

**BMS EDUCATIONAL TRUST**

**BMS COLLEGE OF COMMERCE AND MANAGEMENT**  
**No.97, Kavi Lakshmisha Road, VV Puram,**  
**Bengaluru-560004**



**BACHELOR OF COMPUTER APPLICATIONS**

**Computer Assembly and Repair Lab Manual**

# BMS COLLEGE OF COMMERCE AND MANAGEMENT



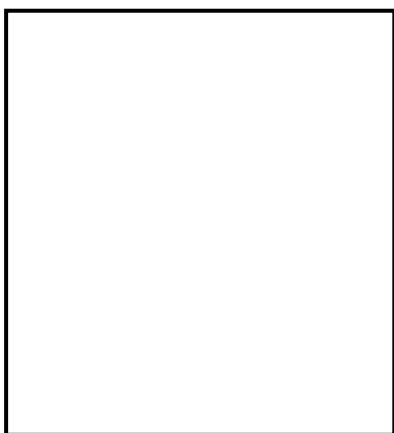
## CERTIFICATE

*This is to certify that Smt./Sri. \_\_\_\_\_  
has satisfactorily completed the course of Experiments in practical  
\_\_\_\_\_ prescribed by the  
\_\_\_\_\_ university in the Laboratory  
of this College in the year 20 -20*

*Date: \_\_\_\_\_*

*Faculty-in-charge*

*Principal*



*Name of the Candidate: \_\_\_\_\_*

*Reg. No. \_\_\_\_\_*

*Examination Centre \_\_\_\_\_*

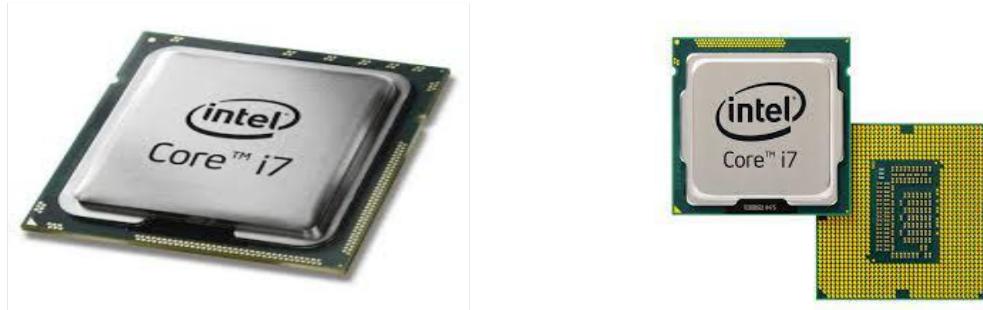
*Date of Practical Examination \_\_\_\_\_*

**Lab -1 Demonstration of Hardware Peripherals: CPU, RAM, SMPS, Motherboard, NIC card, Processor, Processor cooling fan, PCI card, HDD**

**Aim:** To identify the computer hardware parts.

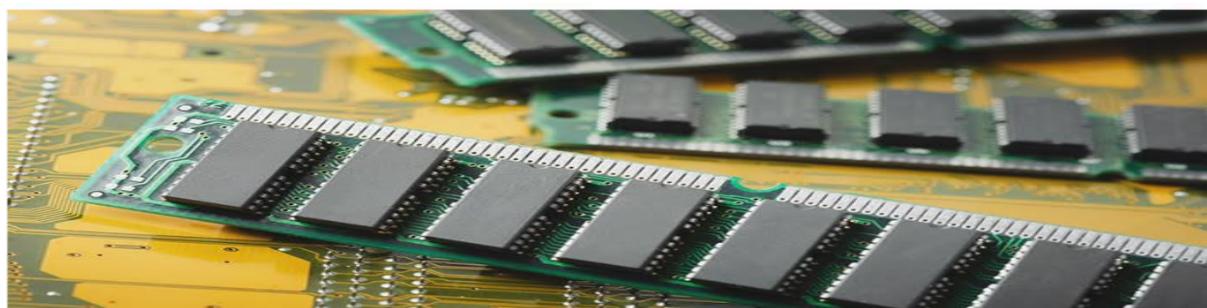
**Requirements:** CPU, RAM, SMPS, Motherboard, NIC card, Processor, Processor cooling fan, PCI card, HDD

#### CPU/PROCESSOR



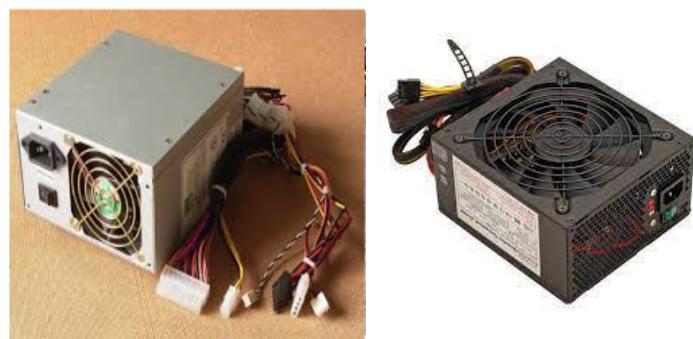
The central processing unit (CPU), also called a processor, is located inside the computer case on the motherboard. The CPU is usually a two-inch ceramic square with a silicon chip located inside. The chip is usually about the size of a thumbnail. The CPU fits into the motherboard's CPU socket, which is covered by the heat sink, an object that absorbs heat from the CPU. A processor's speed is measured in megahertz (MHz), or millions of instructions per second; and gigahertz (GHz), or billions of instructions per second.

#### RAM (random access memory)



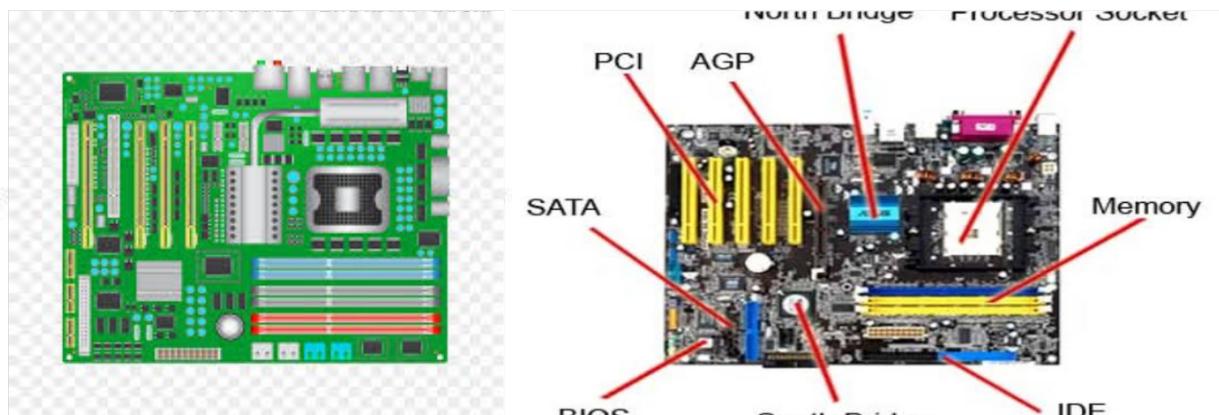
RAM is your system's short-term memory. This short-term memory disappears when the computer is turned off. When you save a file, the data is written to the hard drive, which acts as long-term storage. RAM is measured in megabytes (MB) or gigabytes (GB).

#### POWER SUPPLY UNIT



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

## MOTHERBOARD



The motherboard is the computer's main circuit board. The motherboard connects directly or indirectly to every part of the computer.

## EXPANSION CARDS

PCI (peripheral component interconnect) cards. You may never need to add any PCI cards because most motherboards have built-in video, sound, network, and other capabilities.



The network card allows your computer to communicate over a network and access the Internet. It can either connect with an Ethernet cable or through a wireless connection (often called Wi-Fi).

## PROCESSOR FAN

A fan on top of a computer processor. It helps pull and blow hot air off the processor, helping keep it cooler.



## HARD DRIVE



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

Topic	SSD	HDD
Speed	35 to 100 microsecond access speed, nearly 100 times faster than HDD.	Takes about 5000 to 10, 000 microseconds to access data.
Reliability	SSD has no moving parts, so it can keep your data safe when your laptop bag drops or your system gets shaken while it's operating.	The HDD has moving parts and magnetic platters, so they are prone to get wear and tear with more usage.
Noise	Since SSD comes with no moving parts, it won't make much noise when working.	With spinning platters and moving heads, the HDD will produce noises when functioning.
Heat	No moving parts and using the flash memory, the SSD generates less heat, helping increase the lifespan and durability.	With inside moving parts, more heat will be added and damage the electronics gradually. Higher heat will cause more potential damage.
Power	SSD uses less power, so you can enjoy lower engery bill over time and an increased battery life of an laptop.	HDD costs more power than an SSD, because all the HDD parts are required to spin the platters.
Size	Available in 2.5", 1.8", and 1.0", helping save lots of precious space in computers, especially desktops.	Usually, HDD has only 3.5"and 2.5" size for desktops and laptops respectively, no smaller ones.

**Lab- 2 Demonstration of various ports: CPU, VGA ports, PS/2 (Keyboard, Mouse), USB, LAN, Speaker, Audio.**

**Aim:** To identify the computer hardware parts various ports.

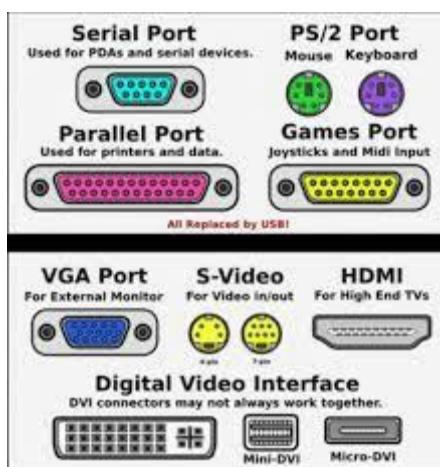
**Requirements:** Motherboard

CPU PORTS

Ports are slots on the motherboard into which a cable of external device is plugged in. Examples of external devices attached via ports are the mouse, keyboard, monitor, microphone, speakers, etc.

Male ports. Have pins that protrude out from the connector and require a cable with a female connector.

Female ports. Have holes in the connector to accept the male cable's pins.



**VGA PORT:**

VGA ports also known as Video Graphic Array connector are those which connect the monitor to a computer's video card. VGA port has 15 holes and it is similar to the serial port connector.



**PS/2 PORT:** PS/2 ports are special ports used for connecting old computer keyboard and mouse. It was invented by IBM. In old computers, there are minimum of two PS/2 Ports, each for the keyboard and the mouse. It is a 6 pin mini Din connector.



**USB (Universal Serial Bus) port:**

In 1997 USB was first introduced. This can connect all kinds of external USB devices, like external hard disk, printer, scanner, mouse, keyboard, etc.



**Ethernet Port:**

Ethernet Port helps to connect to a network and high-speed Internet (provided by LAN or other sources). It connects the network cable to a computer and resides in a Ethernet card. It provides a data travel speed of 10 Mb to 1000 Mb(megabits) per second.



**Sockets: for Speaker and Audio:**

Microphones and speakers are connected with the help of Sockets to the sound card of the computer



**Lab -3 Identify the Computer Name and Hardware Specification (RAM capacity, Processor type, HDD 32bit/64bit)**

**Aim : Identify the Computer Name and Hardware Specification of RAM and HDD**

**Requirements: Computer**

TO FIND YOUR COMPUTER NAME FROM DIFFERENT OPERATING SYSTEMS

Steps -- • Windows 7

- Windows 8/8.1
- Windows 10

WINDOWS 7

1. Click on the Start button.
2. Right-click on Computer.
3. Select Properties.
4. Under Computer name, domain, and workgroup settings you will find the computer name listed

WINDOWS 10

1. Click on the Start button.
2. In the search box, type Computer.
3. Right click on This PC within the search results and select Properties.
4. Under Computer name, domain, and workgroup settings you will find the computer name listed

SCREENSHOTS

Windows 7, 8/8.1, and 10

The screenshot shows the Windows Control Panel System window. At the top, it displays the navigation path: Control Panel > All Control Panel Items > System. Below this, there's a link to Control Panel Home. On the left, there's a sidebar with links to Device Manager, Remote settings, System protection, and Advanced system settings. The main content area starts with a section titled "View basic information about your computer". It shows the Windows edition as Windows 10 Enterprise and the copyright notice © 2015 Microsoft Corporation. All rights reserved. Under the "System" section, it lists the processor as Intel(R) Core(TM) i7-4600U CPU @ 2.10GHz 2.70 GHz, installed memory (RAM) as 16.0 GB, system type as 64-bit Operating System, x64-based processor, and pen and touch support as Full Windows Touch Support with 10 Touch Points. The "Computer name, domain, and workgroup settings" section shows the computer name as TESTPC, full computer name as TESTPC.drexel.edu, and domain as dredel.edu. The "Windows activation" section indicates that Windows is activated and provides a link to the Microsoft Software License Terms. The "Product ID" field is empty. At the bottom left, there's a "See also" section with a link to Security and Maintenance.

### Step for Use the System Information Window to Check Your RAM

Another quick method to view the RAM specification is via System Information. Simply launch the Start menu, search for System Information, click on the Best match, and then scroll to find Installed Physical Memory (RAM) and Total Physical Memory.

