATA drive.

In this picture:

SATA data port. Please pay attention to the "key" form of the slot.

SATA power supply port. In contrast to IDE, a SATA power cable is wider than a SATA data cable. It has a "key" form as well.



Pic. 4. SATA data cable connector.

A SATA cable consists of two equal endpoints on a thin data cable. It makes no difference which of the ends will be used to connect the drive. Please pay attention to the form of the connector that matches the "key" form of the SATA drive data slot.

Step 2. Choosing the method of connection to the host

computer. External adapters

This is the safest but at the same time the most expensive method. You need USB/Firewire adapters for each drive to connect them to the host PC.

If the host computer provides enough disk space, you can create an image of your disk and avoid using an adapter for this disk

You can find external adapters for both SATA and IDE hard drives; some of them fit both interfaces:



Pic. 5. USB to IDE hard disk adapter with an external power supply.



Pic. 6. USB to SATA hard disk adapter with an external power supply.

Please note that some USB to SATA adapters have a pair of SATA interfaces, thus, to connect two SATA drives you need only one adapter.

Pay attention to the external power supply: some adapters are powered via USB and don't match 3.5" hard drives used in NAS and desktop computers.

Mainboard connectors

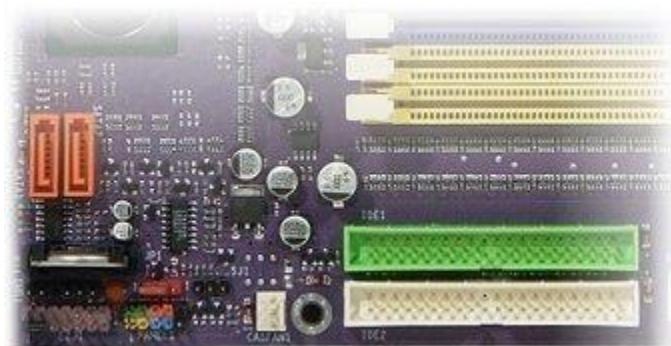
This is the cheapest but not the safest method to connect the drives. Besides, the mainboard is able to place a very limited number of drives.

Before choosing this method, make sure that the computer power supply provides at least 15 Watts of additional power per drive.

Also, see to it that you have a sufficient number of data cables: one cable per two IDE drives and one SATA data cable per one SATA drive.

To check if the method is suitable, examine your motherboard connectors. To do this: Remove the screws from the back panel of your computer that hold the left-side cover is enough (for a tower-type computer);

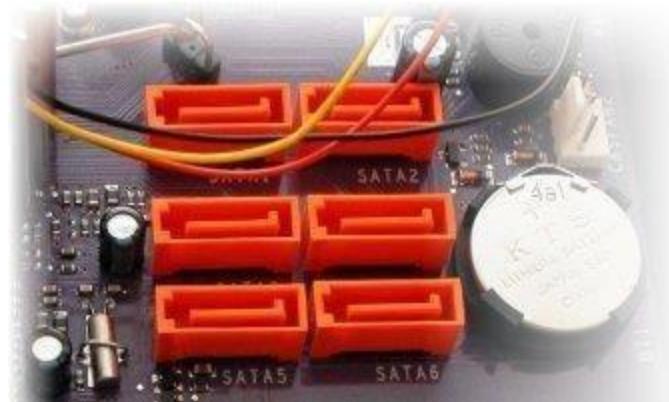
Open the left cover panel: pull it a little back and put it aside; Examine the expansion slots on the mainboard.



Pic. 7. IDE connectors.

In this picture, you can see two IDE connectors marked as IDE 1 and IDE 2 at the right bottom. As a rule, IDE 1 is colored while IDE 2 is usually black or white.

Each IDE connector is capable of hosting two IDE hard drives.



Pic. 8. SATA connectors.

Picture 8 shows SATA connectors. They are usually black, red or orange and are numbered as SATA1, SATA2, etc. Each connector is capable of hosting one SATA drive.

Make sure that the mainboard provides enough free slots. For example, for four disks of your NAS with IDE hard drives you need two free IDE slots on the mainboard: two drives per interface. For four drives with a SATA interface four free SATA slots are needed.

If the mainboard doesn't provide a sufficient number of free slots, use external adapters or expansion cards. If you decide to free up some mainboard slots for extra drives, make sure you don't unplug the system boot drive or RAID.

Expansion cards.

This method of connection is quite efficient, however, is not 100% safe.

Before choosing this method make ensure that the computer power supply is capable of providing at least 15 Watts of additional power per drive plus about 10 Watts for the

expansion card. Expansion cards are available for both SATA and IDE drives.



Pic. 9. PCI IDE expansion card with two IDE channels.

Please note that IDE expansion cards have one or more IDE channels. Each channel is

capable of hosting two IDE drives. It is recommended to use one card for all the drives.

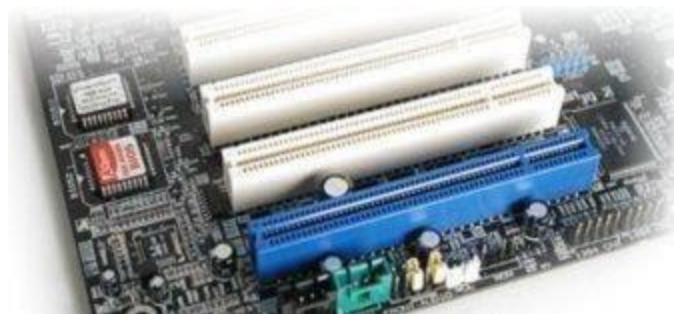


Pic. 10. PCI SATA expansion card with four SATA channels.

SATA expansion cards have two or more SATChannels. Each channel is capable of

hosting one SATA drive. It's recommended to use one card for all the drives. But as multi-port cards are more expensive, you may consider using several cards to save costs. Besides, there are no requirements to expansion cards for hardware RAID, thus, you can choose an inexpensive one.

Expansion cards can be installed to any free PCI (or PCI Express) slots on the mainboard.



Pic. 11. PCI slots on the mainboard.

Please refer to the expansion card installation manual for more details. Make sure that the expansion card kit contains a sufficient number of data cables: one cable per 2 IDE drives and one SATA data cable per one SATA drive. You might need additional cables.

Check HDD partition problem

Manually check and repair Windows hard disk partition errors

Note: Please do remember to backup important personal files first.

Step 1: Open Computer, right-click the partition or drive that you want to check and click "Properties".

Step 2: Click "Tools" under Error-checking, click "Check now" to see whether there exist any errors in your drive.

Step 3: Select "Automatically fix file system errors and Scan for and attempt recovery of bad sectors".

Step 4: Click "Start".

Note: If your hard drive, USB drive, SD card or memory card etc storage devices cannot

work, we also suggest you to apply the above two methods to check and repair bad sectors and errors so to make your devices reusable again.

Check CMOS battery voltage

Step 1: Detect CMOS Battery Failure Of Your Computer

CMOS Battery Failure, Every computer has a small battery on its motherboard used to provide power to the CMOS on the computer. The CMOS (Complementary Metal Oxide Semiconductor) chip on your computer remembers everything like the disk drive, time and date, etc., so you don't want to have a CMOS battery failure. The CMOS battery always provides power to the CMOS chip – i.e., even when your computer is OFF – to save all the settings. So, it is very important at the time of booting your computer and other tasks.

Detect a CMOS Battery Failure

The CMOS battery is a small battery fitted on the motherboard of your computer. It has a life of around five years. You need to use the computer regularly to extend the life of the CMOS battery. The computer power supply increases the availability of a standby current

and hence increases the life of the battery.

If the computer is not plugged in regularly, the life of the battery is normally 3 years. However, the life of the battery gets extended to 5 years when you use it regularly. The

battery provides power to CMOS memory and the real-time clock.

Step 2: Signs of a CMOS Battery Failure

It is a 3V battery. If the voltage drops between certain levels, your computer loses the memory. The CMOS settings like date and time get changed. In some instances, the date and time get set to factory default. For example, your computer date will be set to factory settings, something like 12/01/2008.

All of the settings like drive type, FDD, NUMs lock, etc., in the computer setup will be changed. It may be causing booting problems since your computer does not remember

information about the disk drive.

Your computer will show a message such as “Booting Error, unable to detect disk drive.” The computer may be shutting down and will not allow you to perform any task.

Your computer may be too slow. It may be due to wrong time and date. It is time to replace the CMOS battery to correct these issues.

Some of the drivers may be missing or may not work properly. So, you may not be able to print out on the printer. Even if you install the printer driver correctly, your computer may keep on showing the message “can’t find printer.”

Your mouse may not respond properly. You may feel that your mouse might have gotten damaged and be ready to replace the mouse. But it might be solved by simply replacing the CMOS battery. Therefore, before ordering a mouse you can try the same mouse on

another computer to check if it is actually defective.

You may not be able to connect to the internet. It keeps on showing error when connecting to the internet. You need to check whether time and date are correct. If the date and time are wrong, try correcting. Then, check again; if the computer is still not connecting to the internet, you need to replace the CMOS battery.

If you hear a constant beeping sound when working with your computer, it is a sign that you need to replace the CMOS battery.

The computer will also display CMOS battery failure, CMOS read error, or CMOS

checksum error, etc. If this happens, you need to switch on your computer and leave it on for a day. If the computer is not showing the errors after rebooting, the CMOS battery is

charging. Otherwise, you need to replace the CMOS battery.

Step 3: After Verifying CMOS Battery Failure

Replacing a CMOS battery in your laptop or computer is easy. If you are new to the computer or laptop, you can also seek the help of a local computer technician to replace the computer battery.

Step 4: Steps to replace the CMOS battery

First, switch off the computer or laptop and remove the power cord from the computer. It is also suggested to remove the battery pack from a netbook or laptop.

Remove the cover of the CPU or laptop using a star bit (Torx) screwdriver.

You can find a button type CMOS battery on the motherboard of your computer or laptop. Use the flat-head type screwdriver to slowly lift the button cell from the motherboard.

Use the multimeter to check the voltage of the battery (use a digital multimeter).

If the voltage is less than 3V, your computer will not remember the CMOS settings, so it is time to replace the old battery with the new CMOS battery.

After replacing the battery in the same orientation, you can replace the computer cover and tighten the screws.

Plug in the power cord and switch the computer ON to check if it is working properly.

However, after replacing the CMOS battery you need to enter the correct BIOS settings.

So, after booting your computer, you need to enter the correct date and time.

Check HDD parameters in CMOS setup

Step 1: To enter the CMOS Setup, you must press a certain key or combination of keys during the **initial startup sequence**. Most systems use "Esc," "Del," "F1," "F2," "Ctrl-Esc" or



tells you "Press_ to Enter Setup.

Step 2: Change your setting for your convenience in following methods

List of options to change

System Time/Date - Set the system time and date

Boot Sequence - The order that BIOS will try to load the operating system

Plug and Play - A standard for auto-detecting connected devices; should be set to "Yes" if your computer and operating system both support it

Mouse/Keyboard - "Enable Num Lock," "Enable the Keyboard," "Auto-Detect Mouse".

Drive Configuration - Configure hard drives, CD-ROM and floppy drives

Memory - Direct the BIOS to shadow to a specific memory address

Security - Set a password for accessing the computer

Power Management - Select whether to use power management, as well as set the amount of time for **standby** and **suspend**

Exit - Save your changes, discard your changes or restore default settings

Note: Be very careful when making changes to setup. Incorrect settings may keep your computer from booting. When you are finished with your changes, you should choose "Save Changes" and exit. The BIOS will then restart your computer so that the new settings take effect.

The BIOS uses **CMOS** technology to save any changes made to the computer's settings.

Step 3: Save all changes and exit the BIOS. This is done with the "F10" key motherboard.

The computer reboots after saving the changes. The computer will boot from the optical drive,



starting the Data Lifeguard Diagnostics utility.

Check for boot virus

Step 1: Start Menu or press windows button

Step 2: click to All Programs

Step 3: then click to Accessories

Step 4: Now, Right click on Command Prompt

Step 5: then click on Run as administrator

Step 6: After performing above operation, you will watch a new cmd box will come out to ask for confirmation. Press Yes. Now your command prompt window will be opened as shown in figure below.

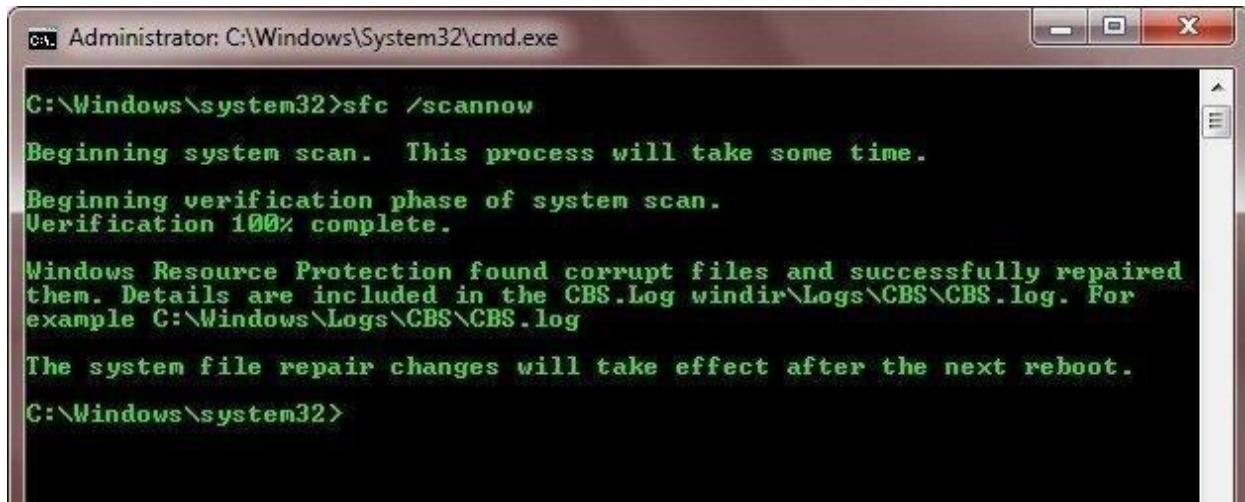
Step 7: scan computer using cmd

Step 8: Now type sfc /scannow in the cmd box as show in figure below

Step 9: Now press ENTER after typing it. Your computer Verification will starts

Note: Wait until your verification will complete. After completing your verification. Your computer scan completed. And the output in the command prompt will come out like (given in the following figure) if your computer will not contain any virus.

Output/Results snippet:



```
Administrator: C:\Windows\System32\cmd.exe
C:\Windows\system32>sfc /scannow
Beginning system scan. This process will take some time.
Beginning verification phase of system scan.
Verification 100% complete.

Windows Resource Protection found corrupt files and successfully repaired them. Details are included in the CBS.Log windir\Logs\CBS\CBS.log. For example C:\Windows\Logs\CMS\CMS.log

The system file repair changes will take effect after the next reboot.
C:\Windows\system32>
```

Activity 2

Aim: Service if OS not loading

Learning outcome: Able to perform troubleshooting and maintenance of PC based on the faulty condition.

