



BRAINWARE UNIVERSITY

MNC19402

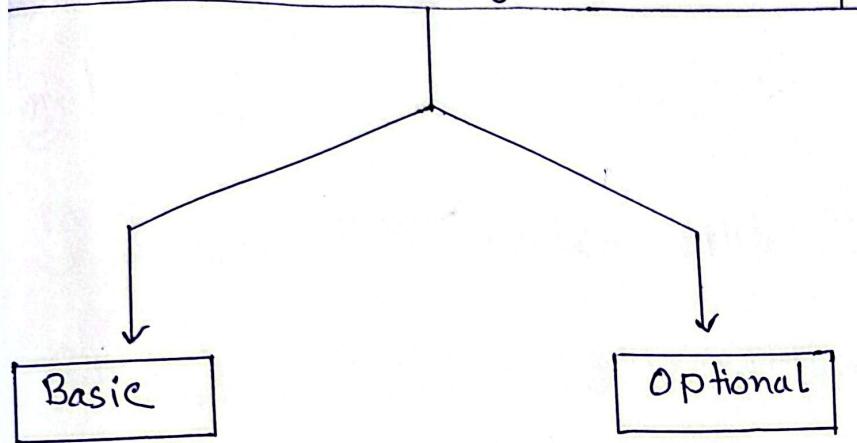
Core Hardware & Troubleshooting Lab.

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Steps for Assembling a PC

Tools For Assembling PC



- ① Anti-Static Wrist Strap
- ② Magnetic Screw Driver Set
- ③ Brush
- ④ Heat-Sink Compound
- ⑤ Needle Nose Plier
- ⑥ Tweezer
- ⑦ Pen & Paper

- ① Torch-Light
- ② Hot-Air Gun

Steps For Assembling PC

- ① Install SMPS in the Cabinet.
 - ② Install Processor on the Motherboard.
 - ③ Install Heat-Sink on the Motherboard.
 - ④ Install RAM module on the Motherboard.
 - ⑤ Install Motherboard in the Cabinet.
 - ⑥ Install HDD in the bay.
 - ⑦ Install ODD in the bay.
 - ⑧ Install Expansion cards.
- 11.8.25

What is BIOS?

- ① BIOS stands for basic input output system.
- ② It is a chip on the Motherboard.
- ③ It is a Firmware (A software which is embedded onto a chip).
- ④ It manages all the hardware components.
- ⑤ It is a flash ROM type of memory.

2. Functions of BIOS?

- ⇒ ① Power-on Self-Test (POST)
- ② Bootstrap Loader
- ③ BIOS Drivers
- ④ BIOS (CMOS) Setup

Q3: BIOS vs UEFI?

BIOSUEFI

① Interface Typically text-based,
 keyboard only interface

Graphical, mouse and
Keyboard support

	<u>BIOS</u>	<u>UEFI</u>
② Firmware Architecture	16 bit real mode with Limited memory and functionality	Native 64 bit capable for sophisticated pre-OS ops
③ Partition Scheme	Mater Boot Record (MBR), Limited max partition to 2.2TB	GUID Partition Table (GPT) to support up to 9.4ZB per partition
④ Secure Boot	No built-in support for secure boot and verification feature	Support secure boot where only signed & trusted code is executed during boot process.

Q4: How to enter in BIOS/UEFI?

⇒ Restart the Machine and continuously press F1, F2, or ESC or DEL,

Q5: How to change Date/Time?

⇒ Enter into the BIOS and go to System info tab and change Date and time.

Q7: How To Change Boot Order?

⇒ Enter the BIOS → Go to Boot Tab and change the it to priorities option 1 as our priority

Q8: How to block Front USB/Audio ports?

⇒ Enter into the BIOS → Go to Setting Tab and Double Click IO ports, Click on audio controller → Click on Disabled/ Enabled as priority

→ Enter in BIOS → Go to Setting Tab → Click on IO ports → Click USB configuration → Click on Legacy USB Support → Choose disable/enable as priority

Q8: How to set Administrator/ Supervisor password?

⇒ Enter into BIOS → Go to Boot Tab → Click on Administrator Password → Enter New password → confirm password → OK → Click F10 to Save and Exit.

Remove password: Go to Boot Tab → Administrator password → write old password → skip new password → yes → F10 save & Exit.

Q: How to Reset BIOS?