The screenshot shows the System Information utility window. The left pane contains a tree view of hardware resources: Hardware Resources (Conflicts/Sharing, DMA, Forced Hardware, I/O, IRQs, Memory), Components (Multimedia, CD-ROM, Sound Device, Display, Infrared, Input, Modem, Network, Ports, Storage, Printing, Problem Devices, USB), and Software Environment. The right pane displays a table of system summary information. The "Installed Physical Memory (RAM)" row is highlighted with a blue background. The table data is as follows:

Item	Value
BaseBoard Product	834F
BaseBoard Version	1.00
Platform Role	Desktop
Secure Boot State	Unsupported
PCR7 Configuration	Binding Not Possible
Windows Directory	C:\WINDOWS
System Directory	C:\WINDOWS\system32
Boot Device	\Device\Harddisk\Volume1
Locale	United States
Hardware Abstraction Layer	Version = "10.0.19041.1949"
User Name	DESKTOP-1BLFNSL\admin
Time Zone	India Standard Time
<b>Installed Physical Memory (RAM)</b>	<b>8.00 GB</b>
Total Physical Memory	2.14 GB
Available Physical Memory	181 MB
Total Virtual Memory	4.53 GB
Available Virtual Memory	1.13 GB
Page File Space	2.39 GB
Page File	C:\pagefile.sys
Kernel DMA Protection	Off
Virtualization-based security	Not enabled
Device Encryption Support	Reasons for failed automatic device encryption: TPM is not usable, PCR7 bindi...
Hvner-V - VM Monitor Mode F...	Yes

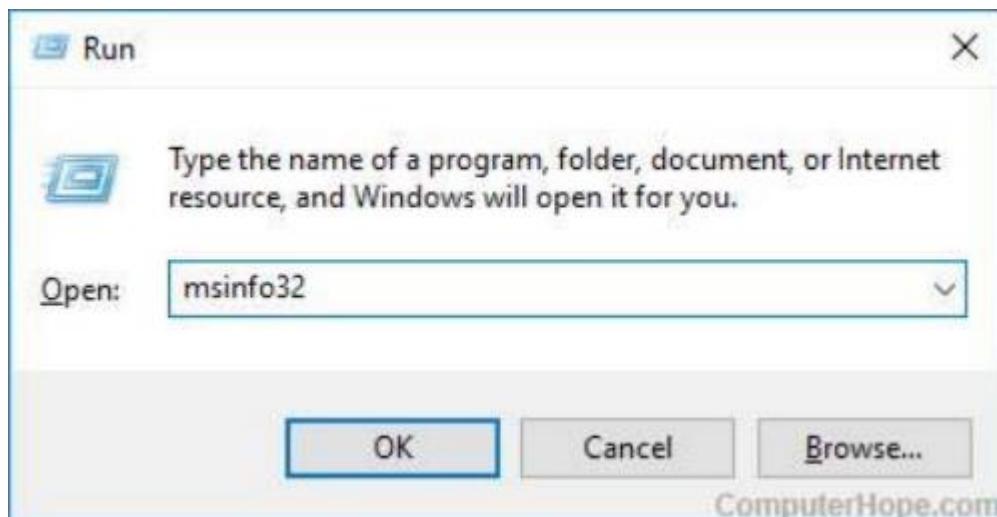
### HDD Specification

### Step for System Information utility in Windows 10 and Windows 11

Press the Windows key, type System Information, and press Enter.

Or, you can use the Run box to open the System Information utility.

1. Press the Windows key + R keyboard shortcut.
2. In the Run box, type msinfo32.
3. Press Enter or click OK.



4. In the System Information window in the left window panel list of hardware categories appears. Expand Components, then Storage. Then, choose Drives, Disks, or any category you'd like to view.

The screenshot shows the Windows System Information window. The left pane is a tree view of hardware components:

- System Summary
- Hardware Resources
- Components
  - Multimedia
  - CD-ROM
  - Sound Device
  - Display
  - Infrared
  - Input
    - Modem
  - Network
  - Ports
  - Storage
    - Drives
    - Disks** (selected)
    - SCSI
    - IDE
    - Printing
    - Problem Devices
    - USB
- Software Environment

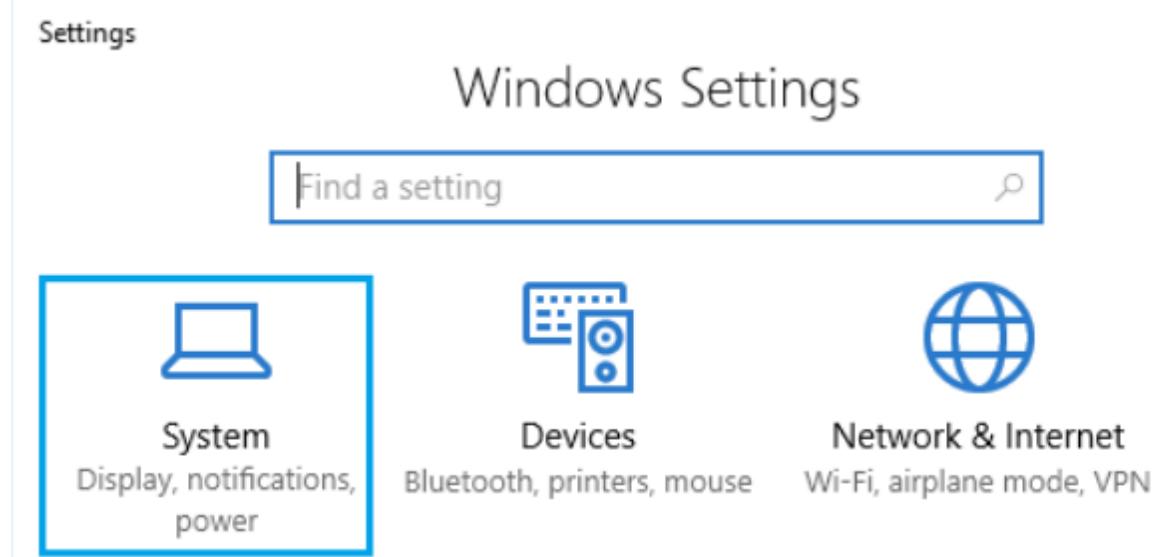
The right pane displays detailed information for the selected "Disks" category. The table includes the following data:

Item	Value
Description	Disk drive
Manufacturer	(Standard disk drives)
Model	WDC WD2500BEVT-0BA23T1
Bytes/Sector	512
Media Loaded	Yes
Media Type	Fixed hard disk
Partitions	2
SCSI Bus	0
SCSI Logical Unit	0
SCSI Port	0
SCSI Target ID	0
Sectors/Track	63
Size	232.88 GB (250,056,253,440 bytes)
Total Cylinders	32,301
Total Sectors	488,391,120
Total Tracks	7,752,240
Tracks/Cylinder	240
Partition	Disk #0, Partition #0
Partition Size	232.05 GB (249,166,823,424 bytes)
Partition Starting Offset	1,048,576 bytes
Partition	Disk #0, Partition #1
Partition Size	849.18 MB (890,429,440 bytes)
Partition Starting Offset	249,168,920,576 bytes

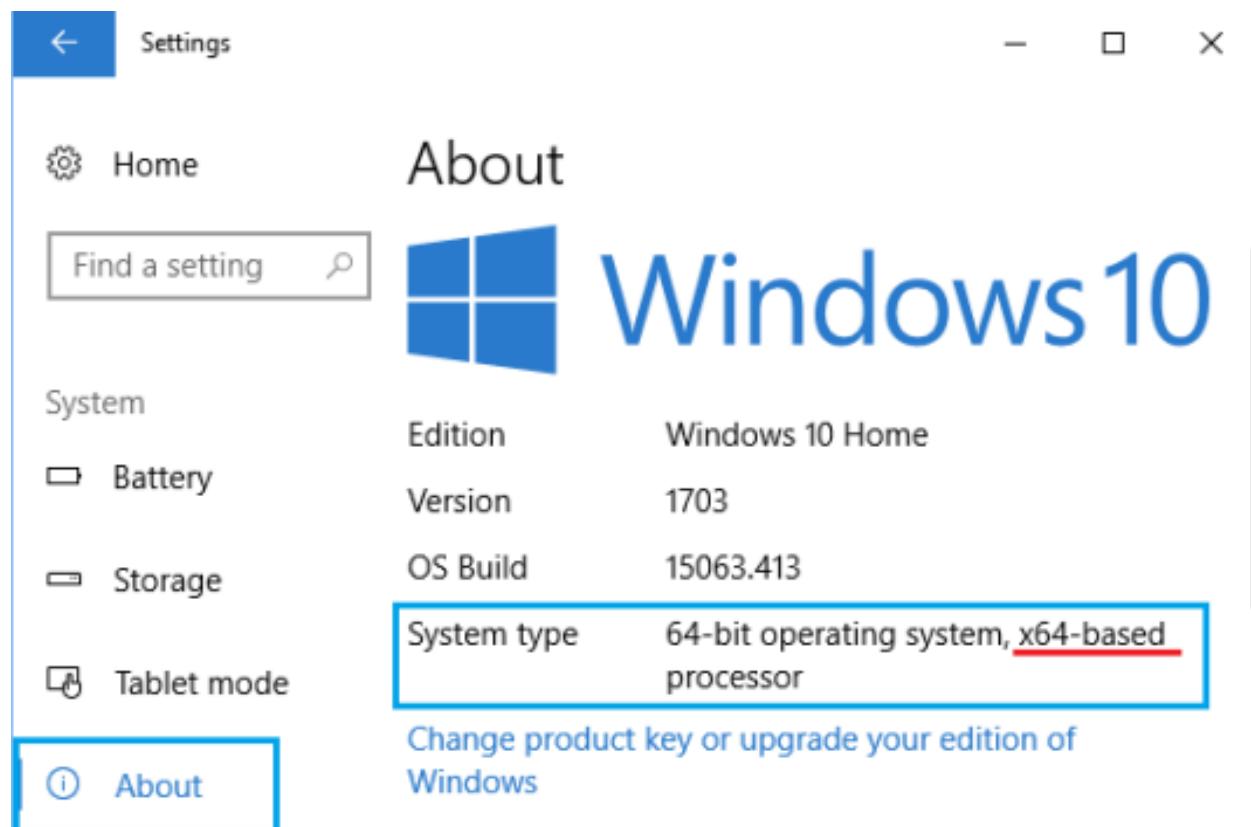
At the bottom of the window, there is a search bar labeled "Find what:" and two checkboxes: "Search selected category only" and "Search category names only".

## How to Check if Your Computer is 32 or 64-bit

1. Open Settings and click on the System tab.



2. On the next screen, click on About in the left-pane. In the right-pane, scroll down and check the entry next to System Type listing "Device Specifications" section.



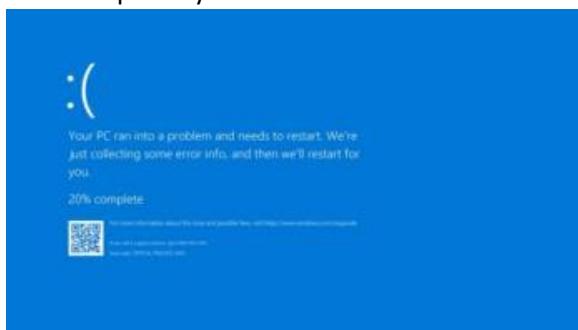
## **Lab -4 Identify and Troubleshoot the problem of RAM (beep sound with blue screen), SMPS, and motherboard (CPU is not switched on)**

### **Aim: Identifying and Troubleshooting of RAM, SMPS and Motherboard**

#### **Requirements: Computer**

#### **Diminishing Performance**

One of the most tell-tale signs of RAM failure is diminishing performance over time. After first boot computer is running perfectly, after using memory-intensive apps such as Photoshop, complex video games, and web browsers, the slower it becomes—The problem will be especially noticeable on RAM



**Random Crashes** Getting the blue screen of death on Windows every time you try and open a certain app, it's likely that the app is the culprit rather than your hardware. But if you find that the crashes occur without warning and at random times, your RAM could be responsible.

<b>p Code</b>	<b>Sequence/Pattern</b>	<b>Meaning</b>	<b>Troubleshooting Steps</b>
beeps	On-off (1.0 second each) three times, then 2.5-second pause (off).  The pattern repeats until the computer is powered off.	Memory error	<ul style="list-style-type: none"><li>Reseat the memory.</li><li>Make sure that the contacts on the memory and the socket are clean.</li><li>Try removing one bank of memory modules at a time. (Some systems can require a memory module in Bank 0.)</li><li>Try using memory modules from the same manufacturer with the same part number and speed.</li><li>Check for a faulty memory module by trying the memory in a known good system.</li></ul>

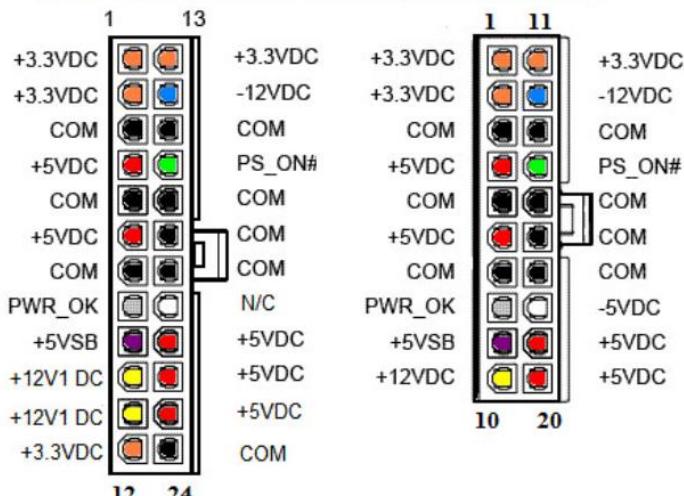
#### **SMPS Problems and Solutions**





**SMPS** - Switched Mode Power Supply. An SMPS is a Device to efficiently provide a regulated output voltage, from different level of the input voltage. SMPS transfers power from a source like the electrical power grid to a load (Eg: Computer).

MAIN POWER CONNECTOR (PIN-SIDE VIEW)



Version 2.0

Version 1.0

### Tips For Power Supply Service

1. Be sure that the line- voltage switch(120/220 Vac) is set correctly for your region.
2. Do Not Use a Splitter
3. Be sure that each output is within tolerance (Voltage tolerances are usually +or-5%)
4. Verify that the power-supply connectors are attached to the motherboard drivers
5. Check the AC Input voltage with the help of a multi meter

## Troubleshooting SMPS

### **Problem 1: The Power doesn't come on.**

#### Solutions

1. Check the Power from the wall socket
2. Check the Voltage Setting On the CPU
3. Check the Power switch of the Cabinet and Front Panel of Motherboard
4. Check the Power Supply Connections to the Motherboard
5. Check the SMPS without connecting it to the motherboard, you could see the two wire green and black which you have to short them (using any piece of wire/paper clip) in the 24 pin motherboard connector of the SMPS.