Duration: 2 Hours

List of Hardware/Software requirements:

Hand Tools

Flat-head screwdriver

Phillips-head screwdriver

Torx screwdriver

Hex driver

Needle-nose pliers

Wire cutters

Tweezers

Part retriever

Flashlight

Wire stripper

Crimper

Punch-down tool



Soft cloth

Compressed air
Cable ties

Diagnostic Tools

A digital millimetre
A loopback adapter

Software Tools

Disk Management Tools
Protection Software Tools

Procedure:

Check RAM

Method 1: Check RAM via msinfo32.exe

Since Windows 98, Microsoft includes a built-in tool called Microsoft System Information (msinfo32.exe), which enables you to gather information about your computer. Here's how to use it:

Step1: On your keyboard, press the Windows logo key and R at the same time to invoke the Run box.

Step2: Type msinfo32.exe and click OK.

Step3: You can check your RAM in Installed Physical Memory (RAM). You can also browse other system information from this window.

Method 2: Check RAM via Task Manager

You can also check your RAM on Windows 10 from Task Manager. To do so,

follow the steps below:

On your keyboard, press the Ctrl key, Shift key, and Esc key at the same time to invoke Task Manager.

Click Performance, then click Memory, and you will see the RAM in use and the available memory in your Windows 10 computer.

Control Panel is a powerful feature where you can check information and diagnose the issues in your Windows 10 computer.

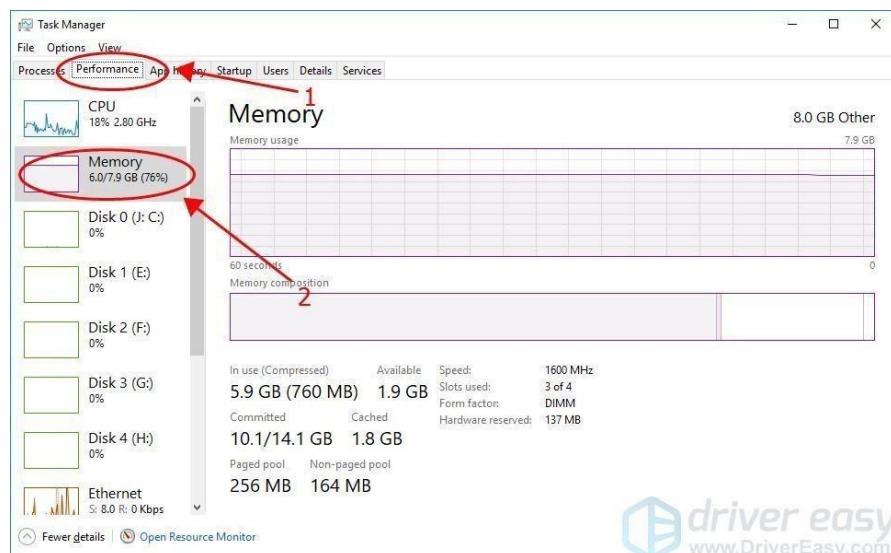
Type Control Panel in the search bar from the Start menu, then click Control Panel to open it.

View Control Panel items by category, then click System and Security.

Click View amount of RAM and processor speed in the System section.

You can check your RAM information in Installed memory under the System section..

Output/Results snippet:



Check proper installation of Driver Software in device manager

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Method1: Installing driver from Microsoft(Online)

To update a device driver with Device Manager on Windows 10, use these steps:

Open Start.

Search for Device Manager and click the top result to open the tool.

Double-click the branch with the hardware you want to update.

Right-click the hardware and select the Update driver option.

Device Manager update driver

Click the Search automatically for updated driver software option.

Device Manager search for updates automatically

Note: After you complete the steps, if a newer update is available, Device Manager will download and install the package automatically similar to Windows Update using the Microsoft servers.

Method 2: Installing driver from manufacturer (Offline)

In the case that the driver isn't available through Windows Update, because it's too recent or available only in beta, you'll need to download and install the package

from the manufacturer's support website manually.

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When getting an update from a manufacturer support website, you should always attempt to follow their instructions first. However, if there are no instructions, double-click the ".exe" self-extracting package, or use this guide to extract the content of the ".zip" compressed file, and then continue with these steps:

Open Start.

Search for Device Manager and click the top result to open the tool.

Double-click the branch with the hardware you want to update.

Right-click the hardware and select the Update driver option.

Device Manager update driver option

Click the Browse my computer for driver software option.

Device Manager update driver manually option

Click the Browse button.

Device Manager update driver manually option

Select the main folder with the driver files you have extracted earlier.

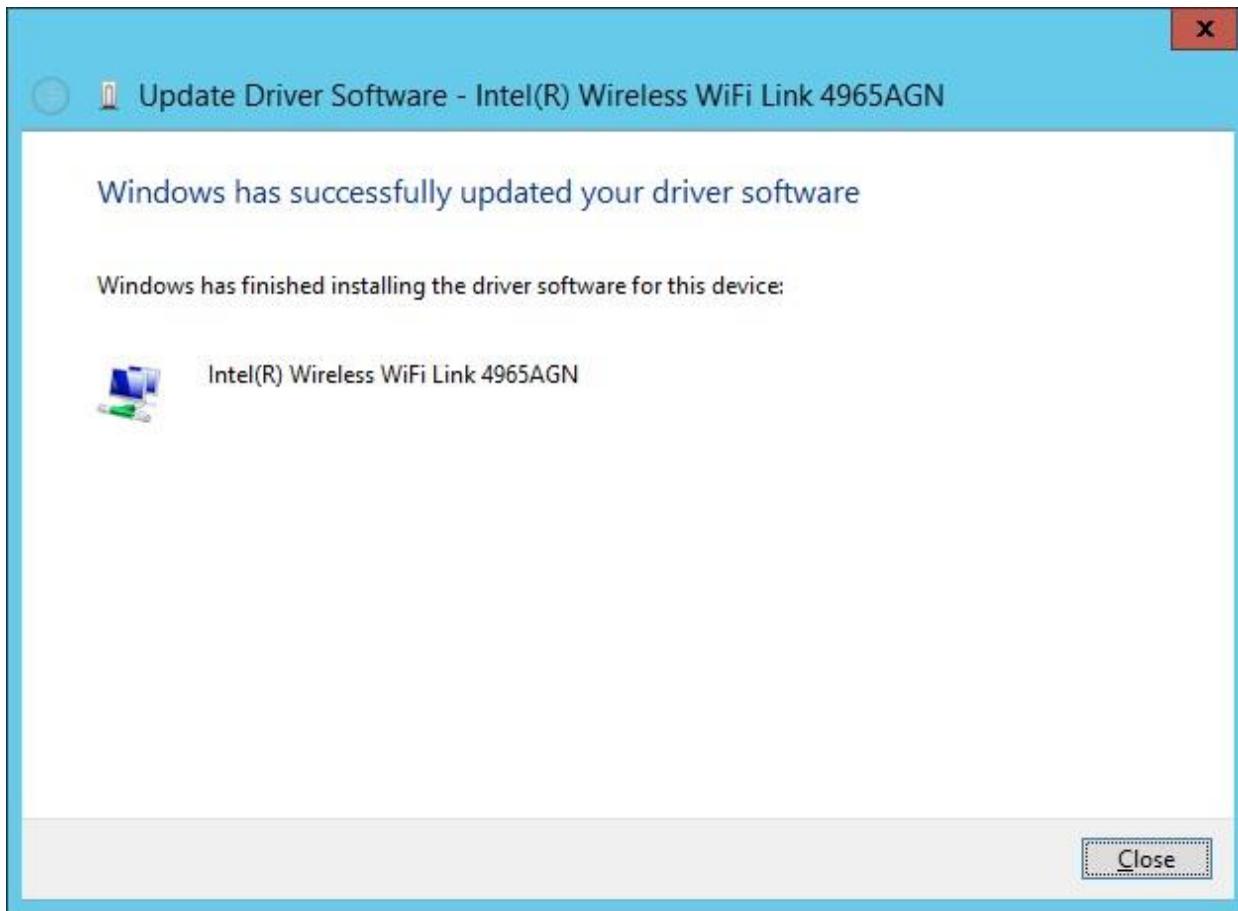
Click the OK button.

Check the Include subfolders option to allow the wizard to find the correct ".inf" file with the instructions to update the driver.

Click the Next

button.

Note: Once you complete the steps, the wizard will detect and install the new driver on your computer to improve the overall experience with fixes, new functionalities, or new support depending on the update and device.

Output/Results snippet:**Uninstall recently performed drivers**

Step 1. Try to delete a driver by using the device's uninstaller

Before anything else, you should check whether the driver that you want to remove has an uninstaller. A typical example is graphics cards from Nvidia and AMD, which have complex driver kits that also include other software. Regardless of the device, if you

installed its drivers using an installer, it should also provide an uninstaller.

To find if you have this option, open the Settings app from Window 10, go to Apps, and check whether your device's software is shown in the list of Apps & features. For

example, if you want to uninstall Nvidia drivers, all you have to do is find them in the list and click or tap on Uninstall.

Removing the NVIDIA Graphics Driver from Windows 10

In Windows 7, the steps are similar: open the Control Panel, go to Programs, then to Programs and Features, and find the device drivers that you want to uninstall. Then, click or tap Uninstall and remove those bad drivers.

If your device doesn't come with a driver uninstaller, follow the next steps to get rid of it

Step 2: Open the Device Manager

Open the Device Manager: a quick way to do that, both in Windows 10 and Windows 7, is to search for the words "device manager" and click or tap the appropriate search results.

Opening Device Manager in Windows 10

Step 3: Find the device or hardware component with the faulty drivers

The Device Manager shows a list of all the hardware components that are inside your computer or connected to it. It also includes emulated hardware by the apps that you have installed. They are organized by type.

Browse the list of hardware and find the device for which you want to uninstall the driver because it's causing you troubles.

Browsing to the device or hardware component with bad drivers

Step 4: Open the properties of the hardware device with the bad drivers

Right-click or press-and-hold (on a touchscreen) the name of the component with the problematic driver. In the menu that opens, choose Properties.

Opening the Properties of the device

You can also select the device and then press Alt + Enter on your keyboard.

Step 5: Uninstall and delete the drivers completely

Now, Windows opens a window with the properties of the hardware device that you've selected. To completely remove its driver, go to the Driver tab and click or tap on the Uninstall Device button.

Choosing to Uninstall Device

In the Uninstall Device dialog window, make sure that you check the box that says: "Delete the driver software for this device." Then, click or tap Uninstall. If you don't check the box we mentioned, Windows does not completely delete the driver for that device. Instead, it keeps the driver files on your PC and uses them the next time it detects your device.

Uninstall and Delete the driver software for this device

The faulty driver is now deleted, and the device is gone from the Device Manager. You should be able to resume using your computer without the problems that you had.

Note: In Windows, you could try to hide the bad driver update and block it from ever installing, using the steps from this tutorial: Use the Show or Hide Updates tool to block unwanted Windows updates, including drivers.

However, that only works in some situations, and it's not an option for those of you who are still using Windows 7. If you need a more radical way of stopping Windows 10 or Windows 7 from automatically installing drivers on your PC, follow the next steps:

Use the Search from Windows 10's taskbar, or the search field from the Start Menu in

Windows 7, to look for "advanced system settings." In the list of results, click or tap on

"View advanced system settings."

Searching for advanced system settings

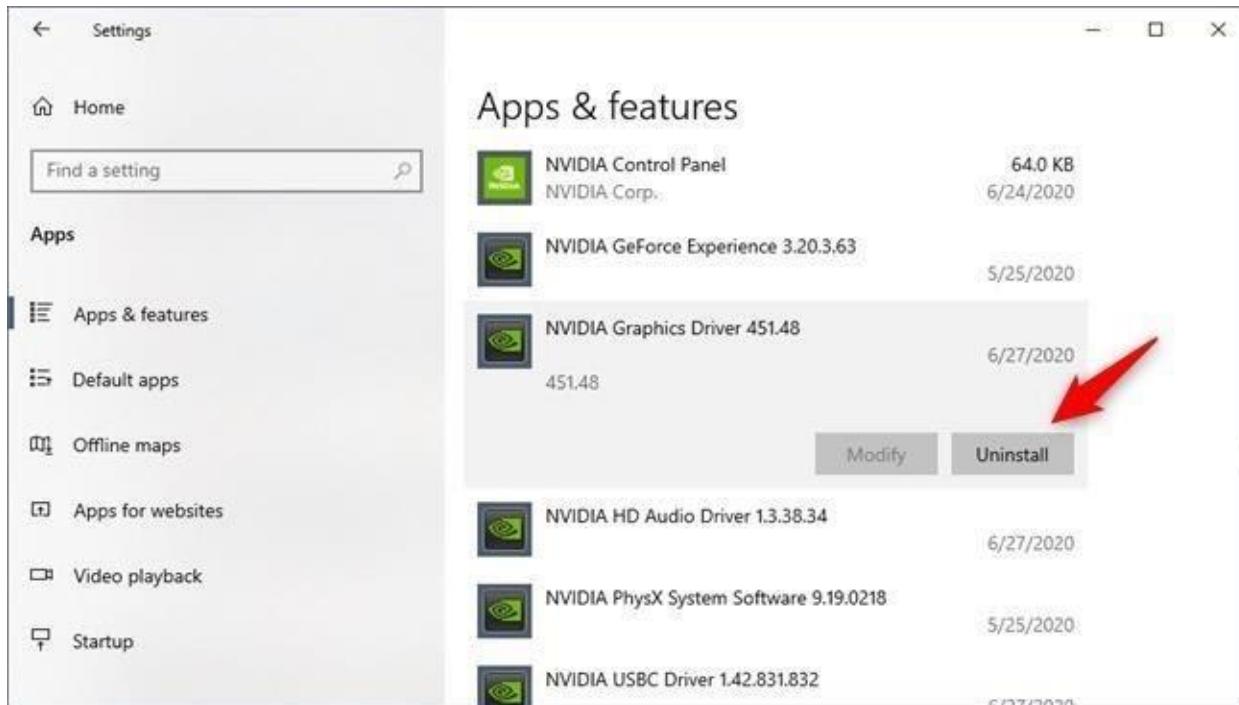
This opens the System Properties window. In it, select the Hardware tab and click or tap on the "Device Installation Settings" button.

Device Installation Settings on the Hardware tab from System Properties
The previous action opens a window called "Device installation settings." On it, Windows asks you if "[...] you want to automatically download manufacturers' apps and custom icons available for your devices." Select "No (your device might not work as expected)" and push the Save Changes button.

Choosing not to let Windows download drivers automatically

IMPORTANT: Enabling this setting means that none of your devices, connected right now or which you will connect at a later time, will get driver updates from Microsoft via Windows Update.

Output/Results snippet:



Boot in safe mode

Method

1

To access the Boot Manager of your system, please press the key combination Ctrl + F8 during the startup process. Select the desired Safe Mode to start your PC.

Note: With computers that start quickly or which are equipped with a fast SSD, it may be difficult to hit Ctrl + F8 at exactly the right time to catch the dialog. Therefore it might take several attempts to access the Boot Manager this way.

Alternatively, Safe Mode can also be launched directly from Windows or via the Windows System Configuration Utility described in the following video or in the text below.

Method 2: Start Safe Mode directly from Windows

Click the Windows-button → Power.

Hold down the shift key and click Restart.

Click the option Troubleshoot and then Advanced options.

Go to “Advanced options” and click Start-up Settings.

Under “Start-up Settings” click Restart.

Various boot options are displayed.

The relevant options for booting in Safe Mode are numbers, 4,5, or 6.