→ Enter into BIOS → Go to Save & Exit Tab → Double Click

Load Optimized Defaults → Yes

13.8.28

Assignment - 3

Creating a Virtual Machine in VMWare &
Installing Windows OS in it.

Steps

- ① Open VMWare Workstation.
- ② Click on Create a New Virtual Machine.
- ③ Select Typical \Rightarrow Next.
- ④ Select Installer disc imagefile (iso) from device. \Rightarrow Next.
- ⑤ Name the Virtual Machine & Choose location for Virtual Machine. \Rightarrow Next
- ⑥ Specify Disk Size & select Store virtual disk as a single file \Rightarrow Next.
- ⑦ uncheck "Power on this virtual machine" \Rightarrow Finish.
- ⑧ Power on this virtual Machine \Rightarrow
- ⑨ Automatically ~~OS~~ installing start

✓ 20/08/2025

Managing Users through Control Panel of Windows OS

Q1: What is a user account?

⇒ ① This is a digital identity which allows a person or a computer to access the resources of a machine.

② A memory location is assigned to the specified user where all the user detail, like user name, password, user settings are stored.

Q2: Types of user account in Windows 10.

⇒ There are 4 types of users.

① In-built (Administrator & Guest)

② Local (Administrator & Standard)

③ Microsoft account (This user account is linked to an Email account and is used for Single Sign-on (SSO).
Example: outlook.com, live.com)

④ Azure AD (Cloud Service),

Q3: How to create a new user through control panel.

⇒ ① Process 1:

Goto control panel → User Accounts →

→ Add or remove user accounts → Add a new user in PC Setting

→ Add someone else to this PC → Set username & password

→ Next

② Process 2:

Goto search → cmd → Run as administrator

→ net user ^{username}pabitra ^{password} 1234 /add

To check user

→ net user

Q4: How to elevate them or promote standard user to administrator by using cmd?

⇒ cmd → Run as administrator → net localgroup Administrators

pabitra /add

↑
Local user

Q5: How to manage the users.

⇒ Search → control panel → User Accounts → Add or
remove user accounts → Select pabitra-db →

① Change the account name → Set new name → Change

② Change the password → New password, confirm password, hints
→ Change password.

⑩ Change the account type → choose Standard / Administrator
→ Change Account Type

⑪ Delete the account → Delete files → Delete Account

= Delete the user account by cmd.

⇒ net user ^{username} pabitra1 /delete

16
27/8/25

Assignment: 05

Managing Disk and Drives.

Q1: Basic Disk Vs Dynamic Disk

⇒

Basic Disk

① It's a traditional storage model that uses normal partition tables to manage all partitions on the hard disk.

② It uses partitions to manage data.

③ It can hold up to four primary partitions or up to three primary partitions plus one extended partition, along with logical drives.

④ It supports multi-boot configurations meaning you can easily switch between operating systems.

Dynamic Disk

It's a relatively newer storage model that uses a hidden LDM database to manage all volumes on the hard disk.

It uses dynamic volumes instead of partition partitions.

It contains simple volumes, spanned volumes, striped volumes, mirrored volumes, and RAID-5 volumes.

It does not support multi-boot configurations meaning you can not switch between OSs.

To check → Windows + R → diskmgmt.msc

basic = Client storage

dynamic = Server

Q2: Difference between primary and extended partition?

⇒ Primary partition	Extended partition
I Functions as a physically separate disk	① Cannot host an OS
II Can host an OS	② Cannot be active partition
III Up to 4 are supported or 3 + 1 Extended	③ Do not format extended partition, but the logical drives.
IV Each is formatted and assigned a drive	

Q3: Shrink & Extend Drives

Windows + R → diskmgmt.msc

Shrink

click on C drive → Shrink Volume →

Enter the amount of space to shrink in MB : 30000

→ Shrink

Extended

Click on C drive → Extend Volume → Next → Next
→ Finish

Q4: Using Disk Maintenance Tools

- ⇒ ① Disk Clean up
- ② Disk De-fragmenter

Disk Clean up: It removes unwanted files.