### **Problem 2: The PC Powers on after the second or third try**

#### Solutions

1. Check the Power switch of the Cabinet
2. Replace SMPS (Get a Better Quality SMPS)

### **Problem 3: The PC Powers on but nothing happens after that (no beep)**

#### Solutions

1. Remove the last hardware component installed and check again
2. Replace SMPS (Get a Better Quality SMPS)
3. Check the power cables to the Devices (Hard disk, DVD Drive etc)

### **Problem 4: The PC Powers on beeps and stops. NO Power On Self-Test (POST)messages**

#### Solutions

1. Check with another SMPS
2. This may be a Motherboard Problem.

### **Problem 5: The PC Powers on runs POST but there is no display**

#### Solutions

1. Check the Monitor and the VGA Cable Connections
2. Check with another SMPS
3. This may be a Display Card Problem

## **Problem 6: There is a squealing/whistling/whining noise from SMPS when the PC starts**

### Solutions

1. Check the SMPS Fan
2. Component problem with SMPS. Replace it

## **Problem7: The PC freezes or reboots suddenly**

### Solutions

1. Check the SMPS Fan (May be overheating Problem)
2. Replace the SMPS

fan error occurs during startup, you will:

- Hear an audible beep code, or
- See a blink pattern on the power LED

### Audible beep codes

You can hear the beep codes through the on-board piezoelectric speaker. For Intel® Desktop Boards without the on-board speaker, you can hear the beeps through a speaker attached to the line out audio jack on the board

<b>Beep Code</b>	<b>Sequence/Pattern</b>	<b>Meaning</b>	<b>Troubleshooting Steps</b>
Single beep	One 0.5 second beep	F2 Setup / F10 Boot Menu prompt	This short beep occurs when the BIOS is ready to accept keyboard input. No action needed.
2 beeps	On-off (1.0 second each) two times, then 2.5-second pause (off). The pattern repeats once. Then the computer continues to boot.	Video error (no add-in graphics card installed)	<ul style="list-style-type: none"> <li>• Reseat add-in graphics card.</li> <li>• Make sure a compatible processor is installed.</li> </ul> <p>Related topics  <a href="#">No video and two beeps during boot</a>  <a href="#">Intel® Processors and Boards Compatibility Tool</a></p>
3 beeps	On-off (1.0 second each) three times, then 2.5-second pause (off). The pattern repeats until the computer is powered off.	Memory error	<ul style="list-style-type: none"> <li>• Reseat the memory.</li> <li>• Make sure that the contacts on the memory and the socket are clean.</li> <li>• Try removing one bank of memory modules at a time. (Some systems can require a memory module in Bank 0.)</li> <li>• Try using memory modules from the same manufacturer with the same part number and speed.</li> <li>• Check for a faulty memory module by trying the memory in a known good system.</li> </ul>
High/low beeps	Alternate high and low beeps (1.0 second each) for 8 beeps. Then the computer shuts down.	CPU thermal trip warning	<ul style="list-style-type: none"> <li>• Check that the processor heatsink/fan is properly installed.</li> <li>• Check that the thermal interface material is sufficient and is spread evenly.</li> </ul>

## **Lab- 5 Configure BIOS setting – disable and enable USB and LAN**

**Aim : Configure BIOS Disable USB and LAN**

**Requirements: Computer**

**What is BIOS?**

PC's most important startup program, BIOS, or Basic Input / Output System, is the built-in core processor software responsible for booting up your system

### **How to Enter BIOS Setup on Windows PCs**

In order to access BIOS on a Windows PC, you must press your BIOS key set by your manufacturer which could be F10, F2, F12, F1, or DEL.



#### **1. Using BIOS Setup Utility Menu Items**

You can access BIOS Setup utility screens from the following interfaces:

- Use a USB keyboard, mouse, and VGA monitor connected directly to the server.
- Use a terminal (or terminal emulator connected to a computer) through the serial port on the back panel of the server.
- Connect to the server using the Sun ILOM Remote Console.

To access BIOS configuration screens and to change the system's parameters, complete the following steps:

1. Power on or power cycle the server.
2. To enter the BIOS Setup utility, press the F2 key while the system is performing the power-on selftest (POST) FIGURE 1.

#### **FIGURE 1 Press F2 to Run Setup Prompt**

```
Initializing USB Controllers .. Done.  
Press F2 to run Setup (CTRL+E on Remote Keyboard)  
Press F8 for BBS POPUP (CTRL+P on Remote Keyboard)  
Press F12 to boot from the network (CTRL+N on Remote Keyboard)
```

When BIOS is started, the main BIOS Setup utility top-level screen appears (FIGURE E-2). This screen provides seven menu options across the top of the screen.

**FIGURE 2 BIOS Setup Utility - Main Screen**



3. Use the left and right arrow keys to select the different menu options.
4. To select an option on a top-level screen, use the up and down arrow keys to scroll up and down the options presented.

**Only options that can be modified are highlighted when you press the up and down arrow keys.**

If a field can be modified, as you select the option, user instructions for modifying the option appear in the right column of the screen. If a field is a link to a sub-screen, instructions to press the Enter key to access the sub screen appear in the right column.

5. Modify the setup field and press the Esc key to save the changes and exit the screen.

**Some screens present a confirmation dialog box that enables unwanted changes to be retracted.**

6. On sub-screens that only provide configuration information and cannot be modified, press the Esc key to exit the screen.
7. To continue modifying other setup parameters, repeat Step 3 through Step 6. Otherwise, go to Step 8.
8. Press and release the right arrow key until the Exit menu screen appears.
9. Follow the instructions on the Exit menu screen to save or discard changes and exit the BIOS Setup utility

## 2 BIOS Setup Screens Overview

contains summary descriptions of the top-level BIOS setup screens

TABLE E-1 BIOS Setup Screens Summary

Screen	Description	See This Section
Main	General product information, including BIOS type, processor, memory, and time/date.	<a href="#">BIOS Main Menu Screens</a>
Advanced	Configuration information for the CPU, memory, IDE, Super IO, trusted computing, USB, PCI, MPS and other information.	<a href="#">BIOS Advanced Menu Screens</a>
PCI	Configure the server to clear NVRAM during system boot.	<a href="#">BIOS PCI Menu Screens</a>
Boot	Configure the boot device priority (storage drives and the DVD-ROM drive).	<a href="#">BIOS Setup Utility: Boot - Boot Settings</a>
Security	Set or change the user and supervisor passwords.	<a href="#">BIOS Security Menu Screens</a>
Chipset	View the configuration of server chipsets.	<a href="#">BIOS Chipset Menu Screens</a>
Exit	Save changes and exit, discard changes and exit, discard changes, or load optimal or fail-safe defaults.	<a href="#">BIOS Exit Menu Screens</a>

### Enabling or Disabling the Front or Rear USB Ports in BIOS

Manage which USB ports on the computer are allowed to connect to USB devices, such as keyboards, headsets, or USB storage devices through BIOS.

1. Turn on the computers, and then immediately click F10 to enter the BIOS.
2. Under the Security tab, use the up and down arrows to select USB Security, and then press Enter.

Figure : Select USB Security



3. A list of USB ports and their locations displays.

4. Use the up and down arrows to select a port, then use the left and right arrows to select either Enabled or Disabled as desired.

Figure : Enable or Disable the USB port



5. When finished, press F10 to save changes and exit BIOS.

**FIGURE : BIOS Setup Utility: Advanced - LAN Configuration**



## **Lab -6 Identify, how to recover the hidden files from corrupted pen drive using command**

**Aim : Recover the hidden files from corrupted pen drive using command**

**Requirements: Computer and Corrupted Pen Drive**

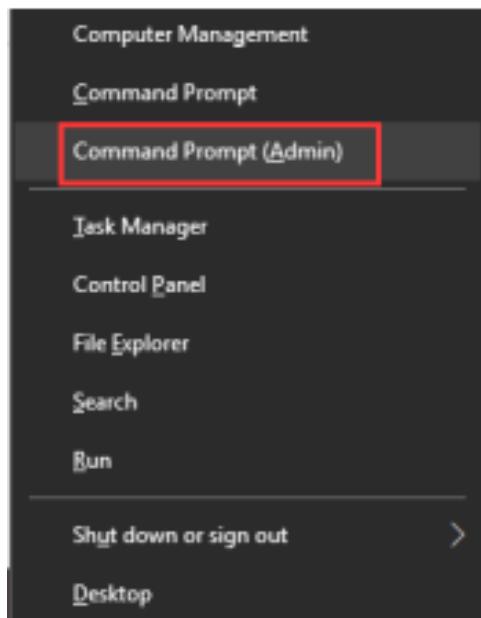
### **Show Hidden Files on a USB Using CMD**

Command Prompt (CMD) is the second choice to show hidden files on external hard disks, USB drives, memory cards, or other storage devices. Here, the full attribute command for hidden files.

**To unhide files using CMD, follow these three steps:**

Step 1. Properly connect the USB drive to computer.

Step 2. Press Windows + X keys to bring up a menu and click Command Prompt (Admin) in this menu.



Step 3. Enter attribute -h -r -s /d G:\\*.\* (replace G: with the drive letter for device) in the Command Prompt window and press Enter.

When finish these steps, access USB flash drive, hard drive, or memory card to see all of the hidden files

### **Attribute syntax explanation**

- -h clears the Hidden file attribute.
- -r clears the Read-only file attribute
- -s clears the System file attribute.
- /s applies attrib and any command-line options to matching files in the current directory and all of its subdirectories.
- /d applies attrib and any command-line options to directories.

## Lab -7 Recover the contents from Crashed Hard disk using Disk Drill software

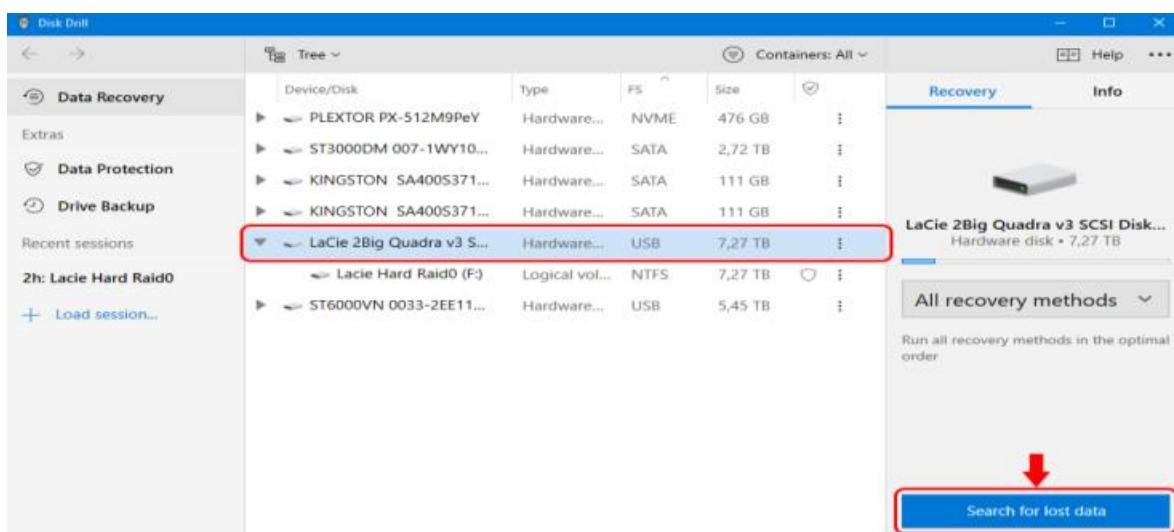
Aim : Recover the contents from Crashed Hard disk

Requirements: Computer

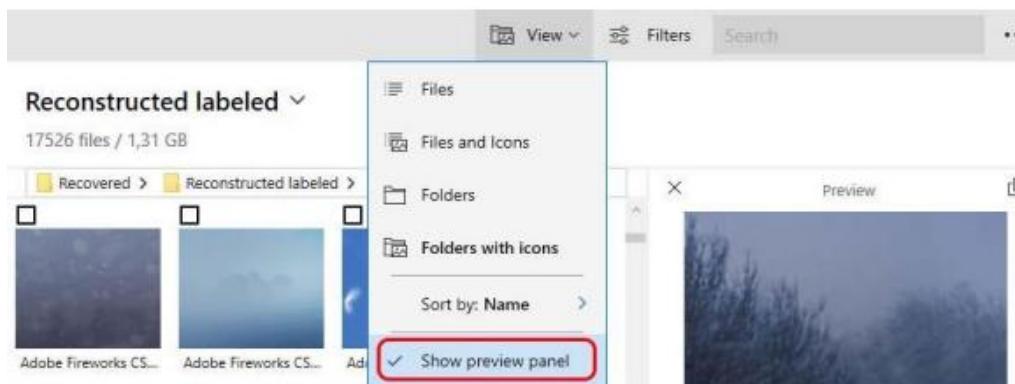
To Recover Deleted Data from a Damaged Hard Drive:

Disk Drill for Windows offers a flexible and effective method to recover data from an external hard disk. Follow these steps to recover lost and deleted files from an external hard drive.

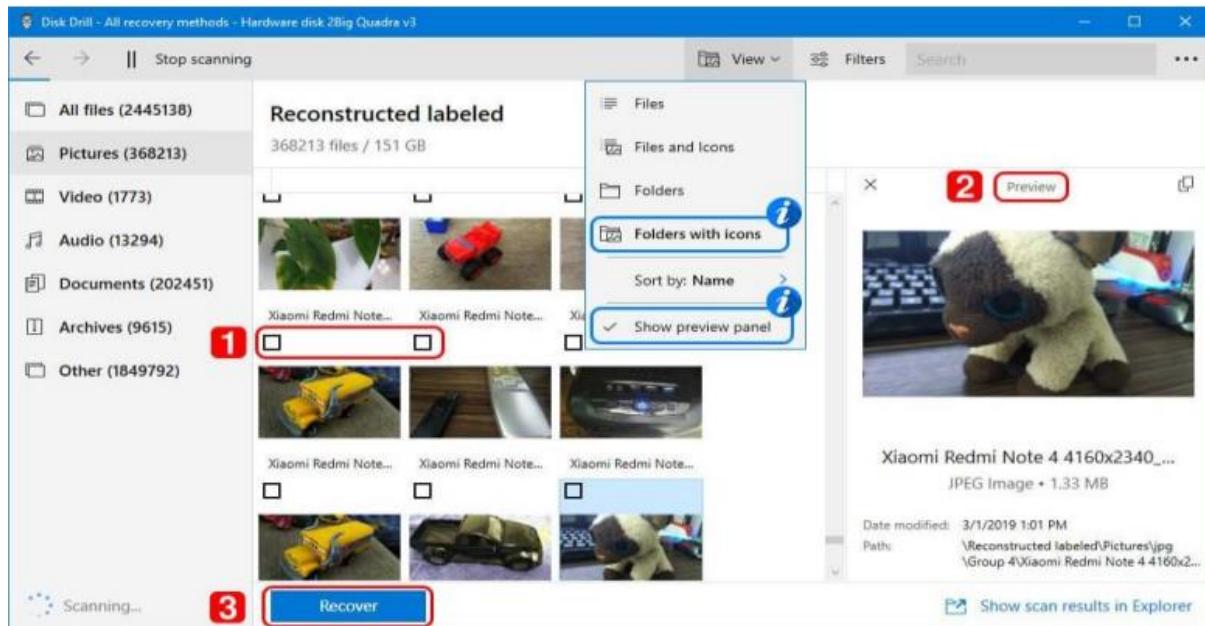
1. Download and install the program.
2. Connect the external hard drive to machine and launch Disk Drill.
3. Select the external drive from the app's list of available disks.
4. Click the Search for lost data button to start scanning the device



5. Preview the files that can be recovered and select those to restore.



6. Click the Recover button to retrieve the selected files to a storage location. Don't save the data to the external drive during recovery as it may lead to file corruption.