Select an option by pressing one of the numbers or function keys F4, F5 or F6

Enable Safe Mode

- o In this mode, the operating system is started with the bare minimum of installed drivers and only the main Windows functions are used.

Enable Safe Mode with Networking

- o In this mode, the network drivers are also started.

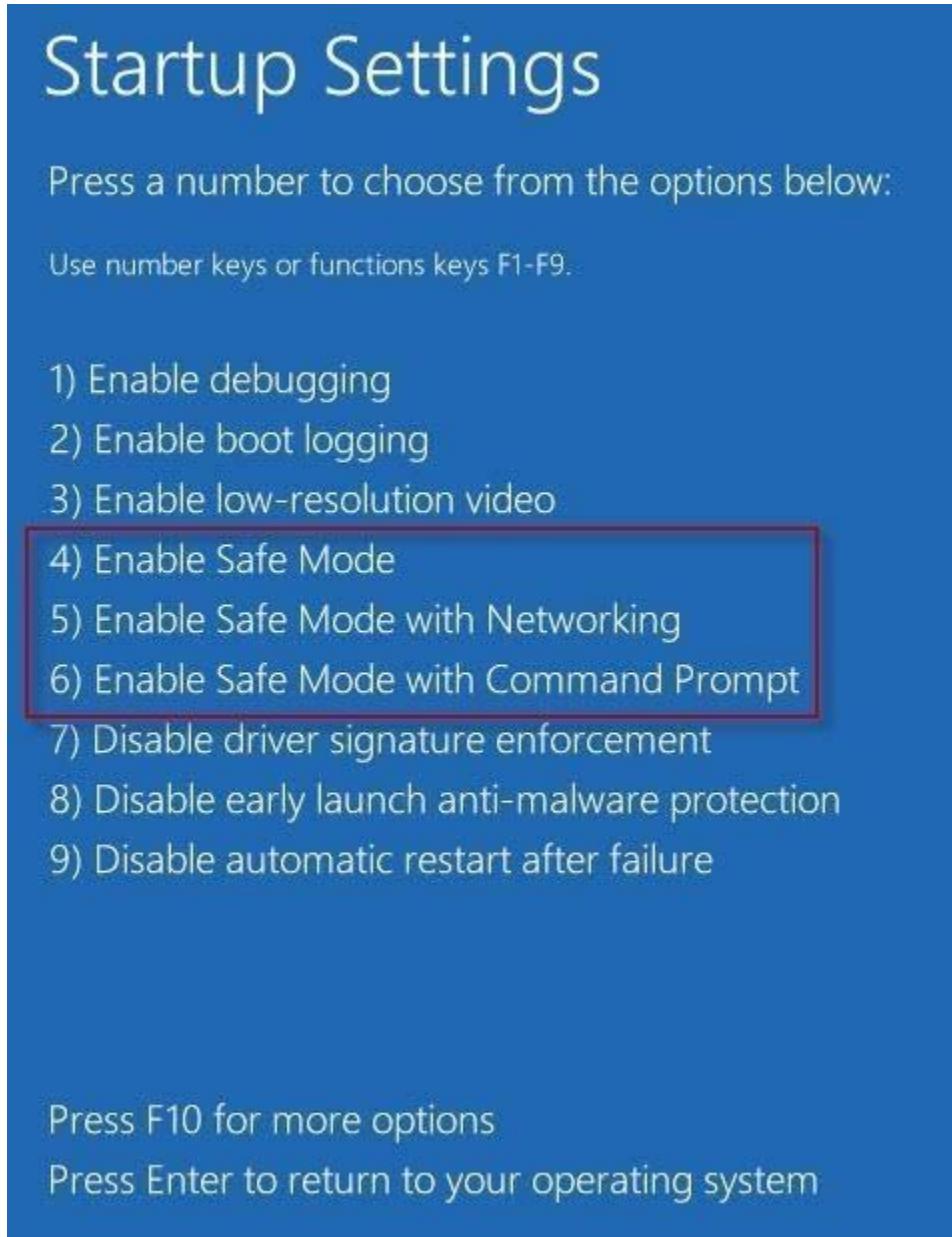
Enable Safe Mode with Command Prompt

- o In this mode, the operating system is started in text mode. This mode requires knowledge of computer commands and is, therefore, more suitable for professional users.

- o Windows 10 starts in Safe Mode.

Note: You can tell you're in Safe Mode as the words Safe Mode are displayed in the four corners of the screen.

Output/Results snippet:



Activity 3

Aim: Service if system gets frequently hanging

Learning outcome: Able to perform troubleshooting and maintenance of PC based on the faulty condition.

Duration: 2 Hours

List of Hardware/Software requirements:

Hand Tools

Flat-head screwdriver

Phillips-head screwdriver

Torx screwdriver

Hex driver

Needle-nose pliers

Wire cutters

Tweezers

Part retriever

Flashlight

Wire stripper

Crimper Punch-down tool

Cleaning Tools

Soft cloth

Compressed air

Cable ties

Diagnostic Tools

A digital millimetre

A loopback adapter

Software Tools

Disk Management Tools

Protection Software Tools

Procedure:

Method 1: Testing an Installed Fan

Download and install SpeedFan. This program uses data provided by sensors in your computer's hardware to display information about the temperatures of various components and the speed at which the cooling fans for those components are rotating.

Launch SpeedFan and wait a few minutes for it to retrieve data.

Examine the information presented in the main program window. The speed at which your computer's fans are rotating, measured in revolutions per minute, is on the left side of the window, while temperatures of various components are on the right side. The RPM data for the CPU fan is listed first, but may be labeled differently depending on the data sent by your hardware.

Check the RPM data for your CPU fan and compare it with the normal RPM range listed in the manual or specifications sheet for it. A particularly low RPM number may indicate your fan is failing.

Click the "Charts" tab, select "Fan Speeds" using the drop-down menu and place a check mark next to the label corresponding to your CPU fan to begin generating a chart of the variation in the fan's speed. Leave the program running for some time while you use your computer. Later, check the chart; a significant variation in the

RPM number, in the order of 1000 to 2000, may also indicate a failing fan.

Method 2: Testing a Fan Separately

Remove the power supply from your computer, disconnecting all cables. If you have access to a spare working power supply, using that one instead will save you the time spent disconnecting it and reconnecting it.

Check the power supply for a three-pin fan connector. Many modern power supplies have this connector; if your power supply lacks it, you will need to purchase a four-pin Molex to four-pin Molex plus three-pin fan splitter cable.

Bend or cut a metal paper clip to create a "U" shape.

Identify the 24-pin main power connector and locate a green wire and a black wire. Insert one end of the U-shaped paper clip into the pin corresponding to the green wire and the other into the pin corresponding to the black wire.

Connect the fan you want to test to the power supply using the three-pin fan connector and, if necessary, the splitter cable.

Plug the power supply into an electric socket using the appropriate power cable and, if necessary, turn it on using the switch on the back of it. Check whether the fan on the power supply is spinning to ensure it is on.

Check if the fan you are testing is spinning, if it's making any odd noises, stuttering or abruptly changing speeds.

Check for dust in motherboard

Note : Depending on your environment, you may need to clean your computer more or less often. Computer placement is one important variable. Keeping your computer on the floor allows for dust, hair, skin cells, and carpet particles to get inside easier. If you keep your computer above the floor—say, on your desk—particles are less prone to getting inside.

If you smoke near your computer, tar, ash, and other gunk can build up in your computer's fans and on inside surfaces. Ridding your computer of these things every 6 months can increase your computer's performance.

If you're the owner of a pet that sheds, you might want to clean your computer more often. The inside of your computer is just as susceptible to fur clogging fans and other areas of your computer.

In short, if you keep your computer off the floor, don't smoke, and don't have shedding pets, you can probably get away with cleaning your computer once per year. If any of those things do pertain to you, you might want to clean your computer every 6, or even 3, months. And, as always, if your computer starts getting hotter than usual, open it up to check for any dust or hair buildup and then clean it.

Step 1: Preparation



Do not open your computer while it is running or with any cables attached to it. It is always safer to remove all peripherals such as USB cables, audio cables, video cables, and *especially* the power cable. Yes, keeping the power cable connected does ground the PC and it's often okay to leave it connected while working inside the case. But, even the tiny trace of moisture from canned air can cause trouble if the components are getting power.

Next, move your computer to a well-ventilated area such as your backyard or garage. This is especially important to consider if your computer has built up a lot of dust that will be blowing around. Breathing all that old, accumulated dust isn't good for you and if you're in an enclosed space, the dust is just going to settle back on your stuff—including back on your computer.

If you're limited on space just be sure to keep a vacuum (**not** for cleaning the inside of the computer; more on that soon) nearby for a quick clean up afterwards. And if you're worried about inhaling dust, you can always stop at your local hardware stop to pick up a

cheap dust mask for less than \$5.

Step 2: Gather Your Tools



Before you begin opening your computer's case, you'll need to gather your cleaning tools. We highly recommend not using a vacuum to clean dust off your computer components. This can create a static buildup and could potentially fry important electrical components on your motherboard, video card, and other places. It's just a bad idea, so spare yourself the agony and pick up a compressed air can.

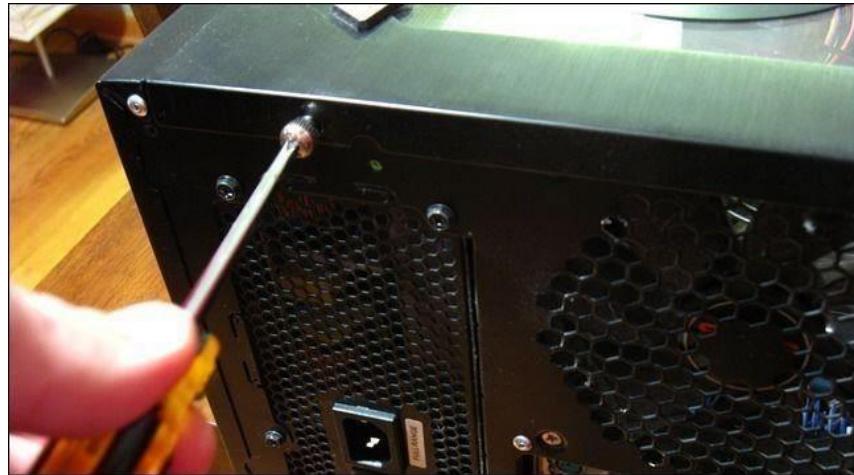
That said, a vacuum can come in handy if you're dusting out your computer inside. Run the vacuum and hold the hose near—but *not touching*—your PC. Blow the dust out of the

PC in the direction of the vacuum hose, so the vacuum can suck most of it right up.

There are a few tools you will need to clean your computer:

- o Hardware set that includes screw drivers
- o Can of compressed air
- o Cleaning cloth
- o Zip ties (optional)
- o Scissors (optional)
- o Cotton swabs
- (optional) o Thermal paste (optional)
- o Pencil or pen (optional)

Step 3: Open Your Case



Now that you're in a well-ventilated area with all your tools gathered, we can start the preparation process by opening up your computer's case. All computer cases are

different. If you've never opened yours before and are having trouble opening it, consult your computer's manual or try searching online for guides specifically about your opening your model.

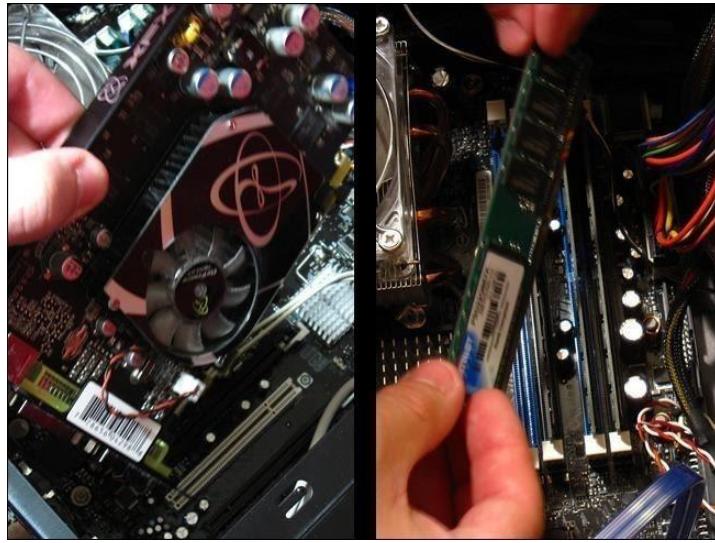
The case we're using is a Sigma Luna WB, and, just like most cases, all it takes is unscrewing two screws, and then sliding the side-panel outward. Note that if your side panel has an attached fan, you may have to disconnect a power cables to get the panel

completely off.



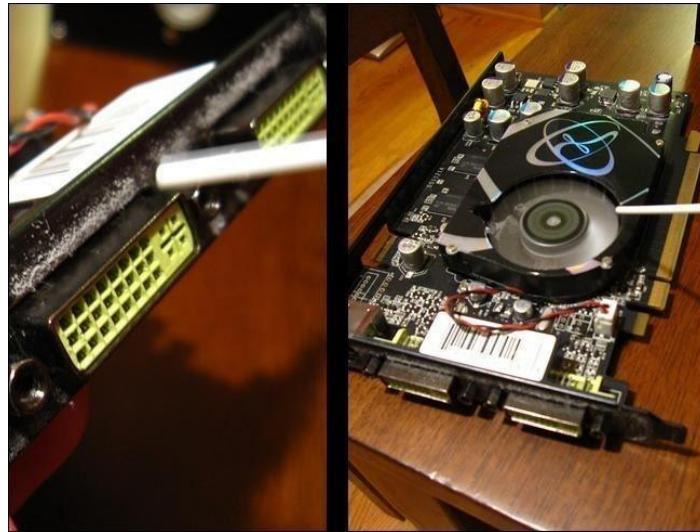
To make the cleaning process easier, it's best to take out any components that can be easily removed. Most desktop computers allow you to remove RAM sticks, video cards,

and hard drives. You don't need to do this, but you can clean more thoroughly if you do.



We recommend not removing your CPU because thermal paste that is used to transfer heat from the top of the processor to the fan needs to be replaced every time the fan is removed. If you *are* equipped with thermal paste and want to remove your CPU, just be sure to clean off the old thermal paste on your CPU with rubbing alcohol and a soft cloth. Then apply a fresh coat of thermal paste once you're done cleaning your computer. Most people shouldn't need to remove their CPU and CPU fan. It just doesn't make sense considering barely any dust makes its way into the CPU socket. Then again, if you're cleaning your computer, why not go all the way? The choice is yours.