Search → Disk Cleanup → Choose (C) Drive → OK

Check : Temporary Internet Files, Setup log files, Temporary files, Thumbnails → OK → Delete Files

Disk Defragmenter: This tool rearranges the ~~drives~~ disk space (drive) by taking all the used memory in one side and the free spaces into another

Search → Defragment and Optimize Drives → Change settings

→ Frequency : Weekly/Daily/Monthly → OK

10
3/9/25

Identifying Processor Specifications

Q1: CISC vs RISC

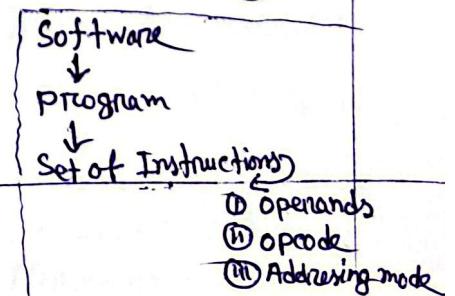


CISC

RISC

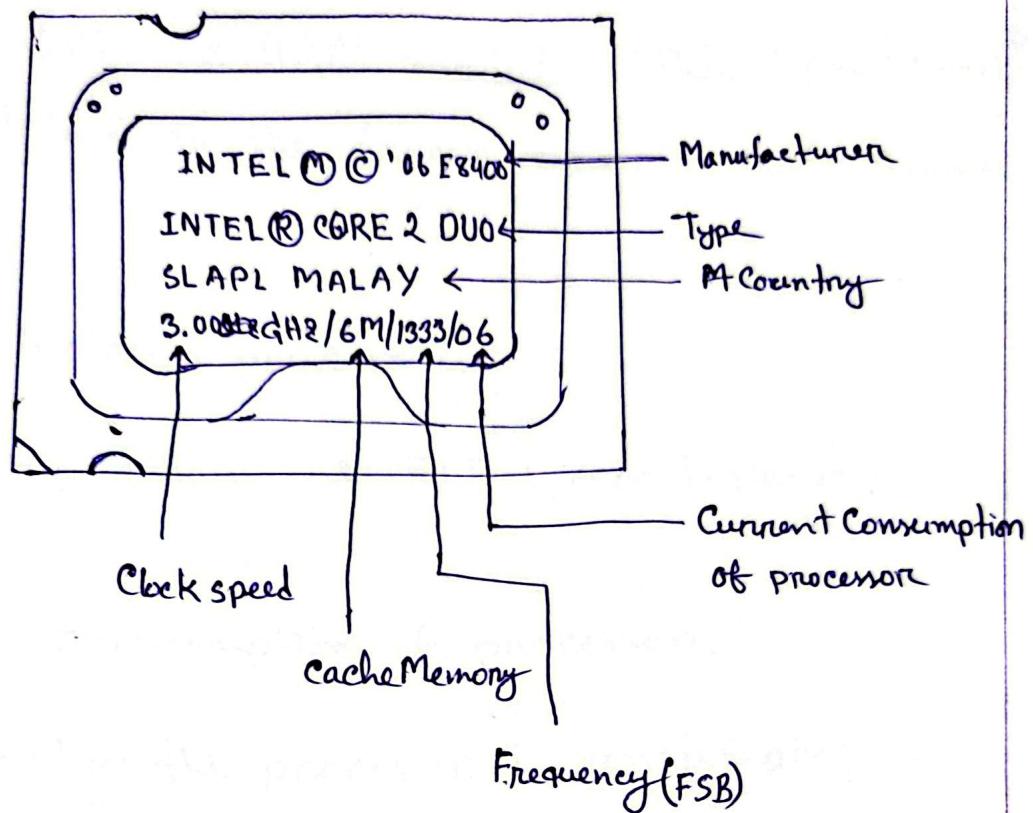
- ① Complex Instruction set Computing
- ② Emphasis on hardware
- ③ Multiple instruction sizes and formats
- ④ Less registers
- ⑤ More addressing
- ⑥ Extensive use of microprogramming
- ⑦ Instructions take a varying amount of cycle time
- ⑧ Pipelining is difficult

- ⑧ Reduced Instruction set Computing
- ⑨ Emphasis on Software
- ⑩ Instructions of same set with few formats
- ⑪ Uses more registers
- ⑫ Fewer addressing modes
- ⑬ Complexity in compiler
- ⑭ Instructions takes one cycle time
- ⑮ Pipelining is easy



Q2:

Specifications of processor



① Clock Speed: It can be defined as the number of instructions processed per second.

② This is the rate of processing and the unit is GHz

③ Cache Memory: This is the smallest and fastest memory

④ It is inbuilt into the processor and it stores frequently accessed data and applications. It has 3 levels.