## **Lab- 8 Install Operating System – Windows 7/ Windows 10 ) and also make partitions**

### **Aim : Installing Windows 7**

#### **Requirements: Computer, windows 7 OS CD, CD Drive**

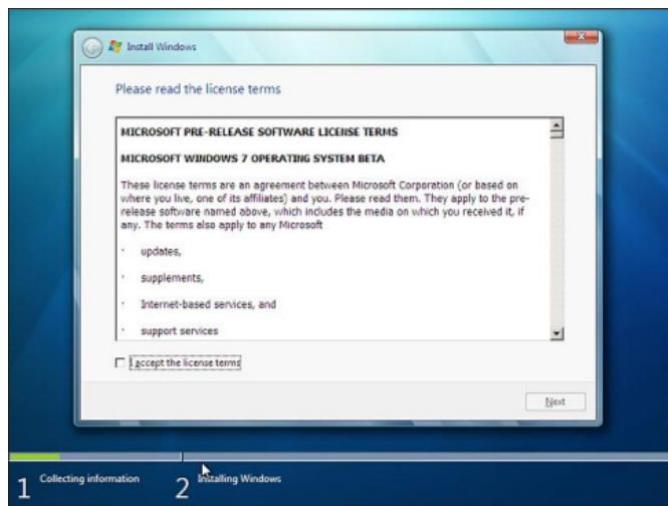
1. Boot PC using Windows 7 DVD/USB drive and Press any key to continue.
2. Next select language, keyboard type (Generally the US) and time format.



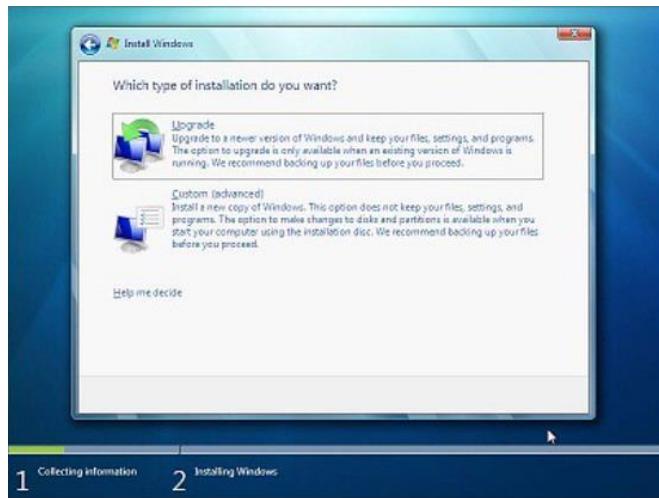
3. Click the **Install** button



4. Click the box labelled I agree with the license terms and click Next to proceed further.

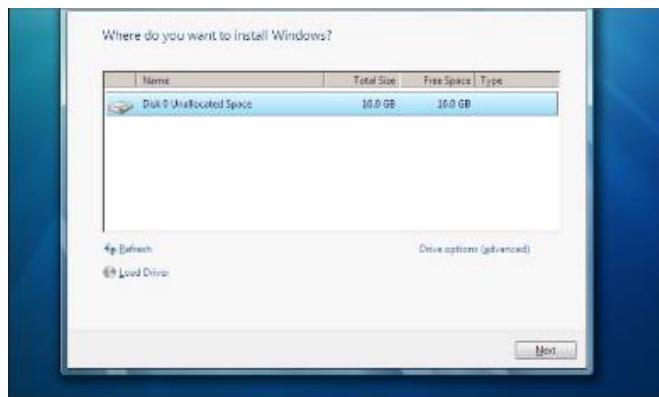


5. In the next screen, click on the Custom (advanced) option. If want to upgrade then just click on the Upgrade option.



6. This is an important step to select the drive where to install Windows

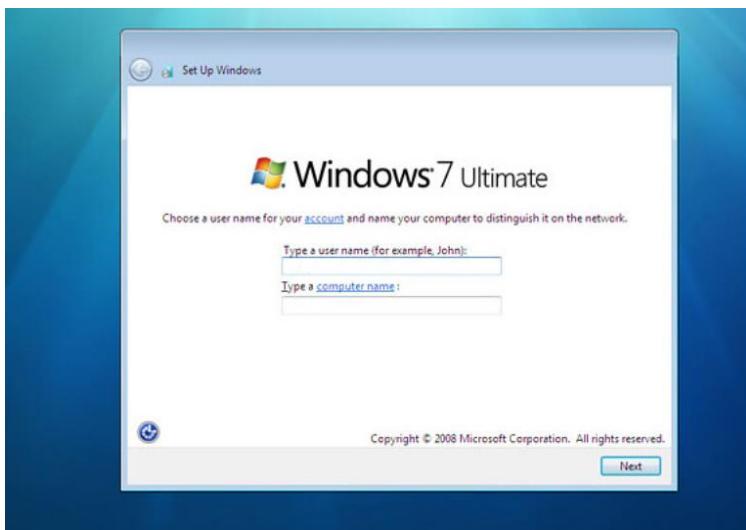
7. Note that selecting a wrong partition will wipe out the data. Also, note that Windows 7 creates another small partition of about 200 MB if you are installing Windows 7 on an empty hard drive. The hidden 200MB partition will not be shown in the Windows Explorer!



8. Click on the Next button to start the Windows 7 installation. Windows may restart many times during the installation.



9. After completing the installation, enter username and password.



10. In the next step Enter the key that got and click the Next button.



11. Select the **Windows 7** update option. Click Use recommended settings option.

12. Select Time Zone, date and time and click Next.

13. In the next screen select the type of network. That is, choose between Home network, Work network and Public network.



14. Finally, the setup will ask to create a group depending on the type of Network chosen. If not sure, just skip as do it later as well.

15. Next screen successfully installed Windows 7 on your PC

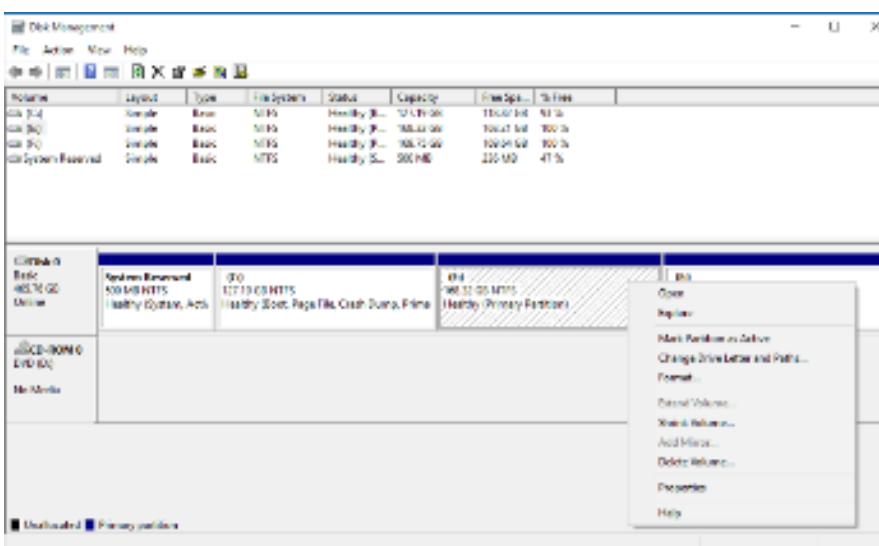
## Make partitions in Windows 7 after installation

### Method 1: Make partitions with Disk Management

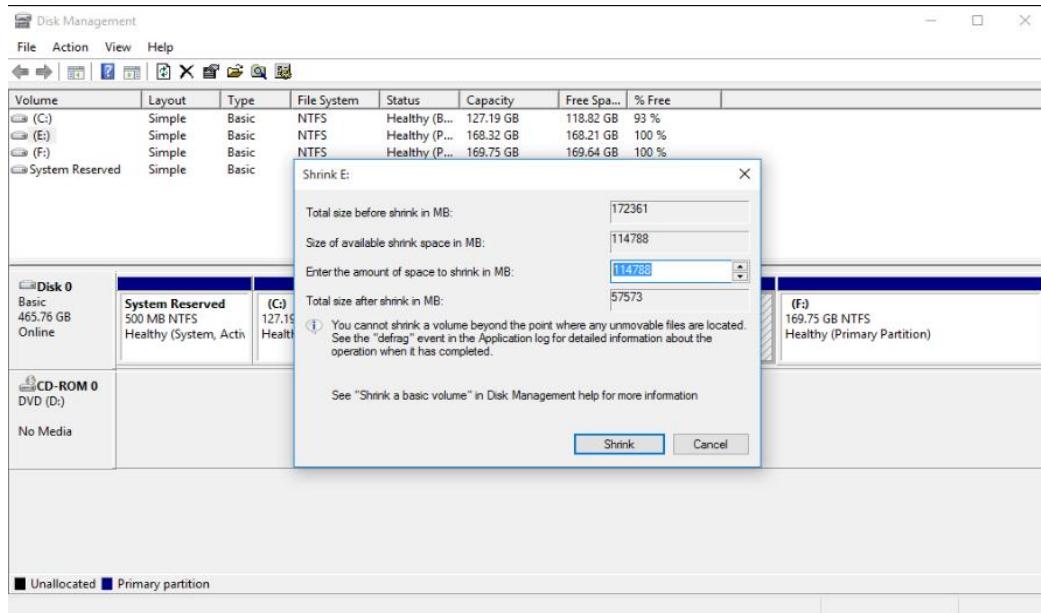
To make more partitions with Disk Management on this disk in Windows 7 after installation

Step 1: Use Windows + R to open Run, type “diskmgmt.msc” and click OK.

Step 2: Right-click on the partition to resize and select the Shrink Volume option.

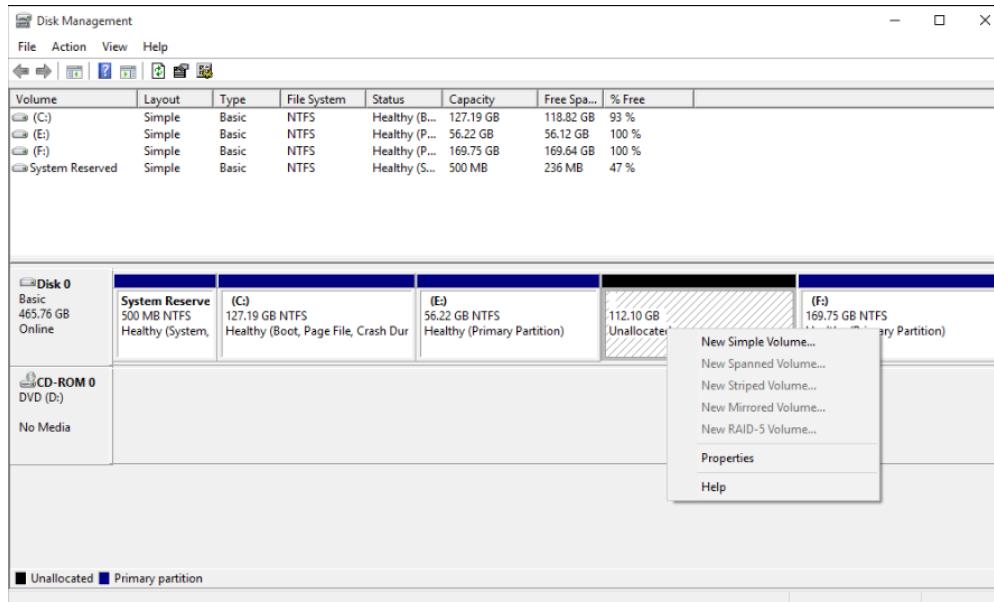


Step 3: Enter the size to shrink drive to in megabytes (1000 MB = 1GB). Then click on the Shrink button.



Note: Shrink volume more than the amount indicated in the Size of available shrink space in MB section.

Step 4: On unallocated space in Disk Management window, right-click on the unallocated space and select the New Simple Volume option. The New Simple Volume Wizard should pop up. Click on the Next button to continue.



Step 5: Enter the amount of memory to allocate for new partition and click on the Next button. To store data on this partition, format it first. Click on the Format this volume with the following settings:

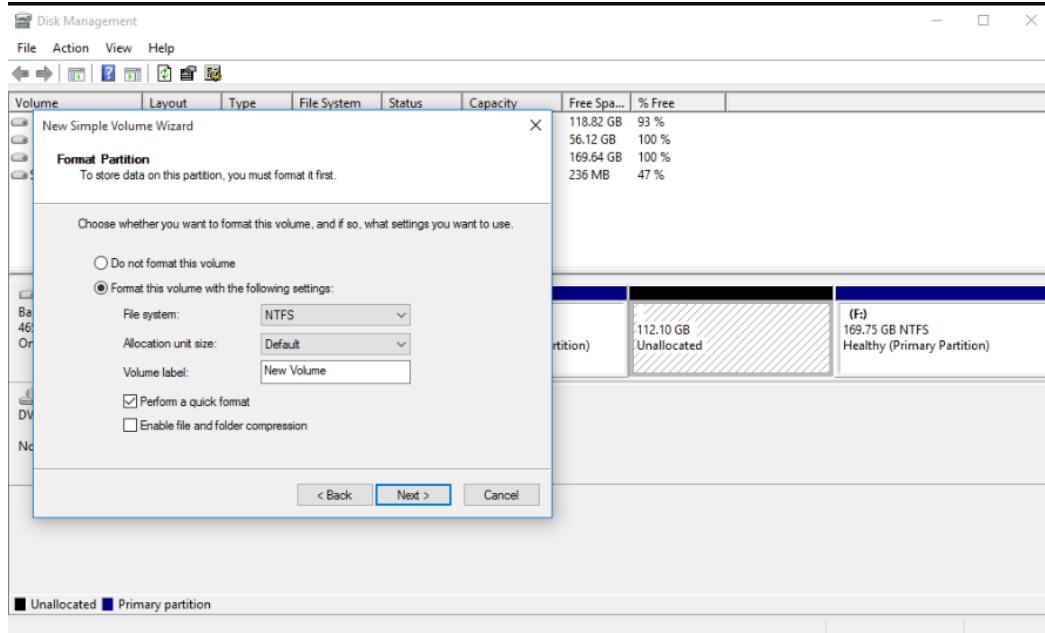
For File System, select NTFS

For Allocation unit size, select Default

For Volume Label, type the name to new drive.

Click on the Perform a quick format

Then click on the Next button



## Lab- 9 Install operating System - Unix family (Linux / Ubuntu)

### Aim : Installing Ubuntu

Requirements: Computer, Ubuntu OS CD, CD Drive or pen drive

#### 1. Download an Ubuntu Image

Download an Ubuntu 20.04 LTS image here.

The screenshot shows the Ubuntu website's download section. It features two main download options: "Ubuntu 20.04.3 LTS" and "Ubuntu 21.10". Each option includes a brief description, system requirements, and a "Download" button. The "Ubuntu 20.04.3 LTS" section also includes links for "Alternative downloads" and "Torrents".

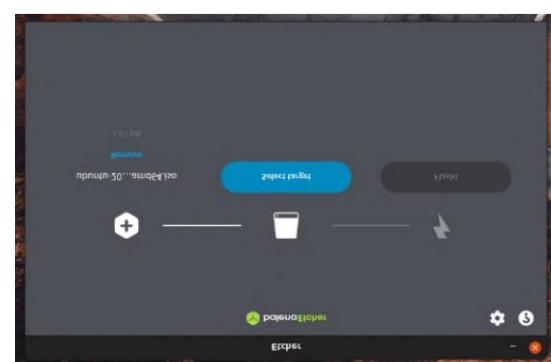
#### 2. Create a Bootable USB stick

To install Ubuntu Desktop, write downloaded ISO to a USB stick to create the installation media. This is not the same as copying the ISO, and requires some bespoke software.