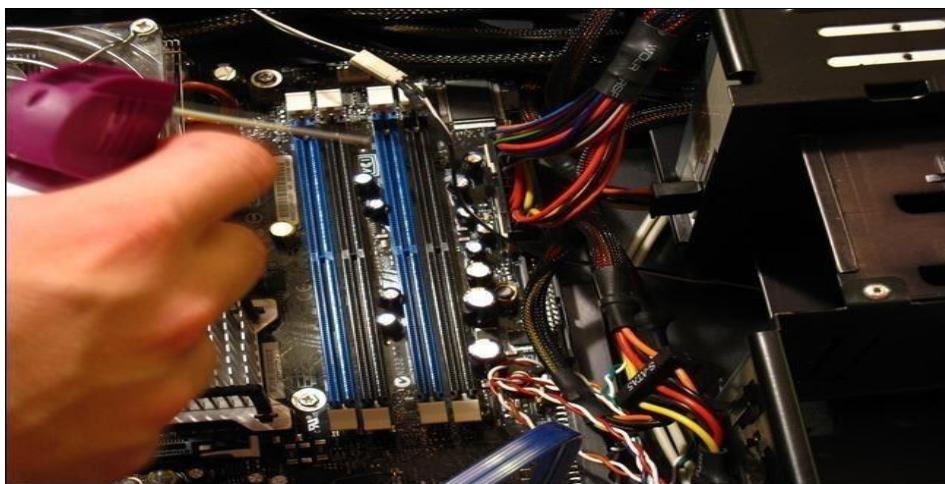
Step 4: Cleaning



To start the cleaning process, begin with the peripherals we just removed. Grab your can of compressed air and hold the trigger to release a burst of air onto an area with a lot of dust buildup. We're cleaning an old video card that never got a lot of attention, so there were some dust clumps accumulating around the DVI ports. If you're cleaning a video card with a fan, you can use a pen or pencil to prevent the blades from spinning while you blow the compressed air.

Next, we move inside the computer case. Start by removing any dust particles that may have found their way inside the RAM slots. Take your compressed air can, aim it at a RAM slot, hold the trigger, and move it down the entire slot. Repeat this for every slot in

your computer case.



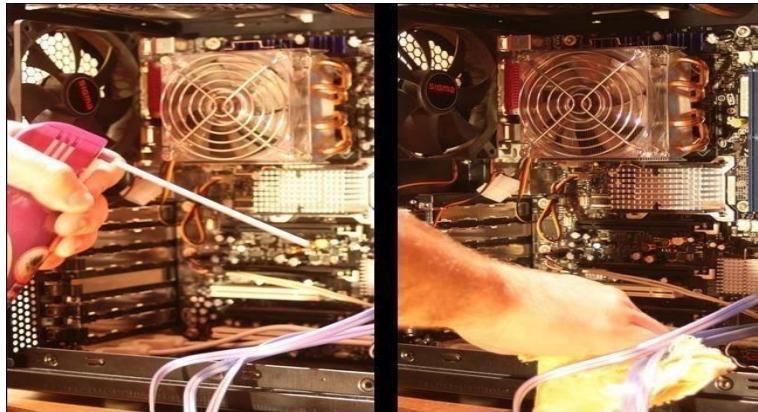
Now we'll move onto the bigger equipment inside such as your CPU fan and power supply unit. Again, it's recommended to use a pen or pencil when cleaning fans to prevent the blades from spinning. Use your compressed air can to blow out any loose dust particles.



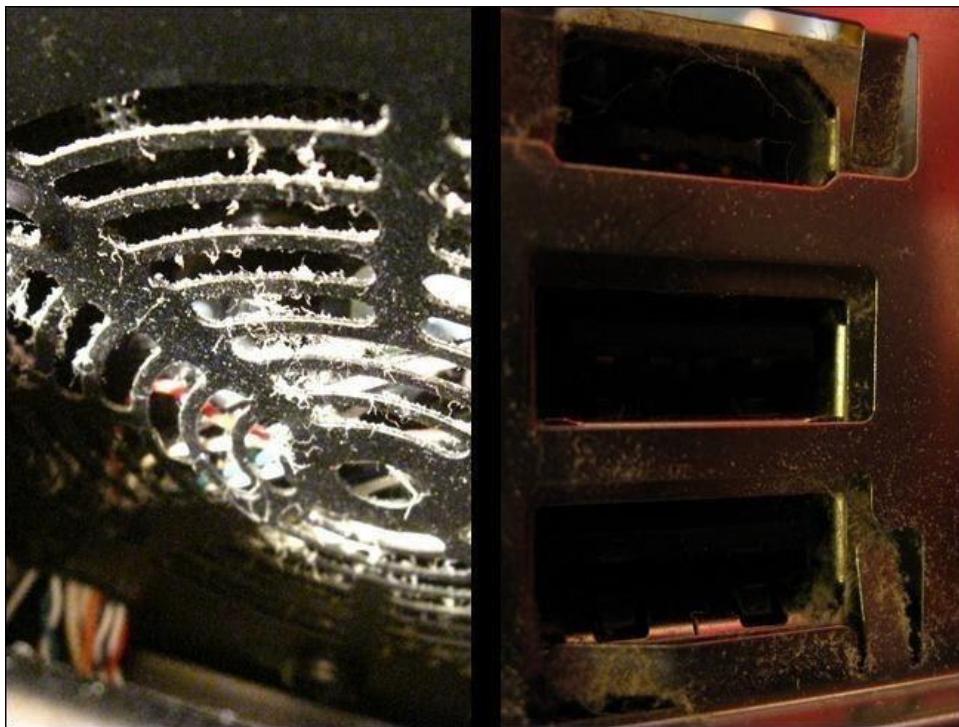
You can also use a cotton swab to clean the fan by rubbing the swab against the blades to stick the dust particles. It's a little tedious, but it makes for a nice, clean fan in the end.

The bottom of your case will undoubtedly have dust buildup. You can begin with blowing the dust away with your compressed air. If there is still dust stuck to the case, you can use a damp cloth to wipe it. Make sure your cloth is not *wet*, but

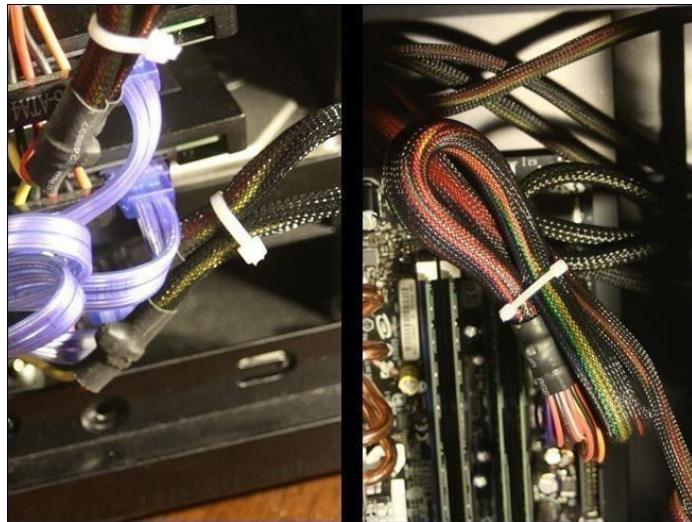
damp. Repeat this step for all the nooks of your case.



Finally, don't forget to also clean out any other fans, ports, or enclosures as described above.



If you've got a fan that's particular gunked up, don't be afraid to use a cotton swab with a bit of isopropyl alcohol to get the blades clean. Give the fans a quick spin to make sure that the blades move freely after cleaning. If they don't, it's probably best to go ahead and replace those fans.

Step 5: Decluttering Cables (Optional)

This next step is optional and is recommended for custom built computers. Unlike professionally manufactured computers, custom built computers don't arrive with nicely

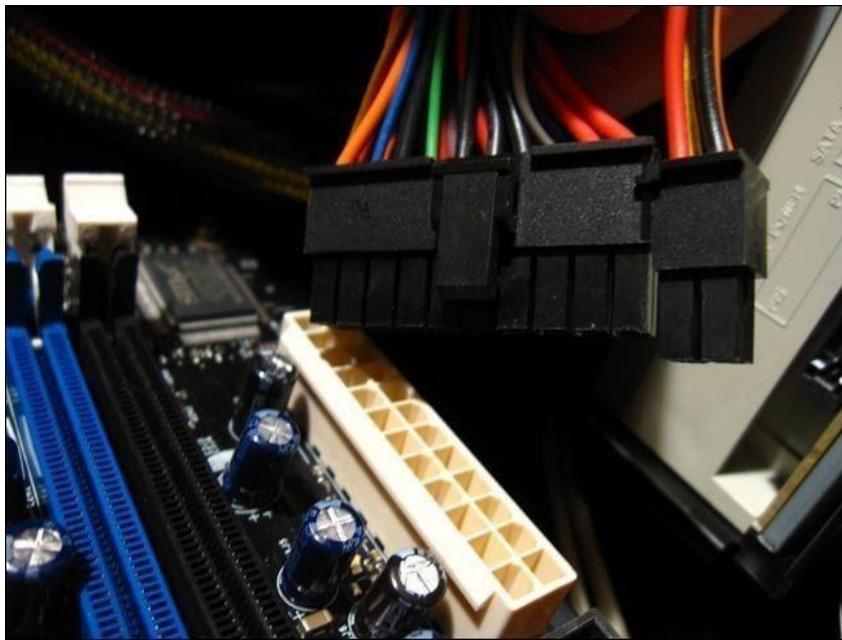
tucked away cabling that fits just right. The best way to make your case more

secure and organized is to use zip ties. You also don't want your CPU fan or any other fans scraping away at cables if they're not neatly tucked away.

To start you'll need a pack of zip ties. It doesn't matter what size or color they are, as long as they can fit around all your cables. We'll be using 4-inch zip ties.

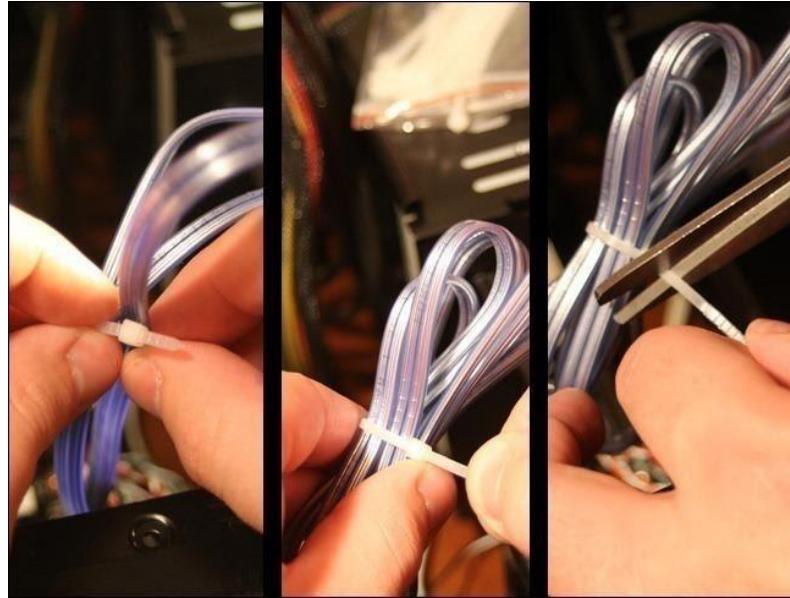


Begin by disconnecting all cables that need to be tied. Be sure to write down how they were connected for reference later and take pictures.



When you have a cable or set of cables grouped to your liking, wrap a zip tie around it and run the thin end through the fastener. Then tighten the zip tie by pulling the thin end

until you can no longer tighten it. Grab your scissors and cut off the excess.



Repeat this step for as many cables as possible. You can then tuck them away to reduce their visibility and give your computer's guts a cleaner look.

Step 6: Final

Plug your cables back into their correct sockets. Refer to your document or pictures from earlier if you don't remember where each cable goes. Also remember to put back any removed peripherals, such as a video card or sticks of RAM, back into their appropriate sockets.

Output/Results snippet:



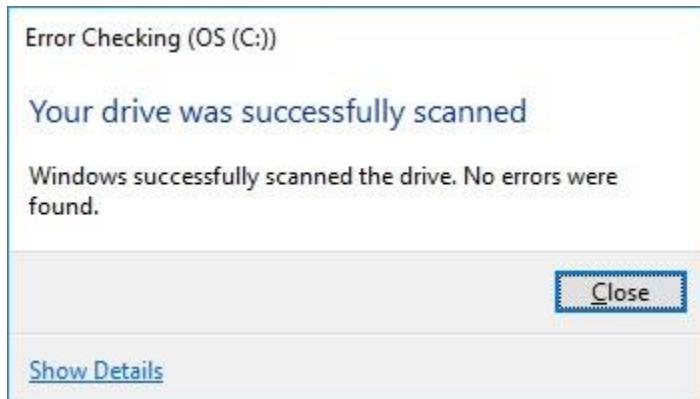
Run CHDKSK

Alternative: run CHKDSK from a Command Prompt

Step 1: To do this, open up command prompt (click Windows key + X then select **Command Prompt - Admin**).

Step 2: In the command prompt window, type in **CHKDSK** then a **space**, then the name of the disk you wish to check. For example, if you wished to perform a disk check on your C drive, type in **CHKDSK C** then press enter to run the command.

Output/Results snippet:



Check for Boot virus

Important: These infect at BIOS level and usually spread through DOS commands. Due to minimized use of DOS commands now, such malware are harder to come across. Yet, there are 'bootkits' that infect the MBR (Master Boot Record) as a means of loading early in the boot process and then concealing the actions of malware running under Windows.

Removing a boot sector virus can be difficult because it may encrypt the boot sector. One of the best options is to use a rescue disc for detection and disinfection. There can be associated risk or failure possible and the only option then will be complete reformatting of the Hard Disc.

In order to remove boot sector virus and scan computer for other malware, we are going to use

Kaspersky Rescue Disk. Perform the following actions carefully:

Boot your computer from Kaspersky Rescue Disk using Graphic Mode. For instructions booting in graphic mode visit [here](#).

After booting in Graphic mode, first of all update Antivirus database.

Navigate to My Update Center tab and click on Start Update button.

After updating the Antivirus database, Navigate to Objects Scan tab.

You could choose drives to scan for infection. By default Kaspersky Rescue Disk scans Disk boot sector and hidden startup objects. Now, click on Start Objects Scan.

Wait for the scan to complete.

After completing the scan, the application will ask you to perform some actions with detected threats. You can select one the following actions:

Disinfect: Select this option to repair or disinfect the selected file.

Delete: Delete infected files if disinfection fails.

Quarantine: Quarantine contains those files that are detected as threat but its not confirm that they are malicious or not.

Output/Results snippet:



Reload OS

Step 1: Make copies of all the personal files on your computer.

Remember that a complete reinstallation wipes the hard drive clean, removing all software and all your personal files. You don't need to make backup copies of your software programs; you'll need to reinstall those programs anyway when Windows is

back in place.

Step

2: Choose Start→Turn Off Computer→Restart to restart your computer and watch the screen carefully.

You should see a message to press a function key (F2 probably) or another key combination to enter the BIOS (Basic Input Output System) screen.

Step 3: Press the designated key or key combination.

You have only a few seconds to press this key to interrupt the startup process and enter the BIOS screen.

Step 4: Look for an option called First Boot Device, Boot Sequence, or something similar; press the arrow keys on your keyboard to select this field and then press Enter.

You may have to select Advanced Options or another submenu to find it.

5: In the resulting screen, select CDROM/DVD and then press the Esc key until you return to the main BIOS screen. Follow the onscreen instructions to save your new settings and exit BIOS setup.

Your computer will restart from the CD/DVD drive.

Step 6: Insert your Windows installation CD into the drive and then restart your computer.

Windows XP, Vista, and Windows 7 present slightly different startup screens. These steps describe the Windows 7 procedure, but the procedures in Windows XP and Vista are similar. The object is to get through the opening screens to the custom install screen,

where you can reformat your hard drive and begin a clean installation.

Step

Step 7: In the startup screen, select the Install Now option. In the next screen, select I Accept the License Terms and click the Next button.