- ① L1 [dedicated memory]
- ② L2 [dedicated memory]
- ③ L3 [shared memory]

② FSB : This is the communication channel between the CPU and RAM module. This speed must match with the frequency of RAM module

③ How to install a processor ?

⇒ We have follow the ZIF (Zero Insertion Force)

④ Voltage consumption of processor

⇒ Currently the processor is consuming 1.2 volt

Earlier it was 2.5 volt and 3.3 volt respectively

⑤ IC packaging (SSI, MSI, LSI, VLSI, ULSI)

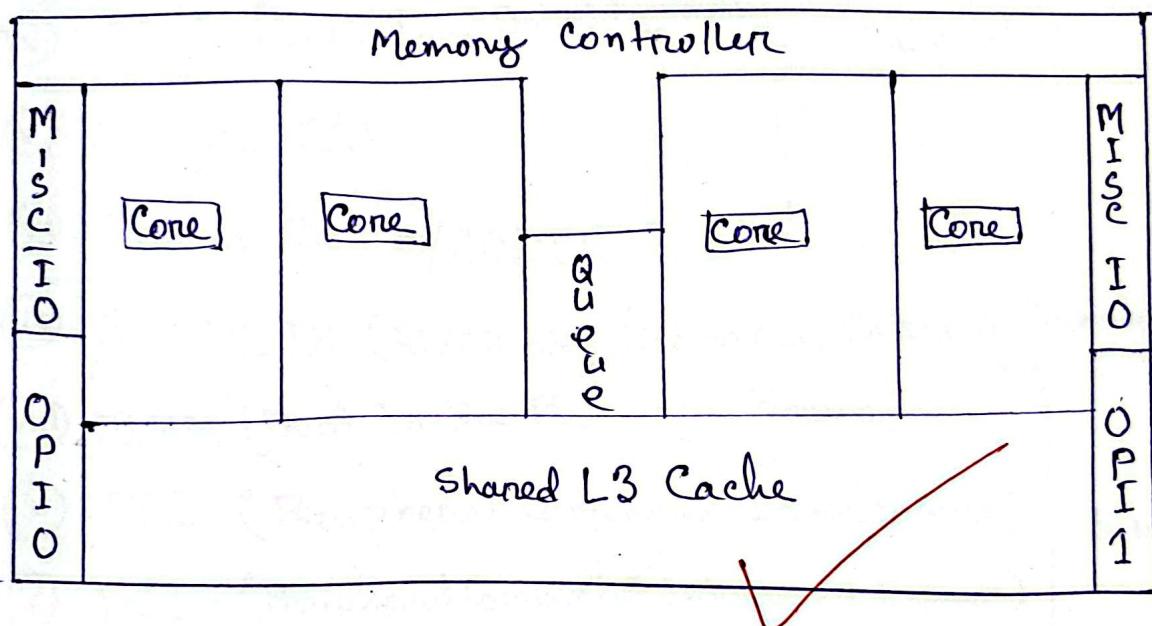
Year	Integration Level	Transistor Count
① 1963	Small Scale Integration (SSI)	< 100
② 1970	Medium Scale Integration (MSI)	100 - 300
③ 1975	Large Scale Integration (LSI)	300 - 30000
④ 1980	Very Large Scale Integration (VLSI)	> 1 million
⑤ 1990	Ultra Large Scale Integration (ULSI)	> 1 billion

Q6: Types of processor sockets (PGA & LGA)

⇒ PGA (Pin Grid Array, ^{Female} Female Socket)

LGA (Land Grid Array, ^{Female} Female Socket)

Q7: What is Nehalem Processor



This Architecture is the base on Intel base i Series Processor

H.S.
10.9.08

Identifying Motherboard & Components

Q: On board Components of Motherboard

- ⇒ ① Processor Socket
 - ② North Bridge (NCH)
 - ③ South Bridge (ICH)
 - ④ BIOS (Basic Input Output System)
 - ⑤ Super I/O
 - ⑥ Sound Codec/CODEC
 - ⑦ ATX / BTX (20/24 pins) (Advanced / Balanced Technology extended)
 - ⑧ DIMM (Dual In-line Memory Module)
 - ⑨ PCI (Peripheral Component Interconnect)
 - ⑩ PCIe (Peripheral Component Interconnect Express)
 - └─ x4
 - └─ x16
 - ⑪ PATA/IDE (40/80 pins) (Parallel Advanced Technology Attachment)
Integrated Development Environment
 - ⑫ SATA (7pins) (Serial Advanced Technology Attachment)
 - ⑬ PS2 (6 pins)
 - ⑭ Serial (9 pins)
- Chipset
- Slot
- Back panel ports