Choose the version that corresponds to current operating system, download and install the tool.

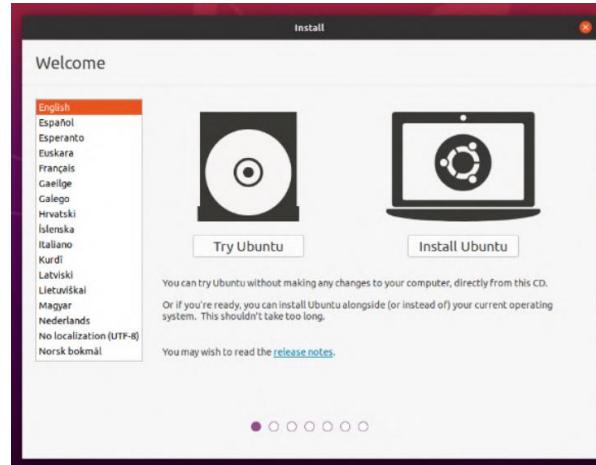
The screenshot shows the Etcher software interface. It has a header "Get your assets" and a table below listing various download options. The table columns are "ASSET", "OS", "ARCH", and "Download". The listed assets include Etcher for Windows (x86/x64) (Installer), Etcher for Windows (x86/x64) (VirtuAlize), Etcher for macOS, Etcher for Linux x64 (64-bit) (AppImage), and Etcher for Linux x86 (32-bit) (AppImage). Each asset has a "Download" button next to it.

Rufus on Windows, Etcher on Mac OS and Startup Disk Creator on Ubuntu. Select downloaded ISO, choose USB flash drive, and then click Flash! to install image



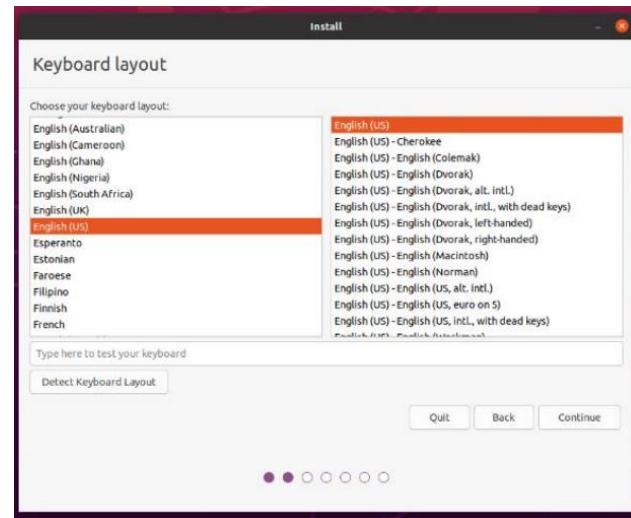
### 3. Boot from USB flash drive

Insert the USB flash drive into the laptop or PC to install Ubuntu and boot or restart the device. It should recognise the installation media automatically. If not, try holding F12 during startup and selecting the USB device from the system-specific boot menu.



To proceed, click Install Ubuntu.

select keyboard layout. Next , click Continue.

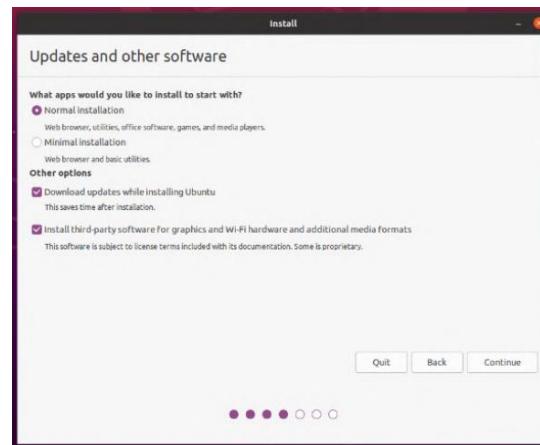


### 4. Installation Setup

Next, choose between the Normal installation and Minimal installation options. The minimal installation is useful for those with smaller hard drives or who don't require as many pre-installed applications.

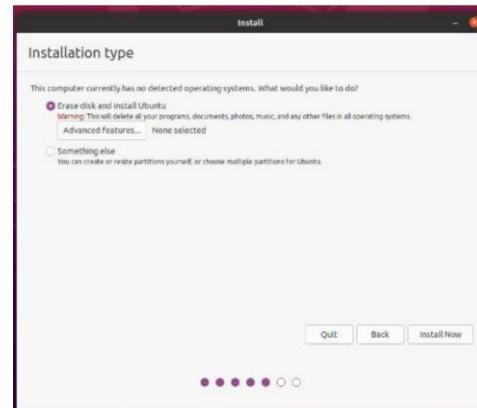
In Other options, download updates as well as third-party software that may improve device support and performance (for example, Nvidia graphics drivers) during the installation. It is recommended to check both of these boxes.

If not currently connected to the internet, next prompted to do so at this point. Ensure you are able to remain connected throughout the installation.

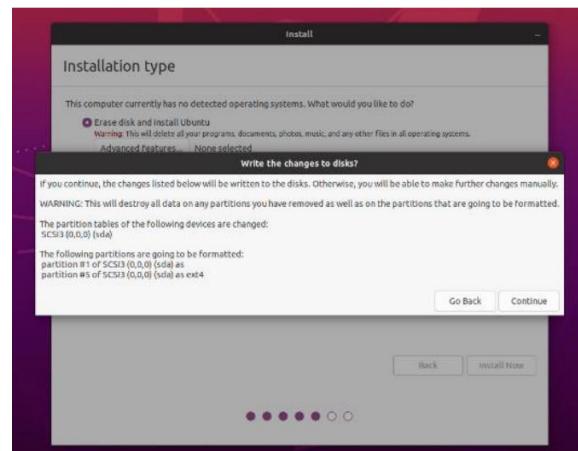


## 5. Drive Management

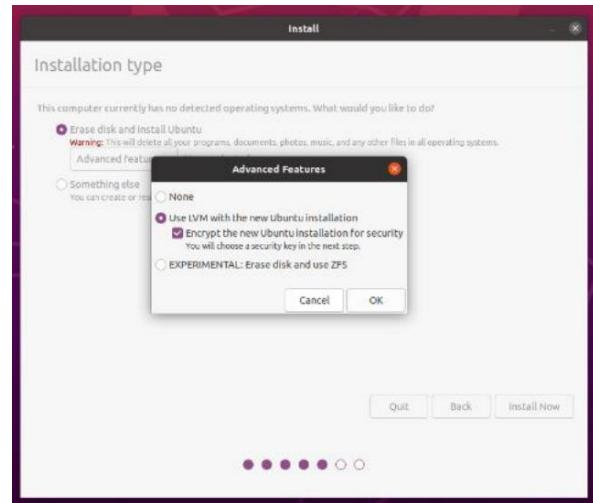
This screen allows to configure installation. If like Ubuntu to be the only operating system on the device, select Erase disk and install Ubuntu.



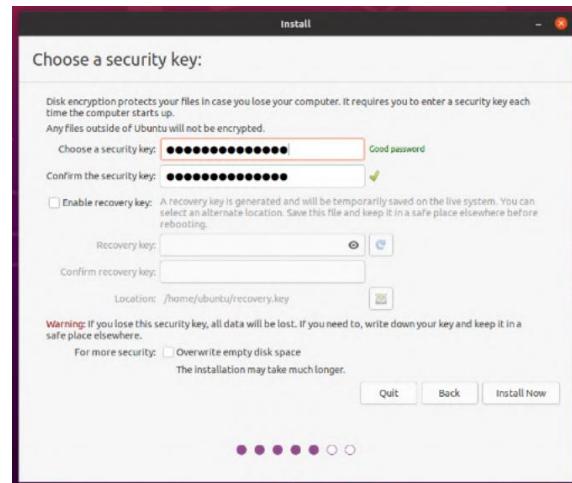
continue the installation without enabling encryption, click Install Now and confirm the changes with Continue. Otherwise keep reading.



6. (Optional) Enable Encryption If like to encrypt device, select Advanced features... > Use LVM with the new Ubuntu installation > Encrypt the new Ubuntu installation for security.



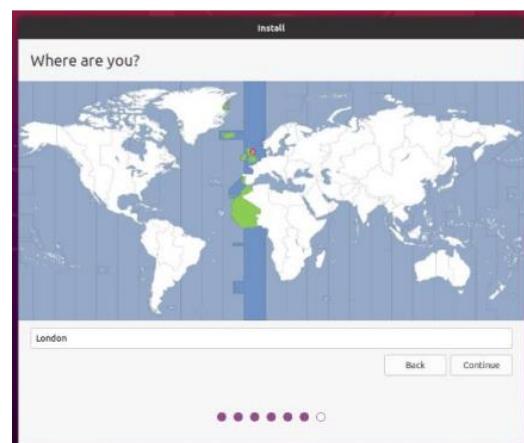
next prompted to create a security key once you click Install Now.



Click Install Now and confirm the changes with Continue.

## 7. Choose Location

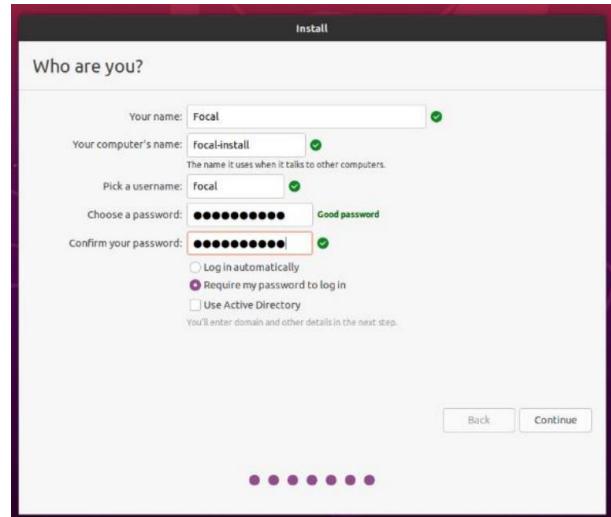
Select location and time zone from the map screen and click Continue. This information will be detected automatically if connected to the internet.



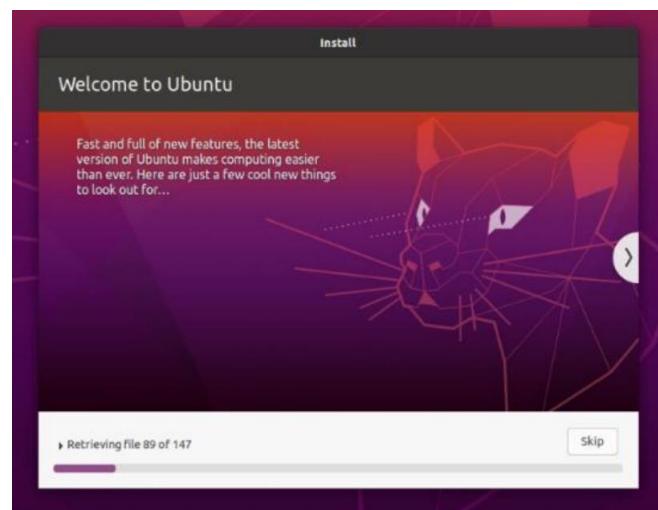
## 8. Create Login Details

On this screen, next enter name of computer as it will appear on the network. Finally, create a username and a strong password.

Choose to log in automatically or require a password



## 9. Complete the Installation

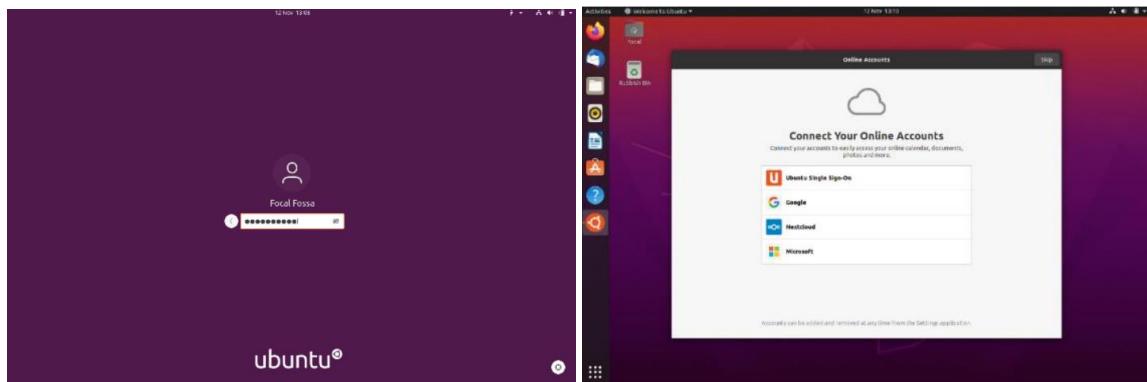


Once the installation has completed, system will ask to restart. Click Restart Now.

When clicked on restart, remove your USB flash drive from the device. Once you've done this, press ENTER.



Enter password on the login screen (assuming you selected that option when creating your login details).



The welcome widget will help you with some additional setup options, including:

- Connecting profile to various online accounts.
- Configure Livepatch to automatically apply updates to device (this option is only available when using a long term support [LTS] version of Ubuntu).
- Opting into sending device information to Canonical to help improve Ubuntu (by default, Canonical doesn't collect device information).
- Activating location services.
- Downloading additional apps from Ubuntu Software.

**It's always good practice to ensure system is up to date, especially after a fresh install.**

**Check for updates and apply them.**

### **Update Ubuntu using the terminal**

Press CTRL+ALT+T to bring up a Terminal window (or click the terminal icon in the sidebar).

Type in:

**sudo apt update**

Enter your login password.

This will check for updates and tell you if there are any that need applying. To apply any updates, type:

**sudo apt upgrade**

Type Y, then press ENTER to confirm to finish the update process.