You're asked what kind of installation you want to do.

Step 8: Select Custom (Advanced). If you're given a choice of partitions, select the larger partition for your Windows installation.

In most cases, you have only one or two choices: maybe a small partition (200MB or so) and a large one (30GB–100GB or larger).

Step 9: In the next screen, click Advanced to expand the options at the bottom of the screen and choose the option to reformat your drive. Follow the onscreen instructions to reformat your drive and install Windows.

You're prompted to enter the Windows product key. This key — a set of 25 letters and numbers — may be on the Windows CD/DVD case or on a separate sheet of paper that came with the software. Some manufacturers also place a copy of the key on a sticker

affixed to the computer case.

10: Follow the onscreen instructions to complete the installation.

You're all done! After reload successfully you can very version of installed OS like shown below in output screen.

Output/Results snippet:

Step



Activity 4

Aim: Service if system is very slow.

Learning outcome : Able to perform troubleshooting and maintenance of PC based on the faulty condition.

Duration: 2 Hours

List of Hardware/Software requirements:

Hand Tools

Flat-head screwdriver

Phillips-head screwdriver

Torx screwdriver

Hex driver

Needle-nose pliers

Wire cutters

Tweezers

Part retriever

Flashlight

Wire stripper

Crimper Punch-down tool

Step 1: Simply press the Alt + Tab key once if all programs and windows are in minimized state.

Step 2: Next, start pressing Alt + F4 hotkey to start running apps and windows until you see the Shut down Windows dialog.

Step 3: If all programs and windows have been closed, you can press the Enter key when you see the Shut Down dialog to commence shutting down Windows.

Step 4: If the Shut Down dialog appears even before closing all open windows and programs, simply press Alt + Tab key once to select an open window or program and then start

pressing Alt + F4 hotkey again to kill remaining programs and windows.

Once all windows and programs are closed, you'll see Shut Down

Procedure:

Close all opened applications

Method 1 : Alt + F4

Windows dialog. Simply press Enter key to shut down your PC. Hope this tip helps you in quickly closing all windows and programs.

Method 2: Close a Group of Windows

close all of them at once using the mouse.

When you have numerous files open in the same program, like a bunch of emails in Outlook, Word files, or several spreadsheets in Excel, you can

Right-click the program in the Windows taskbar and select Close all windows (or Close Group in older versions of Windows).

Method 3: Use the Task View window .

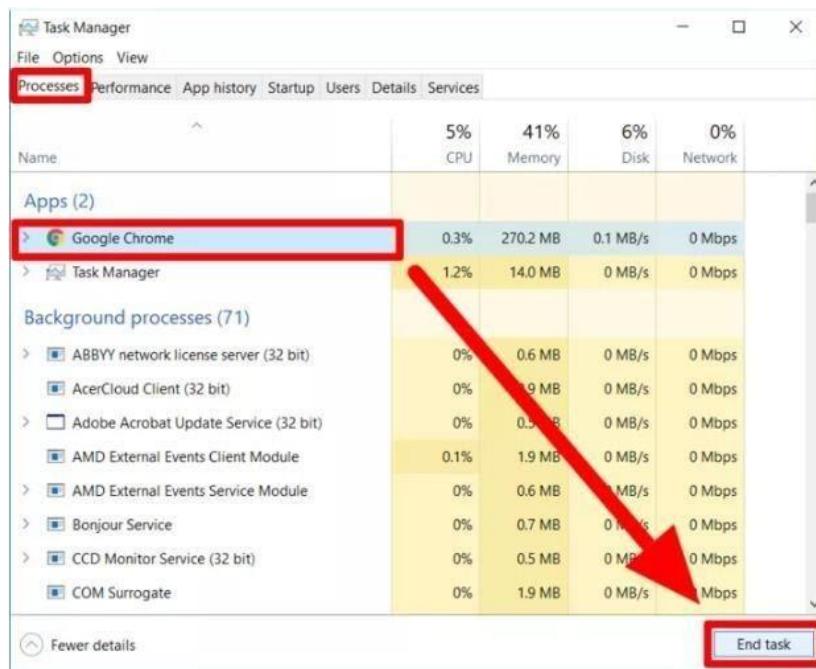
Step 1: Click the taskbar task view Image titled Taskview.png icon. It's to the right of the search bar/icon. Alternatively, press Win+Tab together.

Step 2: Locate the app you wish to close.

Step 3: Move your pointer to the top-right of the app preview, parallel to the title.

Step 4: Click the button. It'll turn red when highlighted.

Output/Results snippet:



Run MSConfig and remove all unwanted startup applications

Step 1: Click Start, point to Run

Step 2: Type in: msconfig

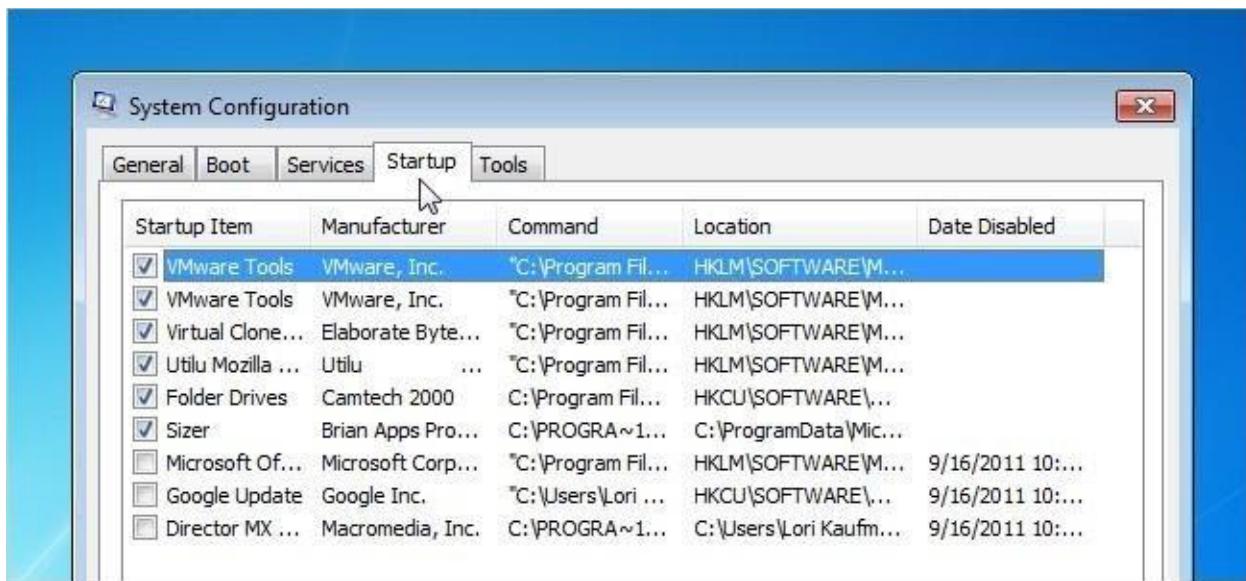
Step 3: Click on the Startup tab

Step 4: A list of options indicate the programs that start up each time you load Windows.

Step 5: Tick only those that are necessary and click OK

Step 6: You'll be prompted to restart your computer. Click Restart

Output/Results snippet:



Check virus affect on OS

Scan your PC with Windows Defender

Step 1: Open Windows Defender by swiping in from the right edge of the screen, and then tapping Search (or if you're using a mouse, pointing to the upper-right corner of the screen, moving the mouse pointer down, and then clicking Search), entering defender in the search box, and then tapping or clicking Windows Defender.

Step 2: Under Scan options, pick the type of scan you want to run:

- o A Quick scan checks only the areas on your PC that malicious software is most likely to infect, and any apps currently running.
- o A Full scan checks all the files on your PC. Depending on your PC, this scan might take an hour or more.
- o A Custom scan checks only the files and locations that you choose.

Step 3: Tap or click Scan now.

Remove a virus manually

Windows Defender will typically remove viruses automatically. However, in some cases you might need to remove a virus manually. This can be a technical process that you should try only if you've exhausted all other options, you're familiar with the Windows registry, and you know how to view and delete system and program files in Windows.

First, run your antimalware app to identify the virus by name. If you don't have an antimalware app or if your app doesn't detect the virus, you might still be able to identify it by looking for clues about how it behaves.

Write down the words in any messages it displays, or, if you received the virus in email, write down the subject line or name of the file attached to the message.

Then search an antivirus provider's website or the Microsoft Malware Protection Center for references to what you wrote down or to try and find the name of the virus and instructions for how to remove it.

After the virus is removed, you might need to reinstall some software or restore lost info. Making regular backups of your files can help you avoid data loss if your PC gets infected again. If you haven't made backups in the past, it's a good idea to start now. For more info, see [Restore files or folders using File History](#).

In Windows 7, click Start. In the Search programs and files box, type appwiz.cpl, and then press Enter.

In the list of installed programs, uninstall any other Internet security programs.

Restart your PC.

Output/Results snippet:



Activity 5

Aim: Troubleshoot if paper is jam in printer

Learning outcome: Able to understand how the web works.

Duration: 5 hour

List of Hardware/Software requirements:

Hand Tools

Flat-head screwdriver

Phillips-head screwdriver

Torx screwdriver

Hex driver

Needle-nose pliers

Wire cutters

Tweezers

Part retriever

Flashlight

Wire stripper

Crimper

Punch-down tool

Cleaning Tools

Soft cloth

Compressed air

Cable ties

Diagnostic Tools

A digital millimetre

A loopback adapter Software

Tools

Disk Management Tools

Protection Software Tool

Procedure:

Check for any loose components in the feed assembly

Step one: Remove any loose paper from the trays

Remove any loose sheets of paper from the input tray and the output tray.

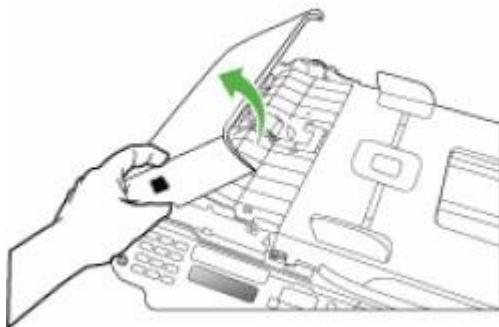
Figure: Remove loose paper from the ADF



Step two: Clear any jammed paper from the ADF top cover rollers

- o Press the Power button () to turn off the product.
- o Disconnect the power cord from the rear of the product.
- o Open the ADF top cover.

Figure: Open the ADF top cover

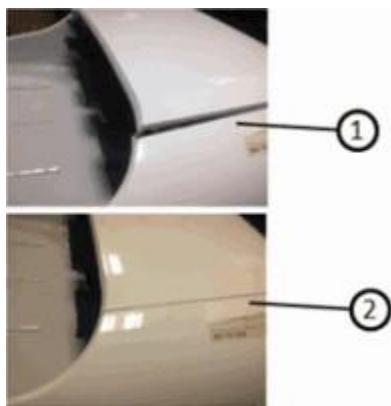


- Carefully remove any jammed paper and bits of torn paper from the rollers inside the ADF top cover. Use both hands to pull whole sheets of paper to avoid tearing them. **Figure: ADF top cover rollers**



Close the ADF top cover.

Figure: Close the ADF top cover



ADF top cover not closed

ADF top cover completely closed

Follow these steps to remove jammed paper from the ADF document lid.

Lift the document lid.

Figure: Lift the document lid



Carefully remove any jammed paper and bits of torn paper from the bottom side of the document lid. Use both hands to pull whole sheets of paper to avoid tearing them.

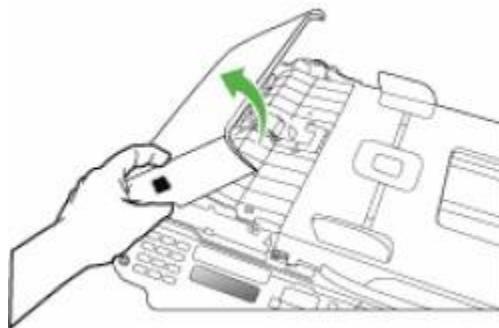
Figure: Paper jammed in the document lid



Lower the document lid.

Open the ADF top cover.

Figure: Open the ADF top cover



Carefully remove any jammed paper and bits of torn paper from the mechanism rollers.

Use both hands to pull whole sheets of paper to avoid tearing them.

Figure : ADF mechanism rollers are under the housing



Close the ADF top cover.

Reconnect the power cord to the rear of the product.

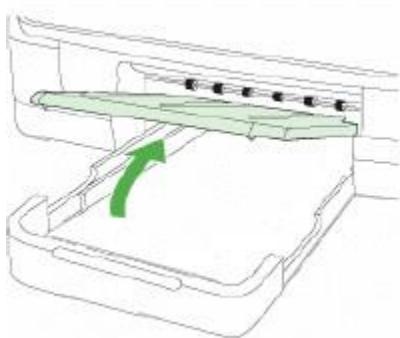
Press the Power button () to turn on the product.

Step five: Load paper in the input tray

Make sure that plain white paper is loaded in the input tray. If paper is already loaded in the tray, continue to the next step.

Lift the output
tray.

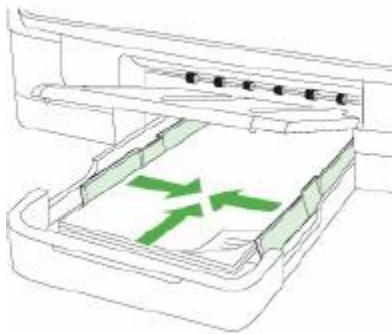
Figure: Lift the output tray



With the print side down, insert a stack of paper until it rests against the rear edge of the tray.

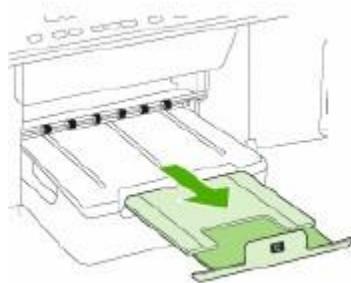
Slide the paper width guides inward so that they rest against the edges of the paper.

Figure: Slide the paper guides inward



Lower the output tray, and then pull out the output tray extender.

Figure: Pull out the output tray extender

**Step six: Try to copy, scan, or fax**

Try to copy, scan, or fax an original document from the ADF document feeder tray to make sure that the ADF functions correctly.

Reload an original document *print side up* into the ADF document feeder tray.

Figure: Reload the original document into the ADF document feeder tray



Press OK to continue the task you started when the issue occurred.

Output/Results snippet:

Test Print page, if error resolve successfully to get printout.

Check for any blockage in paper eject assembly

Clean the rollers inside the top paper tray.

Get a flashlight.

Turn off the printer.

Wait until the printer is idle and silent, and then disconnect the power cord from the rear of the printer.

Remove the paper stack from the input tray.

With the flashlight, look down into the input tray and find the paper pick rollers.

Lightly dampen a cotton swab with water, and then squeeze it to remove any excess water.

Clean the rollers with the swab, rotating the rollers with your fingers to completely clean them.

Allow the rollers to dry for two minutes.

Reconnect the power cord, and then turn on the printer.

Clean the paper picks rollers (under printer)

Clean the paper pick rollers on a printer where the paper tray is located on the bottom.

Turn off the printer

Wait until the printer is idle and silent, and then disconnect the power cord and any cables from the rear of the printer.

Remove the paper stack from the input tray.

Lift the printer and place it on its side or back.

Pull out the paper tray, and then locate the gray paper pick rollers.



Lightly dampen a cotton swab with water, and then squeeze it to remove any excess water.

Clean the rollers with the swab, rotating the rollers with your fingers to completely clean them.

Allow the rollers to dry for two minutes.

Set the printer upright.

Reconnect the power cord, and then turn on the printer.

Clean the paper picks rollers (inside printer)

Clean the paper picks rollers under the cartridges or inside the paper tray area.

Get a flashlight.

Turn off the printer.

Wait until the printer is idle and silent, and then disconnect the power cord and any cables from the rear of the printer.

Remove the paper stack from the input tray.

Depending on your printer model, use the flashlight to find the paper pick roller.

Figure: Printers with the roller under the cartridges

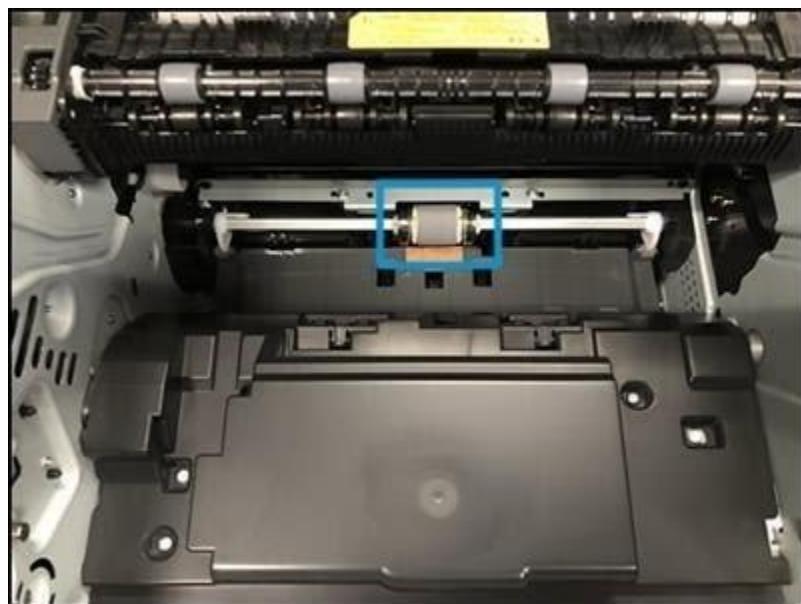


Figure: Printers with the roller above the input tray



Lightly dampen a cotton swab with water, and then squeeze it to remove any excess water.

Clean the rollers with the swab, rotating the rollers with your fingers to completely clean them.

Allow the rollers to dry for two minutes.

Reconnect the power cord and cables, and then turn on the printer.

Output/Results snippet:

Troubleshoot loose components in feed assembly successfully.

Check if Paper tray is full

Check the paper stack for defects such as wrinkled, torn, or bent pieces that might cause a pick-up issue

Step 1: Remove any paper from the paper tray.

Step 2: Remove any severely bent, wrinkled, or torn paper found in the stack.

Step 3: Check for obstructions inside the paper tray. Make sure nothing blocks the paper from engaging with the rollers

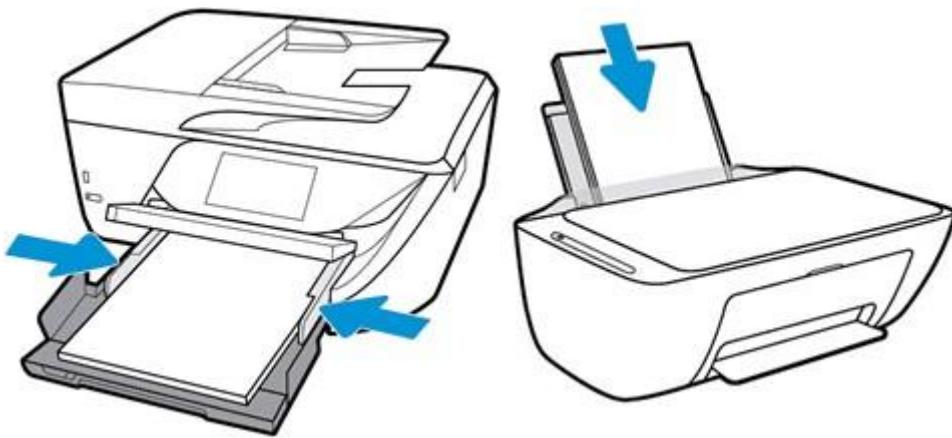
Step 4: Make sure the paper stack is even on all sides.

Step 5: Load the stack of paper into the paper tray.

Step 6: Close or push in the paper tray.

Step 7: Select the correct paper size on the printer control panel or in the printer software.

Output/Results snippet



Check paper pick up sensor

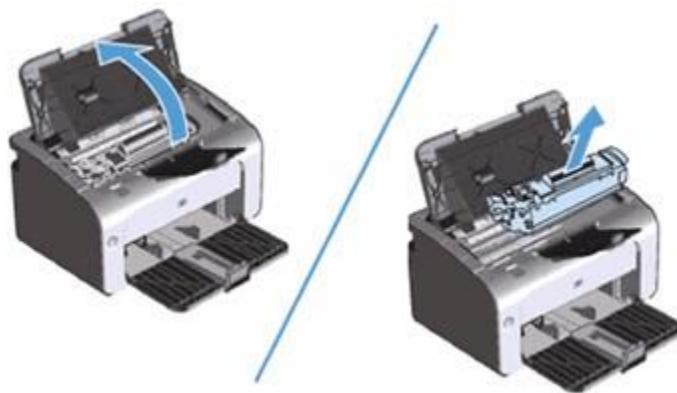
Dust, paper fiber, and other debris might accumulate on the pickup roller and cause paper feed issues. Clean the pickup roller inside the printer, and then try to print again. Gather the following items.

- o A lint-free cloth or swab
 - o Distilled, filtered, or bottled water (tap water might damage the printer)
- Turn off the printer.

Unplug the power cord from the back of the printer, and then wait for the printer to cool.

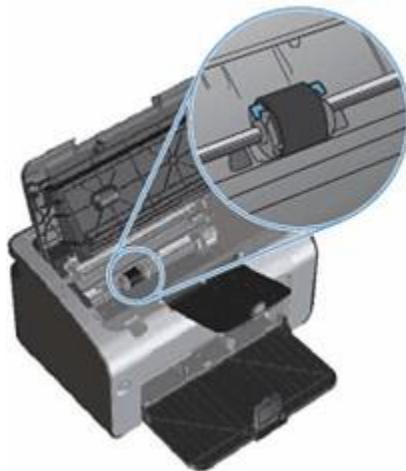
Open the print cartridge door, and then remove the print cartridge.

Figure: Opening the print cartridge door and remove the print cartridge



Find the pickup roller.

Figure: Finding the pickup roller



Lightly dampen the swab or cloth with the water, and then squeeze any excess liquid from the swab.

Clean the pickup roller, applying a moderate amount of pressure.

Allow the pickup roller to dry completely (approximately 10 minutes).

Reinstall the print cartridge, and then close the print cartridge door.

Plug the power cord back into the printer, and then turn on the printer.

Try to print. If the issue persists, continue to the next step.

Output/Results snippet:**Check paper pick up roller for any damage**

Step one: Check for paper jams in the trays or in any printer access doors

Check all the paper trays and remove any loose sheets of paper in the trays.

Open the tray and remove any loose sheets of paper in the tray.

Open the printer access doors and remove any sheets of paper inside the printer.

If any jammed paper is visible, grasp the jammed paper with both hands and gently pull it straight out to remove it out of from the printer.

Verify that no torn remnants of paper remain inside the printer.

Do not tear the paper when removing any paper jams as it becomes more difficult to identify paper remnants inside the printer.

For more help in clearing paper jams, see the following resources:

Jam error message : Check the printer control panel for a jam error message or animation showing how to clear the jam.

User Guide : Look in the "Solve problems" section of the user guide for jam codes and instructions on clearing various types of jams. To search for the user guide for your specific printer model, go to www.hp.com/support, select your country/region, and then follow the instructions to identify your printer.

Step two: Check the paper type and condition

Use the following guidelines to examine the condition of the paper being used.

Replace any ripped, dusty, curled, wrinkled or folded paper. If necessary, use paper from a different package.

Remove any staples, paper clips, or self-adhesive notes.

Use paper that meets HP specifications for the printer.

Use paper that has not previously been printed or copied.

For detailed information on supported paper types and sizes, refer to one of the following documents:

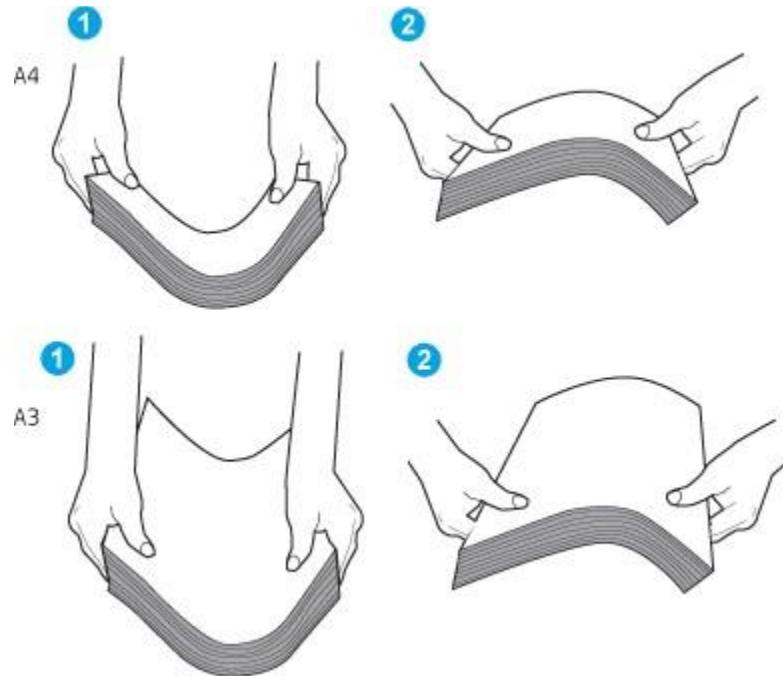
Remove the stack of paper from the tray. Use both hands to flex the paper stack to form a U-shape, and then flex it in the opposite direction.

Use both hands to hold the ends of the paper stack, and then bring each end up to form a U-shape.

Rotate the ends down to reverse the U-shape.

Hold each side of the stack of paper and repeat this process.

Figure: Technique for flexing the paper stack



- A. Rotate the paper 180° and flip it over.
- B. Tap the edges of the paper stack on a table to make sure that the edges are even.

Step three: Check the environment

Verify that the humidity in the room is within the recommended specifications for the printer.

Make sure that the paper is being stored in unopened packages.

Depending on the high- or low-humidity environment, perform the appropriate task:

In high-humidity environments :

- If the paper at the top of the stack in the tray has a wavy or uneven appearance, remove the top five to ten sheets of paper from the stack.

In low-humidity environments :

- If the sheets of paper stick together, remove the paper from the tray, and then flex the

paper stack. Refer to [Step two: Check the paper type and condition](#) for instructions.

- Reload the stack of paper in the tray.

Step four: Adjust the paper guides on the tray

Adjust the paper guides to the appropriate indentation or markings in the tray.

Make sure that the paper guides in the tray are adjusted correctly for the size of paper being loaded into the tray. The arrow on the tray guide should line up exactly with the marking on the tray.

The following images show examples of the paper-size indentations in the trays for various printers. Most HP printers have markings similar to these.

Figure: Size markings for Tray 1 or the multipurpose tray

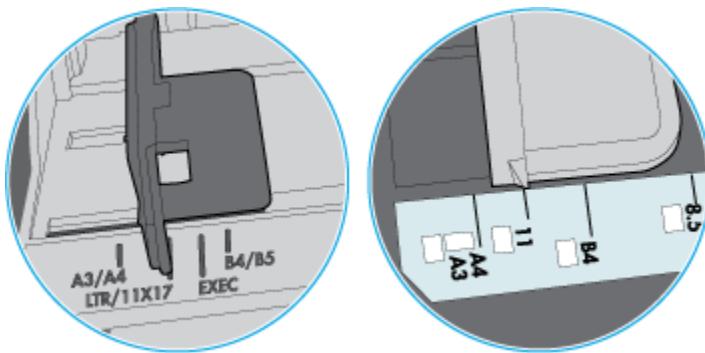
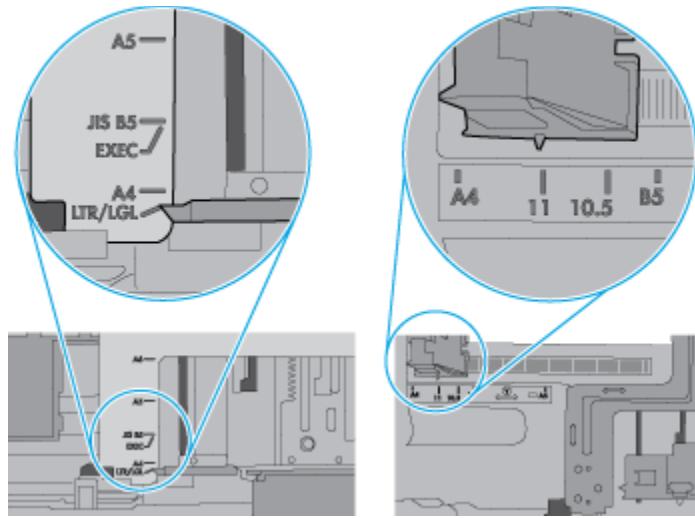


Figure: Size markings for cassette trays



1. Use the following guidelines to make sure that the tray is not overfilled:

- a. Check the stack-height markings inside the tray.
- b. If the tray is overfilled, remove the entire stack of paper from the tray, straighten the stack, and then load some of the paper into the tray.
- c. Make sure that all sheets of paper are below the stack-height markings on the tray.

The following images show examples of the stack-height markings in the trays for various printers. Most HP printers have markings similar to these.

Figure: Stack-height markings

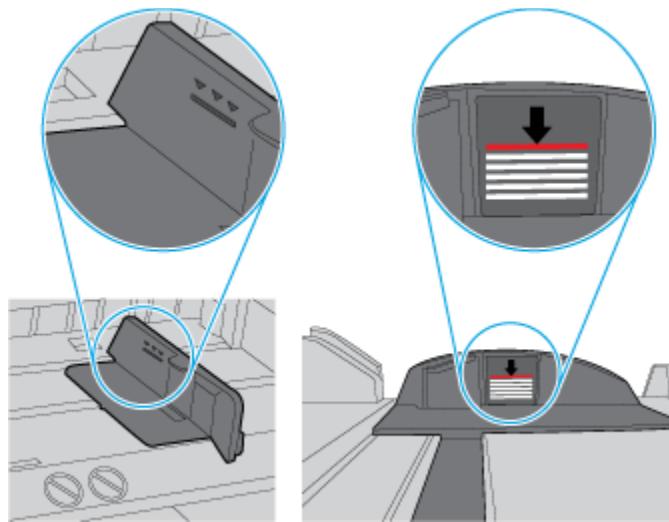
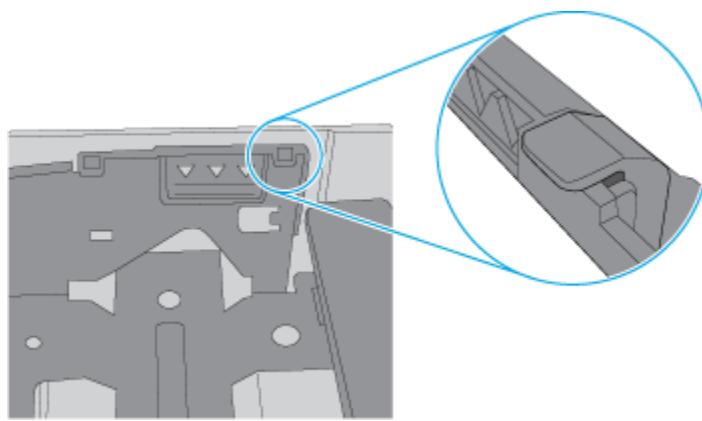


Figure: Tab for the paper stack



1. Try to print and see if the issue persists.
2. If the issue persists, continue to the next step to resolve the issue.

Step five: Check the tray rollers

1. Open the tray and remove it from the printer to access the rollers.

The following images are examples of where the tray rollers might be located. The locations might differ slightly, depending on your printer model.