## Lab- 10 Install Application Software – Python3.8, Office2010/2013, Ms SQL, TOAD , Openoffice etc,

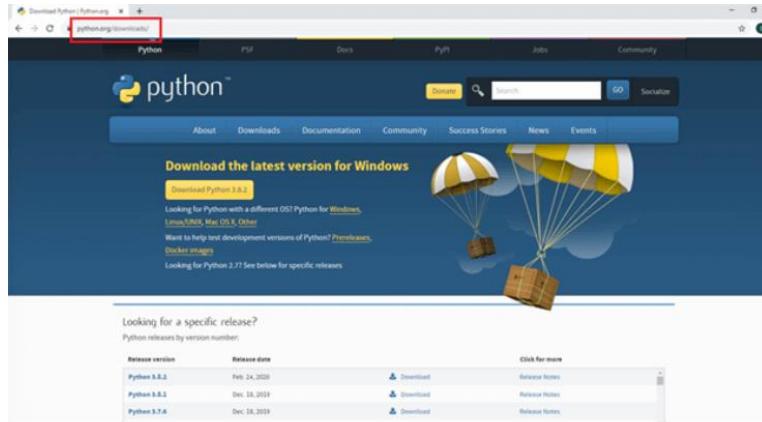
Aim : Installing Python3.8, Openoffice etc

Requirements: Application software - Python3.8, Office2010/2013, Ms SQL, TOAD , Openoffice etc

### Installing Python.3.8

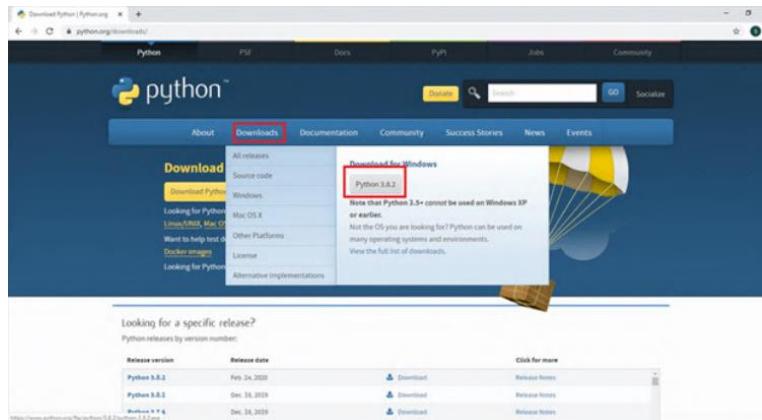
#### Step 1

Click this link, it will take to the Python official download website.

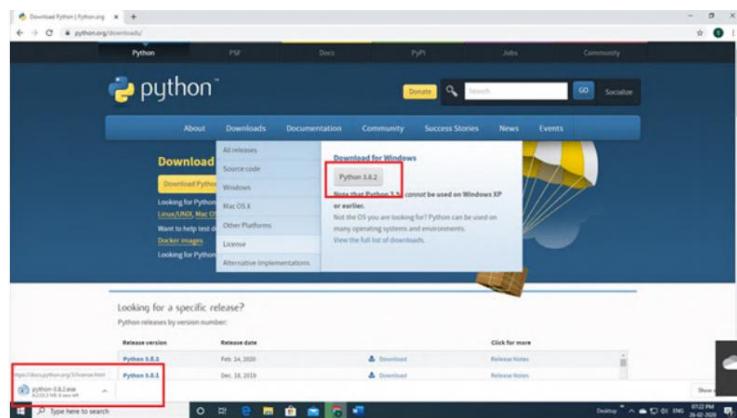


#### Step 2

Click the download buttonl see Python 3.8.2.

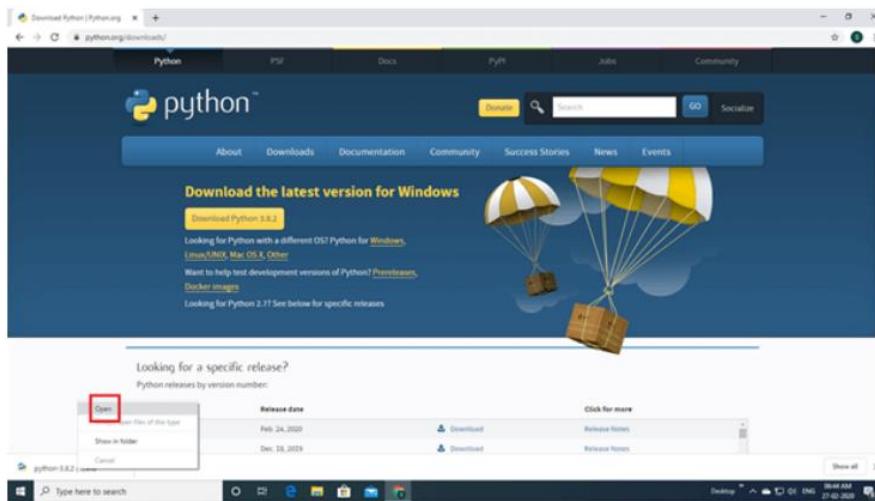


#### Step 3 Click Python 3.8.2 and Python will start to download.



## Step 4

Next, right click the mouse button (click to open).



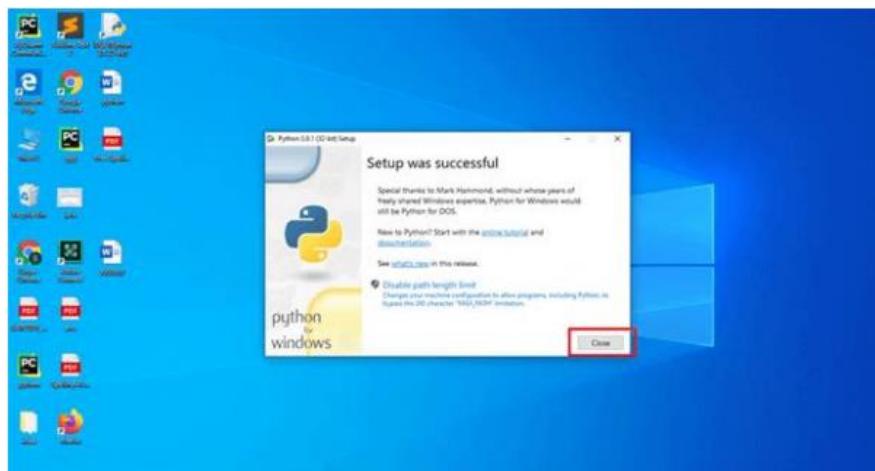
## Step 5

Enable to add Python 3.8 to path and click install now.



## Step 6

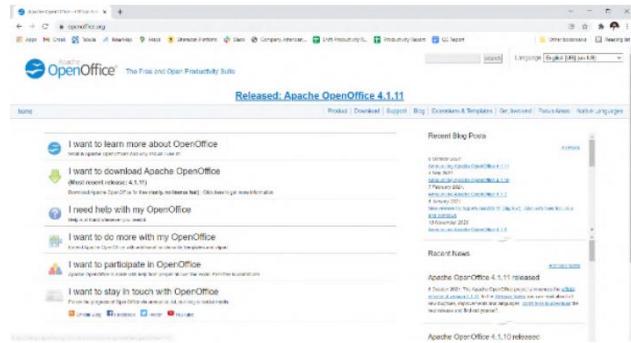
Wait a few minutes and display setup was successful. Next click the close button.



## Installing OpenOffice

Follow the below steps to install Apache OpenOffice on Windows:

Step 1: Visit the official website using URL <https://www.openoffice.org/> in any web browser



Step 2: Click on “I want to download Apache OpenOffice” link.



Step 3: The link directs us to the download page on which we choose operating system, language, and version of the Apache OpenOffice, and then click on the Download full installation button



Step 4: Now find the executable file in the download folder of system and run it.

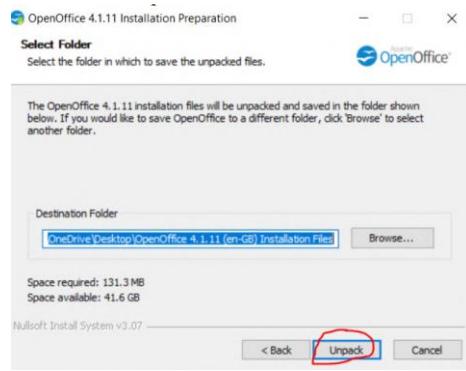


Step 5: It will confirm that the software makes changes to system, so click on the Yes button.

Step 6: Now the installation process is started so click on the Next button.



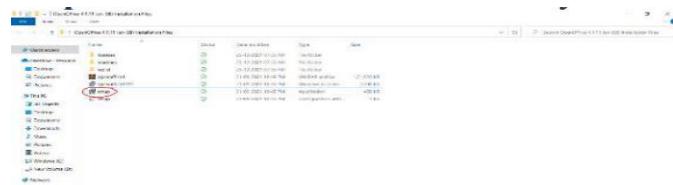
Step 7: Next screen will be of Unpack the Apache OpenOffice in which the location where to extract folder, in this folder, the setup will take place, and after that, next continue setup in that folder. Now click on the Unpack button.



Step 8: After Unpack the setup will automatically start if not started then find place where Setup file available.

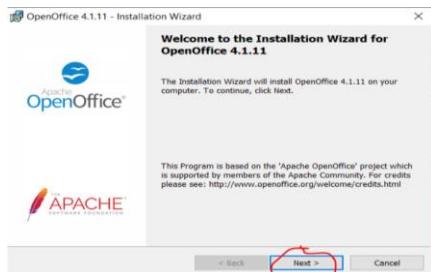


Step 9: Now in the folder find many files but click only on the setup to continue installation

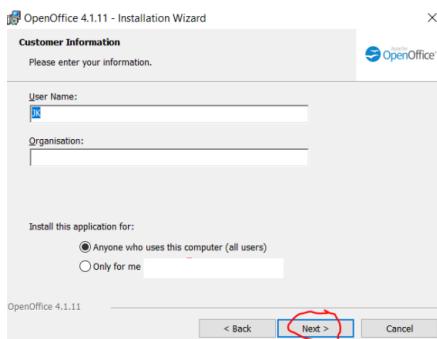


Step 10: After double click again prompt confirmation of the setup to make changes to system. Click on Yes.

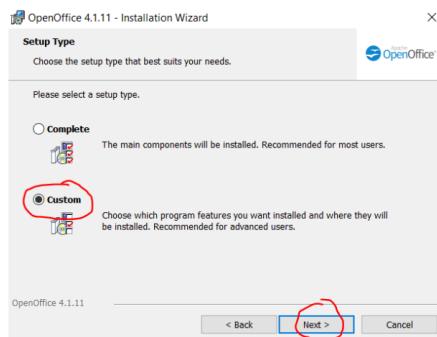
Step 11: The setup will start now click on the Next button



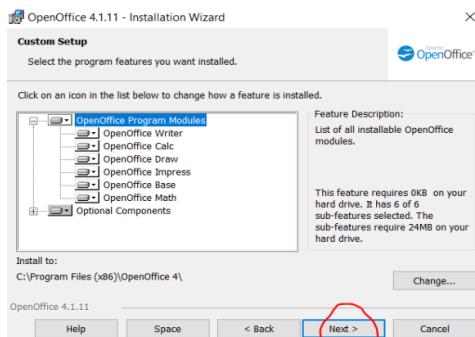
Step 12: Next screen will be of customer information where to write name and organization name, otherwise click on the Next button.



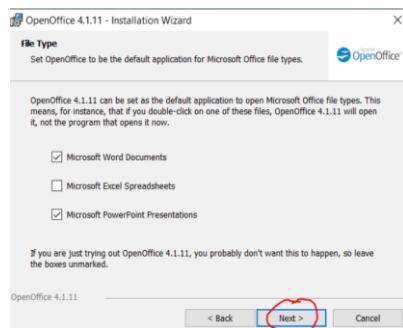
Step 13: Next screen will be of setup type if don't get direct installing software then click on complete and Next it is for basic users and if you Customize setup then click on custom and then Next it is recommended for Advanced User



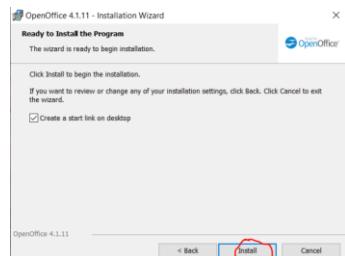
Step 14: Next screen will be of the program modules and components choose the drive and click on the Next button.



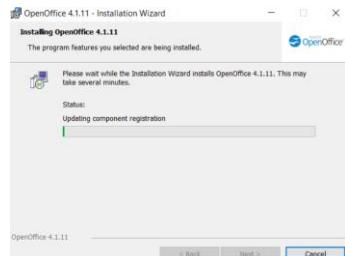
Step 15: Next screen will be of Choose file type and click on Next button. Here we select Microsoft Word Documents and Microsoft PowerPoint Presentation.



Step 16: Now the program is ready to install Click on the Install button.



Step 17: After this, the installation process will start and it might take 2 – 4 minutes depending on your computer speed and specification to complete the installation.



Step 18: After the installation process is completed, click on the Finish button.



At this point, Apache OpenOffice is successfully installed on the system and an icon is created on the desktop.



**Lab 11- Install anyone of the antivirus software (Avast, Kaspersky etc) and observe the variations before and after installation.**

**Aim : Installing antivirus software**

**Requirements: Antivirus software - Avast, Kaspersky**

Install Avast Free Antivirus

1. Click the button below to download the Avast Free Antivirus setup file, and save it in a familiar location on your PC (by default, downloaded files are saved to Downloads folder).

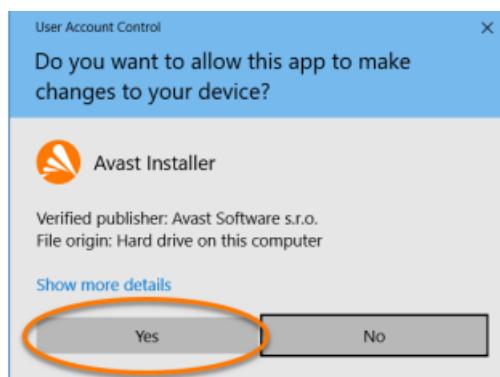
**DOWNLOAD AVAST FREE ANTIVIRUS FOR WINDOWS**

2. Right-click the downloaded setup file `avast_free_antivirus_setup_online.exe` and select Run as administrator from the context menu.

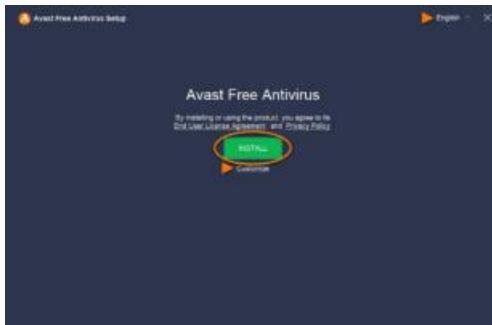


Managing administrative accounts on your Windows PC

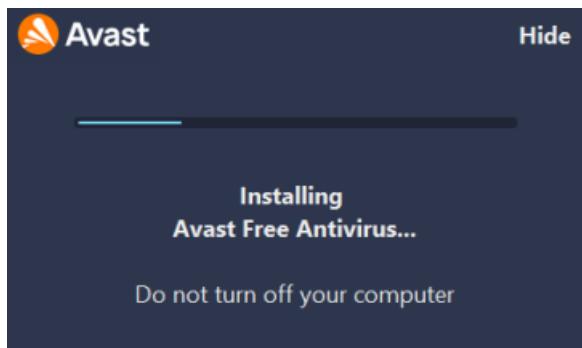
4. If prompted for permission by the User Account Control dialog, click Yes.