Figure: Roller locations for Tray 1 or the multipurpose tray

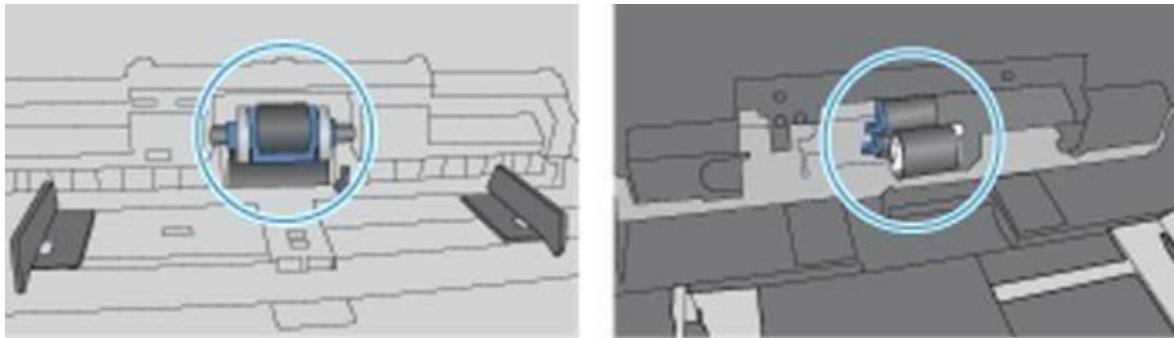
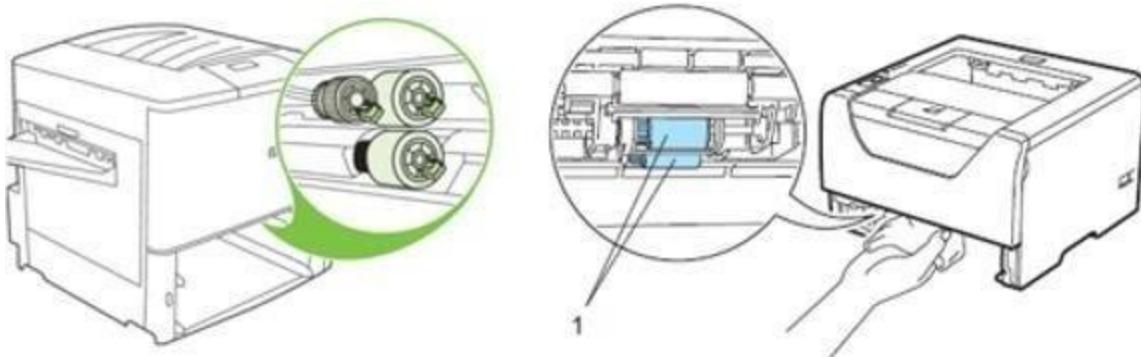


Figure: Roller locations for the cassette trays



1. Check whether the rollers above the tray are contaminated or dirty.

To clean dirty rollers, use distilled water (if available), and follow these steps:

- a. Spray water on a lint-free cloth or dab the cloth in water and wring it out before cleaning the rollers.
 - b. Wipe the rollers with the dampened cloth to remove the dust, debris, or contamination.
2. Check whether the tray rollers are damaged or worn.

Inspect the rollers for damage or any extremely smooth surface, either completely around the circumference, or just on one side.

3. Replace the tray rollers if worn or damaged. Make sure that you know your printer model number which can be found on the label on the back of the printer.
4. Load paper and try to print.

Output/Results snippet:

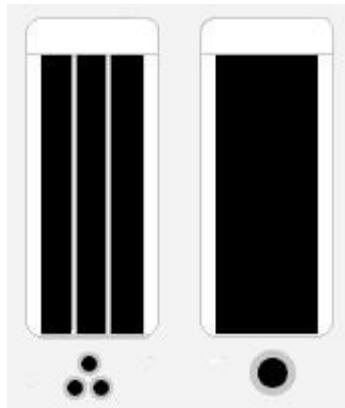
Troubleshoot paper pick up sensor successfully

Check in cartridge access cover**Step 1: Check for ink smears on the back of printouts**

- If there are smears of ink on the back of your printouts, you can use an automated tool to resolve the issue.
- Make sure the printer is loaded with plain white paper.
- On the printer control panel, swipe the display to the left, and then touch **Setup**  .
- Touch **Tools**  .
- Swipe up on the display, and then touch **Clean Page Smears** .
- The printer slowly feeds a blank page.
- Wait for the printer to eject the blank page.
- Try to print. If the print quality is unacceptable, continue to the next step to make sure you are using the appropriate paper for your print job.

Step 2: Check the estimated ink levels

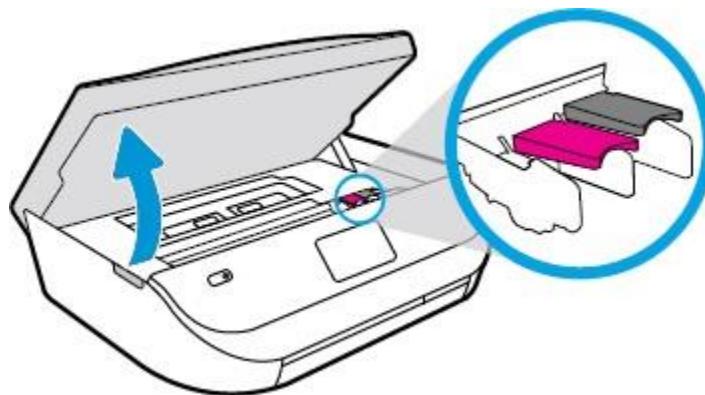
- Low ink levels can affect print quality. Check the estimated ink levels from the printer control panel.
- On the printer control panel, touch the **Ink** icon  to display the current estimated ink levels.



- **If none of the ink cartridges are low on ink**, you do not need to replace them yet. Skip to the step to [print a Print Quality Diagnostic report](#).
- **If any of the ink cartridges are low on ink**, continue to the next step to replace the ink cartridge.

Step 3: Replace any low or empty ink cartridges

- Replace any low or empty ink cartridges, and then try to print again.
- Turn on the printer.
- Make sure to load the printer with plain, white paper.
- Gently grasp the handles on either side of the printer, then raise the ink cartridge access door until it locks into place.
- The carriage moves to the center of the printer.

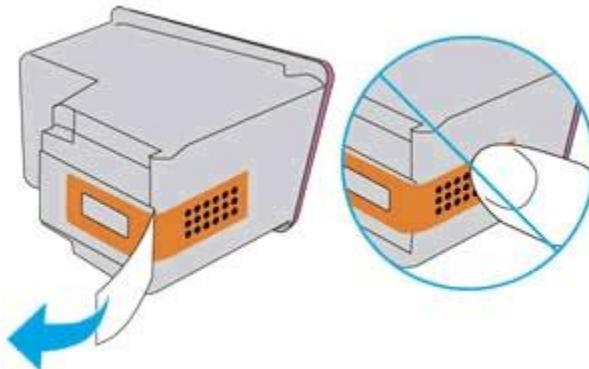


- Wait until the carriage is idle and silent before you proceed.

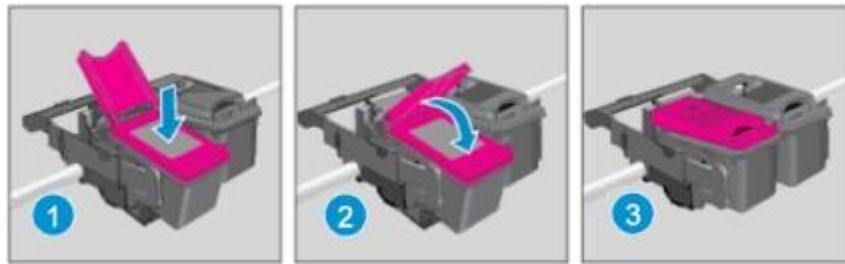
- To release the ink cartridge, lift the lid on the ink cartridge slot, then gently push the lid back until it stops.
- Pull up on the ink cartridge to remove it from the slot.



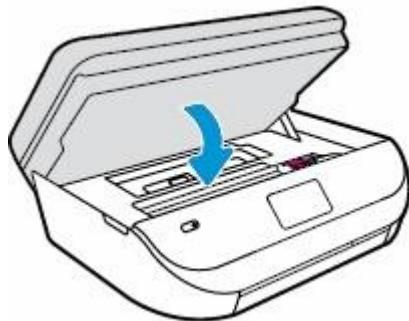
- Lift the lid
- Gently push the lid back
- Pull up on the ink cartridge
- Remove one of the new ink cartridges from its package. Be careful to only touch the black plastic on the ink cartridge.
- Remove the plastic tape from the ink cartridge.



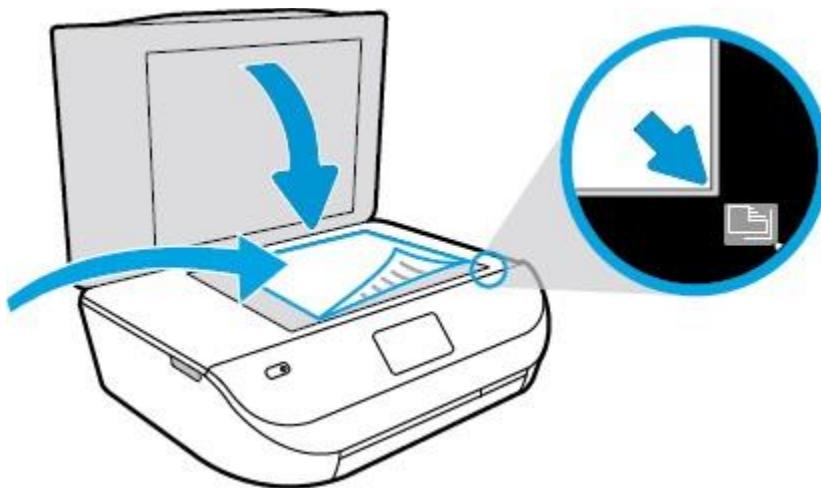
- Hold the ink cartridge by its sides with the nozzles toward the printer, then slide the ink cartridge forward into the slot.
- Close the lid on the ink cartridge slot to secure the ink cartridge into place.



- Insert the ink cartridge
- Close the lid
- The color ink cartridge is on the left, and the black ink cartridge is on the right
- Repeat the previous steps to install the other ink cartridge, if needed.
- Close the ink cartridge access door.
- After you install **new** ink cartridges, the printer automatically prints an alignment page.

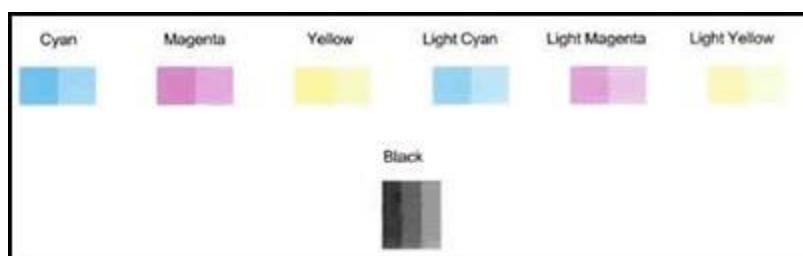


- Wait for the alignment page to fully eject from the printer.
- Lift the scanner lid.
- Place the alignment page with the print side down on the scanner glass. Position it according to the engraved guides around the glass.



- Close the scanner lid, then touch **OK**.
- The printer aligns the ink cartridges.
- If replacing the ink cartridges resolved the issue, you do not need to continue troubleshooting.
- Step 4: Examine the color blocks for defects
- Examine the color blocks on the Print Quality Diagnostic report to make sure the color

blocks do not show white lines and are not faded or missing.



- If the color blocks **do not show white lines and are not faded or missing**, [skip to the step to check the alignment lines](#).
- If any of the color blocks **show white lines, are faded, or are missing completely**, continue to the next step to clean the ink cartridges.

Step 5: Clean the ink cartridges

- Cleaning the ink cartridges can improve print quality. Clean the ink cartridges from the printer control panel, then evaluate the results.
- Make sure to load the input tray with plain, white paper.
- On the printer control panel, swipe the display to the left, then touch **Setup** .
- Touch **Tools** , then touch **Clean Cartridges**.
- The printer prints a Print Quality Diagnostic report.
- Examine the print quality on the Print Quality Diagnostic report.
- If the print quality is **acceptable**, click **No**. You can stop troubleshooting.
- If the print quality is **unacceptable**, click **Yes** when prompted to perform the next level of cleaning.

Step 6: Manually clean the area around the ink nozzles

Print Quality Diagnostic

1. Ink levels are okay and should not cause print quality problems. Ink is genuine HP.
2. Check media and settings. PHOTOS: Use Best mode and photo media. TEXT: Use Normal mode and plain paper.
3. If the color blocks below are streaked or missing, press SETUP, TOOLS, then CLEAN CARTRIDGES.

Cyan	Magenta	Yellow	Light Cyan	Light Magenta	Light Yellow
					
Black					
					

4. If the lines below are crooked, press SETUP, TOOLS, then ALIGN PRINTER.



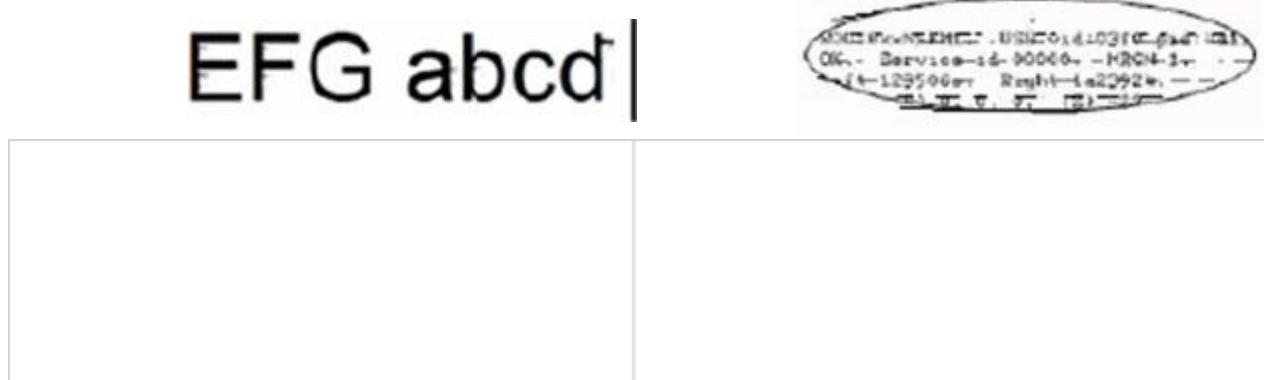
5. If there is a dark line or white gap at the arrow below, press SETUP, TOOLS, then ALIGN PRINTER.



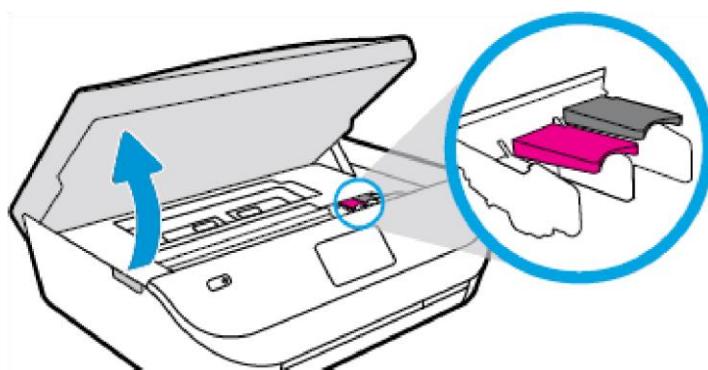
6. If the images above look okay, the printer appears to be working. For more help, go to hp.com/support.

HP USE ONLY: OfficeJet 3830 All-in-One Printer series, SN:CN4C5J03390564, FW:SPL2FA1450AR

- **Do not perform these steps unless the printout specifically shows smeared text or track marks.** Clean the area around the ink nozzles if you see track marks or smears on the printouts.



- Gather the following materials:
- Dry foam-rubber swabs, lint-free cloth, or any soft material that does not come apart or leave fibers (coffee filters work well)
- Distilled, filtered, or bottled water (tap water might contain contaminants that can damage the ink cartridges)
- Turn on the printer, if it is not already on.
- Gently grasp the handles on either side of the printer, then raise the ink cartridge access door until it locks into place.
- The carriage moves to the center of the printer.



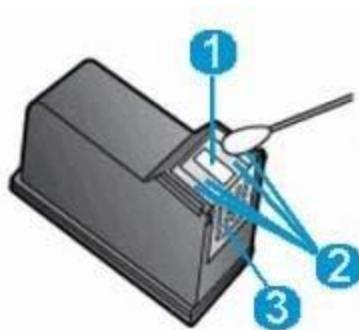
- Wait until the carriage is idle and silent before you continue.
- Disconnect the power cord from the rear of the printer.
- Disconnect the USB cable, if it is connected.
- To release the ink cartridge, lift the lid on the ink cartridge slot, then gently push the lid back until it stops.
- Pull up on the ink cartridge to remove it from the slot.
- Do not remove both ink cartridges at the same time. Remove and then clean each ink cartridge one at a time. Do not leave an ink cartridge outside the printer for more than 30 minutes.



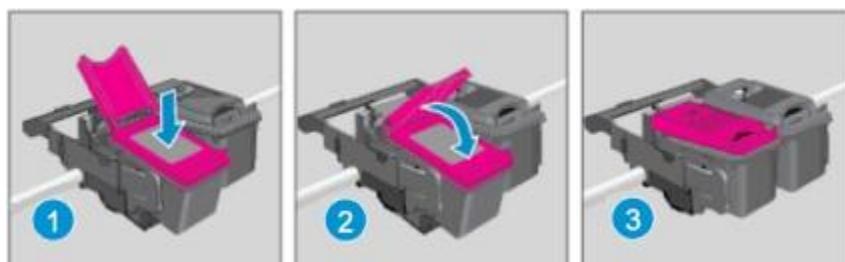
- Lift the lid
- Gently push the lid back
- Pull up on the ink cartridge
- Hold the ink cartridge by its sides.



- Lightly moisten a foam-rubber swab or lint-free cloth with distilled water, and then squeeze any excess water from it.
- Clean the face and edges around the ink nozzle with the swab.



- Nozzle plate - Do not clean
- Area surrounding ink nozzle - Do clean
- Ink cartridge contacts - Do not clean
- Either let the ink cartridge sit for 10 minutes to allow the cleaned area to dry, or use a new swab to dry it.
- Hold the ink cartridge by its sides with the nozzles toward the printer, then slide the ink cartridge forward into the slot.
- Close the lid on the ink cartridge slot to secure the ink cartridge into place.



- Insert the ink cartridge
- Close the lid
- The color ink cartridge is on the left, and the black ink cartridge is on the right
- Repeat these steps to clean, then reinsert the other ink cartridge.
- Close the ink cartridge access door.
- Reconnect the power cord to the rear of the printer.
- Turn on the printer, if it does not turn on automatically.
- Try to print again, and examine the page.
- If the print quality is unacceptable, continue to the next step.

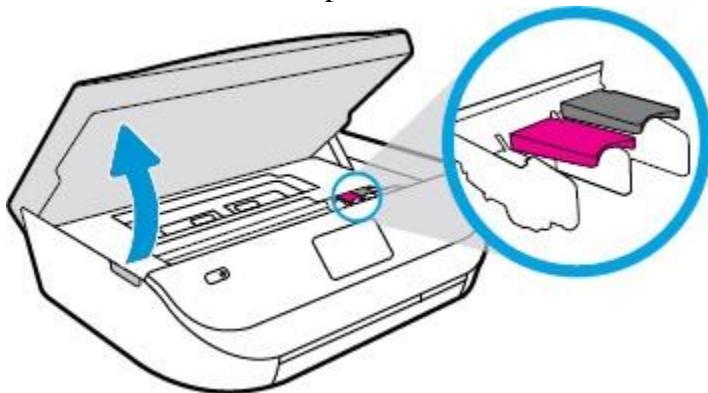
-
- Step 5: Replace the problem ink cartridge
- Replace the problem ink cartridge if you saw defects on the printout and the preceding steps did not resolve the issue, even if the ink cartridge is not low on ink. The problem ink cartridge is the one that printed the defects on the Print Quality Diagnostic report as described earlier in this document.
- If you have a defective cartridge or printhead, it might be under warranty. To check the warranty on your ink or toner supplies, go to [Printer and Page Yield Overview](#), and then

review the **limited warranty** information for your supplies.

- Turn on the printer.

Make sure to load the printer with plain, white paper.

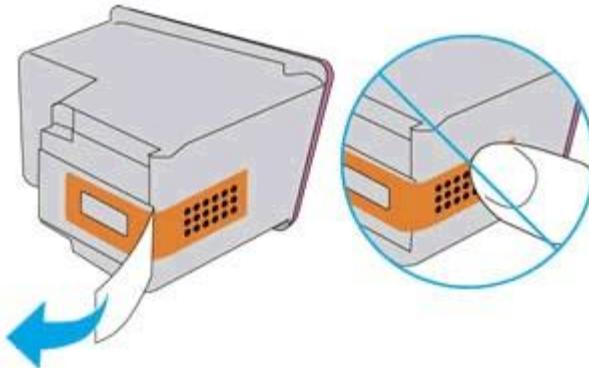
- Gently grasp the handles on either side of the printer, then raise the ink cartridge access door until it locks into place.
- The carriage moves to the center of the printer.



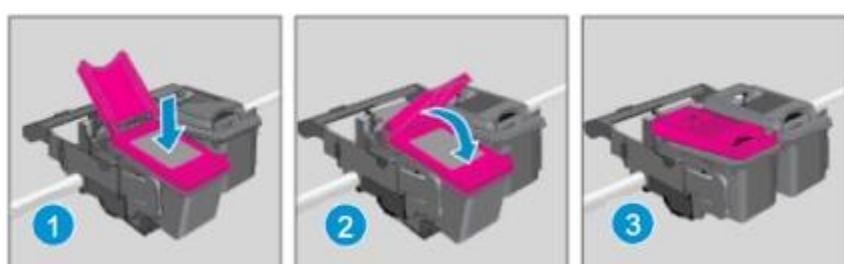
- Wait until the carriage is idle and silent before you proceed.
- To release the ink cartridge, lift the lid on the ink cartridge slot, then gently push the lid back until it stops.
- Pull up on the ink cartridge to remove it from the slot.



- Lift the lid
- Gently push the lid back
- Pull up on the ink cartridge
- Remove one of the new ink cartridges from its package. Be careful to only touch the black plastic on the ink cartridge.
- Remove the plastic tape from the ink cartridge.
- Do not touch the copper-colored contacts or the ink nozzles. Do not replace the protective tape on the contacts. Handling these parts can result in clogs, ink failure, and bad electrical connections.



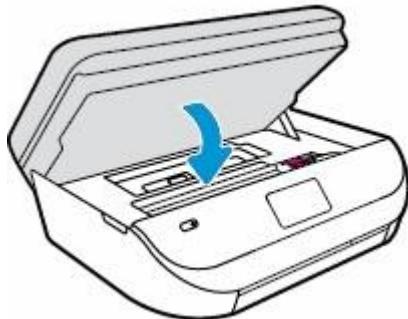
- Hold the ink cartridge by its sides with the nozzles toward the printer, then slide the ink cartridge forward into the slot.
- Close the lid on the ink cartridge slot to secure the ink cartridge into place.



- Insert the ink cartridge
- Close the lid
- The color ink cartridge is on the left, and the black ink cartridge is on the right ●

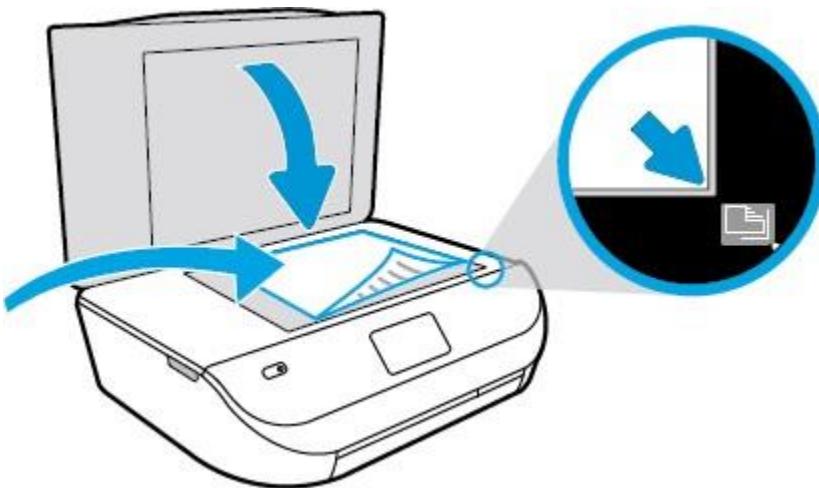
Repeat the previous steps to install the other ink cartridge, if needed.

- Close the ink cartridge access door.
- After you install **new** ink cartridges, the printer automatically prints an alignment page.



- Wait for the alignment page to fully eject from the printer.
- Before a print job, the printer automatically extends the output tray extender. Do not push in the output tray extender until the print job is complete.
- Lift the scanner lid.

Place the alignment page with the print side down on the scanner glass. Position it according to the engraved guides around the glass.



- Close the scanner lid, then touch **OK**.
- The printer aligns the ink cartridges.
- Try the original print job again. If the print quality is unacceptable, continue to the next step to service the printer.

Output/Results snippet:

- Check paper pick up roller for any damage Sucessfully

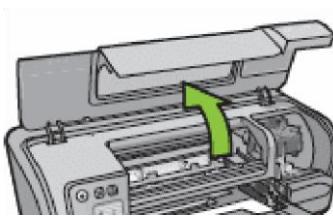
Remove and insert cartridge

Step one: Replace the old ink cartridge

Remove the old ink cartridge and install the new ink cartridge.

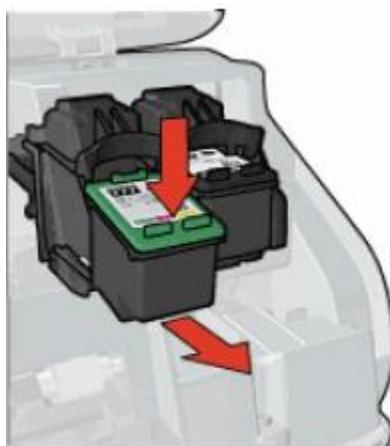
1. Make sure the printer is turned on. If necessary, press the Power button () to turn the printer on.
2. Open the top cover of the printer.

Figure: Opening the top cover



- 3. Wait until the carriage moves to the right side of the printer and is idle and quiet.
 4. Press down on the old ink cartridge, and then slide it out of the carriage.

Figure: Removing the ink cartridge



To replace the tri-color ink cartridge, remove the ink cartridge from the left slot.

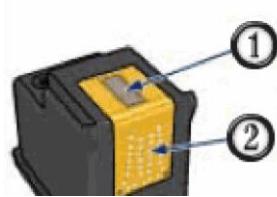
To replace the black ink cartridge, remove the ink cartridge from the right slot.

Remove the new ink cartridge from its packaging and pull the pink tab to remove the protective tape from the ink cartridge.

Figure: Removing the protective tape



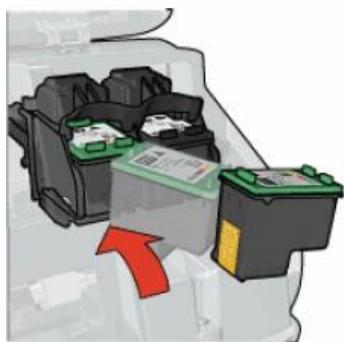
CAUTION:



Do not touch the ink nozzles or copper contacts on the ink cartridge. Touching these parts will result in clogs, ink failure, and bad electrical connections. Do not remove the copper strips. They are required electrical contacts.

-
1. Ink nozzles (do not touch)
 2. Copper contacts (do not touch)
 3. Hold the ink cartridge so that the copper strips are on the bottom and facing toward the printer.
 4. Slide the ink cartridge at a slight upward angle into the carriage until the ink cartridge snaps into place.

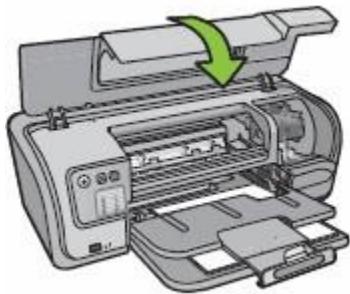
Figure: Inserting the ink cartridge



The tri-color ink cartridge is installed on the left side of the carriage. The black ink cartridge is installed on the right side of the carriage.

Close the top cover.

Figure: Closing the top cover



Step two: Align the new ink cartridge

The ink cartridges should be aligned in order to maintain the best print quality possible. Make sure Letter or A4, plain white paper, is loaded in the input tray.

Open **HP Solution Center** using one of the following methods.

- o Windows Vista: On the Windows taskbar, click the Windows icon (), click **All Programs**, point to **HP**, and then click **HP Solution Center**.

Click **Settings**, and then click **Printer Toolbox**. The **Printer Toolbox** dialog box opens.

Click **Align the Print Cartridges**.

Click **Align**, and then follow the on-screen instructions.

Output/Results snippet:

Check in cartridge access cover Successfully