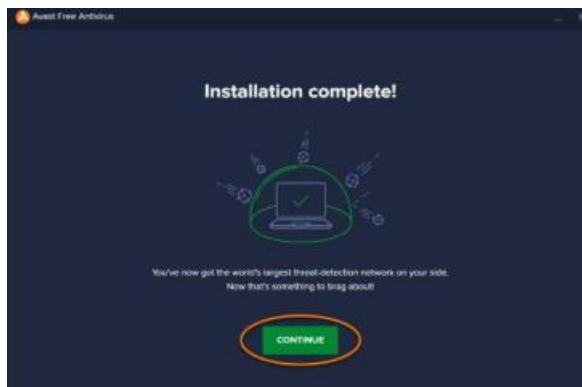
5. To change the default setup language, click the current language in the top-right corner of the screen. Then, click Install to proceed with default installation, or click Customize if you need to make changes to the default setup.



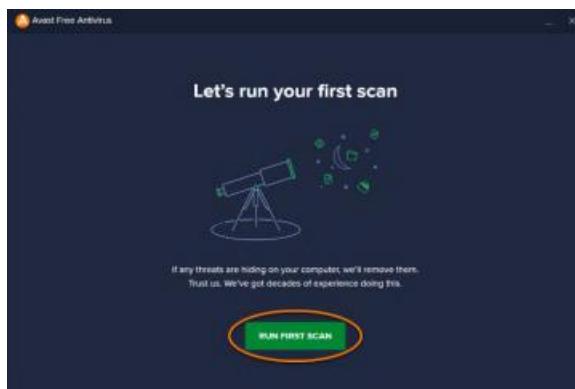
6. Wait while setup installs Avast Free Antivirus on PC.



7. When the installation is complete, click Continue



8. Click Run first scan to start a comprehensive Smart Scan, which detects viruses, malware, bad browser add-ons, and other issues on your PC.



Avast Free Antivirus is now installed on PC and ready to use, but some components may not fully function until restart the PC. It is no longer necessary to register Avast Free Antivirus, as initial free subscription automatically activates after installation

## Install Kaspersky Antivirus

1. Download the Kaspersky Anti-Virus installation package from the Kaspersky website, or via the link in the email you received from us.
2. Run the installer.

3. Wait until the searching for a newer version of the application has been completed, or click Skip.



4. Read the End User License Agreement and click Continue if agree to the terms.



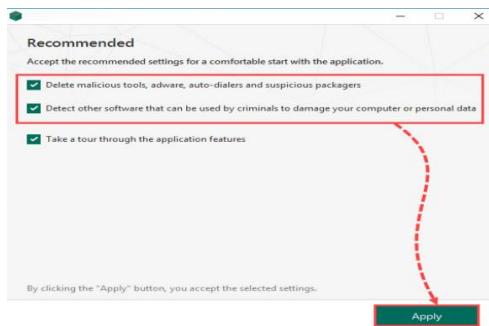
5. Read the Kaspersky Security Network Statement carefully. Select the checkbox agree to the terms. If don't want to participate in the Kaspersky Security Network, clear the checkbox.

6. Together with Kaspersky Internet Security, Kaspersky Secure Connection will be installed to ensure protected connection to the Internet. Click Install.

7.



8. Wait for the installation to complete. Make sure the recommended settings are enabled and click Apply.

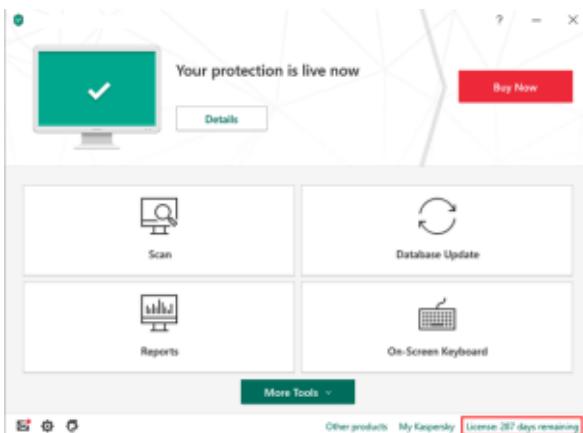


## 9. Click Done

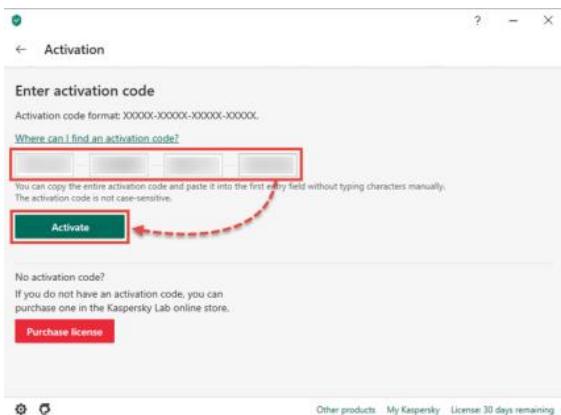


Kaspersky Anti-Virus will now be installed

## 1. To activate the application: In the application window, click.



## 3. Enter the code from the message received after buying the license and click Activate.



## 4. Click Done. Kaspersky Anti-Virus is now activated.

## Lab- 12 Add new Hardware device (keyboard, mouse, speaker, Microphone)

Aim : Adding keyboard, mouse, speaker, Microphone

Requirements: Computer, keyboard, mouse, speaker, Microphone

Same setting for all device. (keyboard, mouse, speaker, Microphone) In Windows XP and Windows 7 need to add device

How to Add and Install and Update Hardware Drivers in Windows 10

Installing drivers through Windows Update

Simply launch it from Start > Settings > Update and Recovery and click Check for Updates

Or

Press Windows key + R

Type: ms-settings: windows update

Hit Enter

Click Check for updates (make sure you have an active Internet connection).

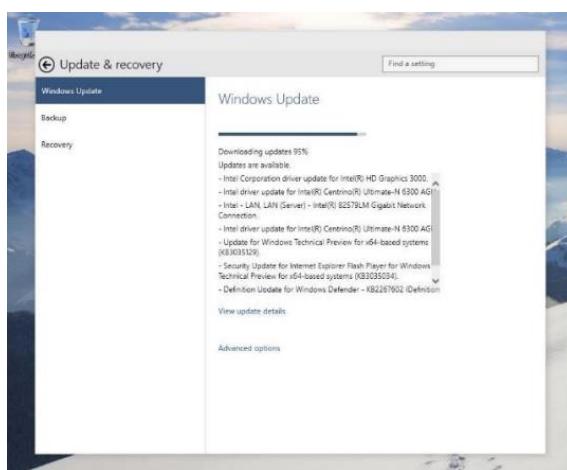


Fig 1: update drivers by windows update

Immediately, Windows Update will detect system configuration and download all the appropriate drivers for system.

1. Navigate to Device Manager and right-click on the keyboard and click on Update Driver Software.

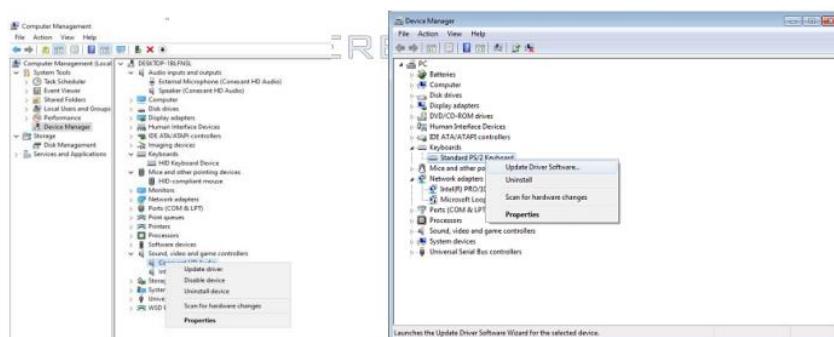
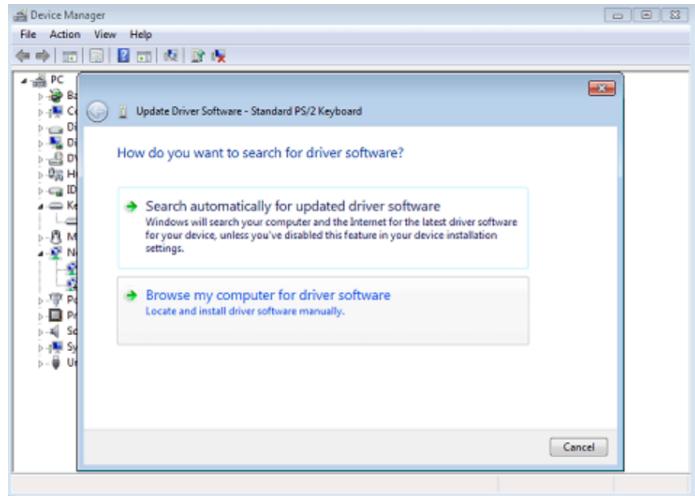


Fig 2: Drivers updated

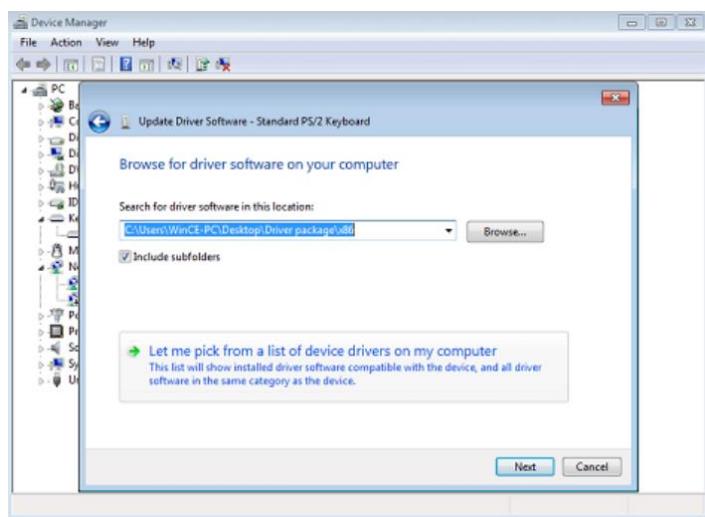
2. Click on Browse my computer for driver software.

Note: For the Keyboard Driver Package navigate to the SureLock installation folder\Drivers\Windows 10\PS2\x64

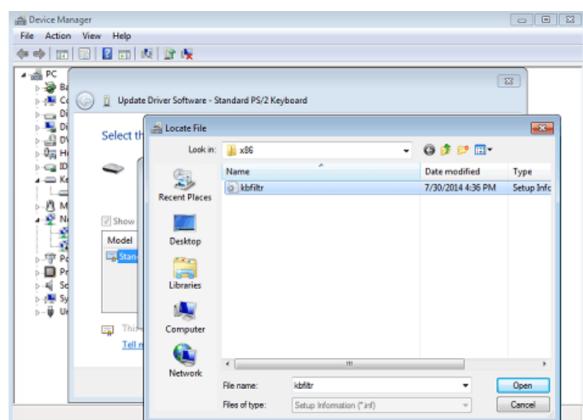
For example: c:\Program Files (x86)\42Gears\SureLock\Drivers\Windows 10\PS\2\x64\kbfilter.inf.



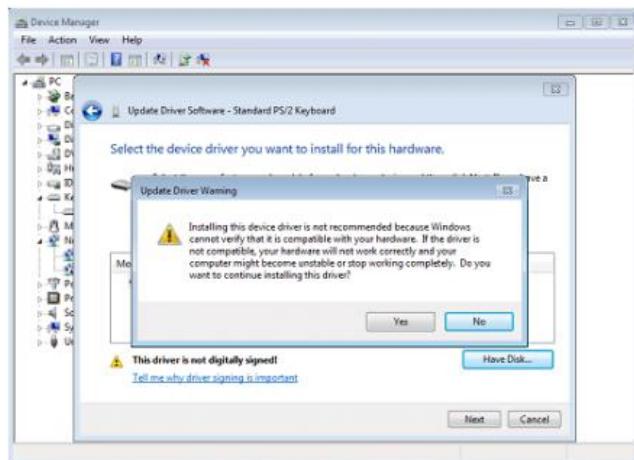
3. Click on Let me pick from a list of device drivers on my computer.



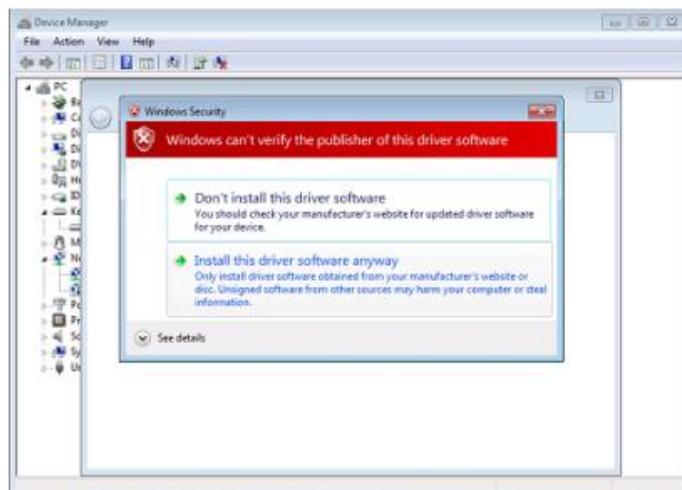
4. Navigate to the Driver package folder (x86 folder for 32-bit machines and x64 folder for 64bit machines) and select kbfiltr.inf and click on Open.



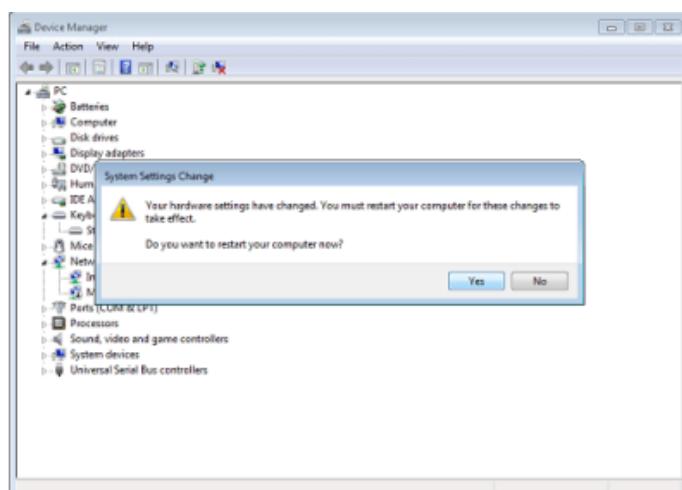
5. On the Update Driver Warning pop-up, click on Yes.



6. On the Windows Security pop up, click on Install this driver software anyway.



7. On the System Settings Change pop up, click on Yes. This will reboot machine.



Once done, the keyboard drivers will be installed on the device

## **Lab -13 Connect the LCD Projector with Laptop/CPU**

**Aim : Connecting LCD Projector to Laptop /CPU**

**Requirements: Computer, LCD Projector**

**Computer, LCD Projector Windows 11 Windows 10 with Dongle.**

To project, connect PC using one of the cable connectors in the room, press the Windows logo key + P, and then choose one of the four options:

- ♣ PC screen only. Get everything on PC. (When connected to a wireless projector, this option changes to Disconnect.)
- ♣ Duplicate. To see the same things on both screens. ♣ Extend. To see everything across both screens, and can drag and move items between the two.
- ♣ Second screen only. To see everything on the connected screen. The other screen will be blank.

Then again, might not even need a cable. If PC and the projector both support Miracast, press the Windows logo key + K, choose a projector, and set.

Not sure if PC supports Miracast? Windows will let to know. Just press the Windows logo key + K to check.

Connect a laptop to a projector using an HDMI, DVI, VGA cable, or Bluetooth (if it's supported by both devices).

## **Lab -14 Adding additional RAM to the system (expanding RAM size)**

**Aim : Expanding RAM size**

**Requirements: Computer, RAM**

### **Upgrade Desktop Memory (RAM) - 10 easy steps to install memory in a desktop computer**

Installing memory can be done in a matter of minutes

#### **Step 1 - Gathering Supplies**

Then, you'll need the following items:

- Your desktop computer
- Desktop memory • Screwdriver
- Owner's manual



*Memory installation supplies*

#### **Step 2 - Shut Down Desktop Computer**

Because files, documents, and data should unaffected during this process.

#### **Step 3 - Unplug the Power Cable**

This includes any cables and accessories plugged into the computer

#### **Step 4 - Hold the Power Button for Five Seconds**

This discharges any residual electricity still in the system.

#### **Step 5 - Open the Case**

For instructions about opening specific system, consult its manual. Take pictures as you work through the process to see where cables or screws are attached to make it easier to put back together.



*Open computer case*

### **Step 6 - Ground Yourself!**

Touch an unpainted metal surface – this is an extra safeguard that protects computer memory and components from static damage during the installation process.



**Ground yourself**

### **Step 7 - Remove Existing Memory Modules**

Press down on the clips on the sides of each module, the clip mechanism will push the memory module up. Then pull the module completely out.



**Computer memory removal**

### **Step 8 - Install Memory**

Holding the modules along the edges, align the notches on the module with the ridge in the slot, then apply even pressure and firmly press the module in. It usually takes about 30 pounds of pressure to fully install the module.



**Memory banks**

### **Step 9 - Close the Computer Case**

### **Step 10 - Plug the Power Cable in**

**Your Memory is now Installed!**

## **Lab - 15 Graphic card insertions**

**Aim : Adding graphic card**

**Requirements: Computer, Graphic card**

Installing the new graphics card

1. Power down the PC.



2. Hit the switch on the back of the PC to turn off supply to the PSU.
3. Extract the side panel (usually held on by two screws on the rear).
  - If already have a GPU installed, skip to Step 7.

4. Remove the screws holding the GPU in on the rear bracket.



5. Unlock the PCI-e slot clip.
6. Remove the GPU by lightly pulling on the card.
7. Hover the new GPU over PCI-e slot



8. Push down on the GPU to slide the connector into the slot.
9. Ensure the secure lock clicks into place.
10. Screw the rear bracket down to secure the card.
11. Connect any required PSU cables.



12. Reattach the side panel.

Now, all you need to do is to plug in the display connectors on the rear of the case, whether they're DisplayPort, HDMI, DVI, or VGA. After that, hit the PSU power switch and boot up Windows. If the PC does not turn on or no signals get sent to the monitor, we'll need to doublecheck that all cables are connected correctly (both inside and on the rear of the PC), and the GPU is seated properly in the PCIe slot.

#### Installing required drivers

Before the GPU can be used for intensive workloads like gaming, you need to get new drivers installed so Windows and software can effectively communicate with the card. Hit the links below to download and install drivers for a new NVIDIA or AMD card.

## **Lab - 16 Assemble and Disassemble Desktop system**

**Aim : Assembling and Disassembling system**

**Requirements: Computer, Keyboard, Mouse, Monitor, Tool Kit Screwdriver**

### **Part1: How to assemble a CPU**

This part is all about CPU assembling.

Following are the steps to assemble CPU:

1. Take Inventory
2. Make space and time
3. Prepare your CPU case
4. Install motherboard
5. Install the processor
6. Install the processor heat sink
7. Install the RAM
8. Install SMPS
9. Install the HDD
10. Install CD/DVD drive
11. Connect Expansion cards
12. Install SYS/Rear cooling fan
13. Bus cable connection
14. Power Cable connection
15. Front Panel connector connection

#### **1. TAKE INVENTORY:**

Before start, take inventory of Computer parts. Make sure the following components and tools with us.

1. Case/ Tower/Cabinet
2. Motherboard
3. Processor
4. HeatSink and CPU Fan
5. SMPS
6. Hard disk drive
7. CD/ DVD drive
8. RAM
9. CMOS Battery
10. A good screwdriver sets

## 2. MAKE SPACE, MAKE TIME:

Work on a flat, stable table top surface or bare floor, where to lay out all of the items, to begin with, assemble.

## 3. PREPARE CPU CABINET:

Remove the case cover from the CPU cabinet.

Check Screw brass standoffs are perfectly placed or not. If it is not in a proper position, in that case, need to position them accurately. (always check the manual and follow their instructions)

## 4. INSTALL THE MOTHERBOARD:



Fig: motherboard and Back panel cover

Take great care, especially when installing the motherboard

1. Next, review the motherboard handbook, to make sure that motherboard layout and understand which socket is which.
2. Check the layout of the sockets on the motherboard. And confirm that the ports on motherboard's back panel match the holes on the case's Input/output (I/O) shield installed in case
3. Carefully position the motherboard on top of the brass standoffs. After that line up all the holes, use the screws that accompanied the case to fasten down the motherboard.
4. Don't forget to place the CMOS in the proper position.

## 5. INSTALL THE PROCESSOR (CPU):



Fig: CPU placement

1. Use the unlocking mechanism to open the CPU socket which is, usually a lever.
2. Carefully line up the pins and place the chip in its socket; it will fit only when oriented correctly.
3. Align with the triangular symbol with the processor and socket key marks, as shown in the Figure.
4. Lower the lever to lock the CPU into place.

#### 6. INSTALL THE CPU HEAT SINK:

If bought an OEM CPU and a separate heat sink, then you need to spread a thin layer of the thermal grease over the chip.

There are some heat sinks that come with this grease already applied. In that case, you don't need to use thermal grease over the chip.

1. Attach the clip that holds the heat sink in place, keeping in mind that it may require a fair amount of force
2. Plug the CPU fan's power connector into the proper connector on the motherboard.

#### 7. INSTALL RAM MEMORY:



Fig: Install RAM

1. Unlock the two tabs from both ends of the RAM slot.
2. To install the RAM, insert them into the proper sockets and push down firmly but evenly until the clips on both sides of the socket pop into place.

#### 8. INSTALL THE POWER SUPPLY UNIT (SMPS):



Fig: Install Power supply unit (SMPS)

1. Place the SMPS inside the CPU cabinet in the proper position.
2. Final steps, to install SMPS, need to tighten the screw to secure the SMPS to the case.

#### 9. TO INSTALL HDD:

See a 3.5 inch bay inside the CPU cabinet. If its unable to find it

Place the HDD inside the bay properly and tighten the screw.

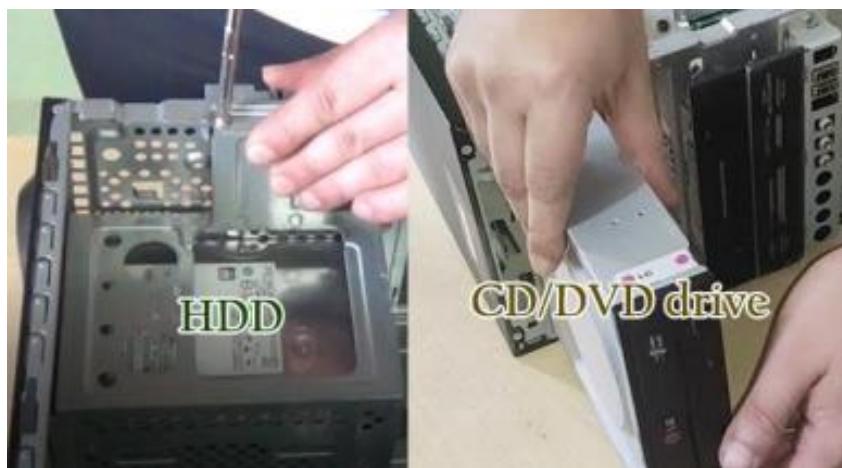


Fig: Install drives

#### 10. TO INSTALL CD/DVD:

See a 5.25 inch bay inside the CPU cabinet.

Place the CD/DVD inside the CPU cabinet to align with the 5.25-inch bay. And, finally, need to tighten all the screws to hold firmly.

#### 11. INSTALL EXPANSION CARDS:

Expansion cards help to increase the functionality of computer. Place Expansion cards on the motherboard.

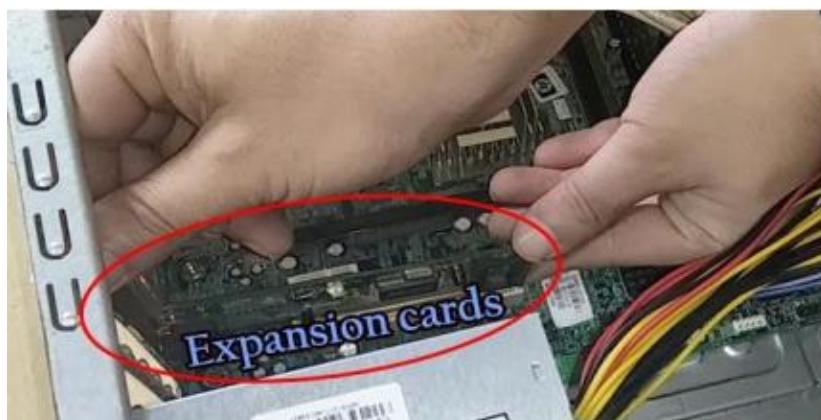


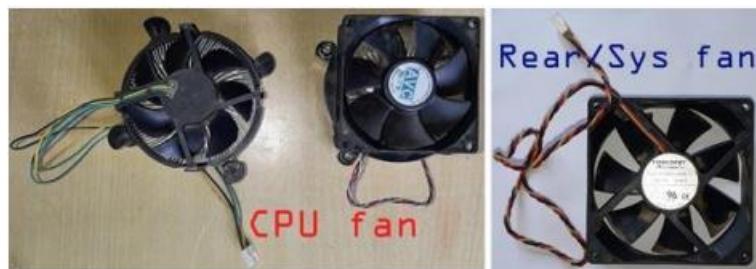
Fig: Install Expansion Cards

PCI compatible expansion cards can place on the PCI slots of the motherboard.

PCI-e compatible expansion cards can place on the

PCI-e slots of the motherboard. Video cards or graphics cards can place on the AGP slot of the motherboard.

## 12. INSTALL SYS/REAR COOLING FAN:



Cooling Fans Find the location where you can place the Sys/Rear cooling Fan.



Fig: Cooling fans

## 13. BUS CABLE CONNECTION:



sata-pata bus and connector

If motherboard has a SATA Bus connector, then need to use SATA cables. AND if motherboard has a PATA Bus connector, then use PATA cable or IDE cable.

In general, two bus cables need to connect inside the CPU. First, Bus cable connects the HDD and motherboard. And the second Bus cable connects the CD/DVD drive and motherboard.

## 14. POWER CABLE CONNECTION:



Fig: Cable connection

This one is the final step of assembling a CPU. You need to provide power to the different parts of the CPU. Plug the ATX power connector from power supply into the matching port on motherboard.

#### 15. FRONT PANEL CONNECTOR CONNECTION:

First, Attach each of the tiny leads from the power and reset switches. After that, the hard-disk activity lights, the PC speaker, and any front-panel USB to the corresponding pin on motherboard.

### PART 2: HOW TO ASSEMBLE PC ( PORT CONNECTIONS)

This one is the final part of assembling a computer system.

1. Check keyboard connector port. If it is a USB connector, then connect keyboard into the proper USB port. And if it is a PS/2 connector, then connect to the correct, PS/2 port.
2. Same steps need to follow to connect mouse into the proper port.
3. Require a VGA (Video Graphic Array) cable to connect the monitor and CPU. Find the 15 pins male connector on the backside of the CPU cabinet and monitor. Use the VGA cable to connect the CPU cabinet and the monitor.
4. If a speaker, connect the speaker on the backside of CPU cabinet.
5. And if a printer, connect the printer on the backside of CPU cabinet. connect the power cable with the CPU case, monitor, speaker, and printer.

#### CHECK YOUR PC SET-UP:

Plug the power cord back in, and turn the machine on.

To boot a computer, need hardware and software. Till now understood to assemble a computer. If want to work on that computer, you need to install an Operating System.

## WHAT IS DISASSEMBLING A PC?

Disassembling a PC means disconnecting the different components of a PC.

## STEPS FOR DISASSEMBLING A PC

1. Unplugged the AC power supply to the PC from the wall socket
2. Remove the Cover or chassis or case.
3. Unplugged bus cables and ATX power cables
4. Remove Adapter Cards if any
5. Now Remove the processor and the heatsink and fan
6. Remove hard disk and CD/ DVD drives
7. Next, remove the Memory Modules
8. Remove the Power Supply (SMPS)
9. Finally, Remove the Motherboard

### 1. UNPLUGGED THE AC POWER SUPPLY TO THE PC FROM THE WALL SOCKET

First disconnect all the power supply connected to computer system before starting to remove parts.

### 2. REMOVE THE CASE COVERING

Loose the screws and remove the case covering to access the inside parts of the CPU cabinet case.

### 3. UNPLUGGED BUS CABLES AND ATX POWER CABLES

Disconnect all the cables one by one inside the CPU case. First, disconnect ATX power cables from the motherboard. After that, disconnect power supply cables, bus cables from the HDD/SSD, and motherboard.

### 4. REMOVE ADAPTER CARDS IF ANY

If any adapter is connected then, disconnect the card from the motherboard.

### 5. REMOVE THE PROCESSOR AND THE HEATSINK AND FAN

The CPU fan and the heatsink attach together. If it is separated in that case, need to remove the fan first after that, remove the CPU heatsink.

In the final step, unlock the processor socket and remove the processor from the motherboard carefully.

### 6. REMOVE HARD DISK AND CD/ DVD DRIVES

Remove the Hard disk drive or SSD from the motherboard. Also remove the CD/DVD drive from the CPU case

### 7. REMOVE MEMORY MODULES

In this process, remove the RAM from the motherboard. First, unlock the RAM from both ends and pull the RAM carefully

## **8. REMOVE THE POWER SUPPLY UNIT (PSU)**

SMPS supplies power to the various parts of the computer system. need to remove the SMPS from the CPU cabinet case.

## **9. REMOVE THE MOTHERBOARD**

The final step of the PC disassemble process is to remove the motherboard from the CPU cabinet case.

**Note:** Remember, bolts or screws are the very essential things. They help to make rigid, all the parts used inside the computer. To remove any part from the computer system mostly, need to take out bolts first. Here in PC disassemble steps