(XV) Parallel (25)pins

(XVI) VGA(15 pins)/ HDMI (19 pins)

(XVII) USB (4 pins)

(XVIII) LAN/RJ45/Ethernet (8 pins)

(XIX) Audio IN/OUT Jack

back panel ports

X. 17. a. 25

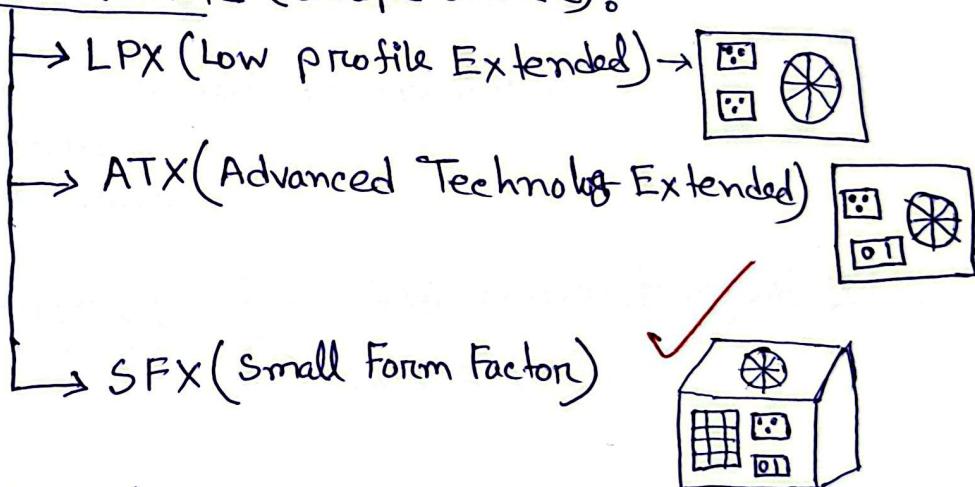
Identifying the Power Supply of a PC and testing SMPS

Q1: What is SMPS (Switched Mode Power Supply) ?

- ⇒ ① This is the power supply unit of any desktop.
- ② It converts input AC to desired DC (Direct current) output.

Q2: Specification of SMPS.

- ⇒ ① Form factor (Shape & Size):



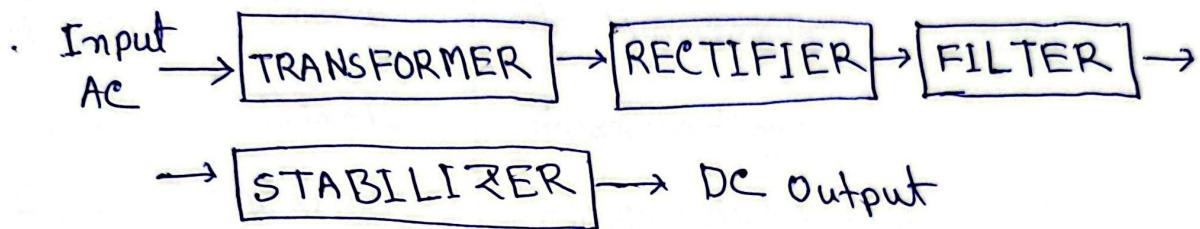
- ② Connectors :

- ① 20/24 pin ATX (for CPU)
- ② +12V 4 pin for CPU
- ③ 15 pin SATA
- ④ 4 pin MOLEX (PATA)
- ⑤ 6 pin PCIe
- ⑥ 4 pin mini/burgle (FDD)

(iii) Wattage :

- ① Client PC (250W - 600W)
- ② Server (400W - 700W)

Q3: Internal Components of SMPS.



① Transformer : Transformer transfers currents from one circuit to another.

- ① Step up
- ② Step down

② Rectifier : Rectifier converts AC to DC.
(Pulsating DC)

③ Filter : Filter converts pulsating DC to steady DC.

④ Stabilizer : Stabilizer maintains the constant output voltage.

*** Q4: Output Voltage of SMPS.

⇒ Voltage	Color of wire	Usage
① +12V	Yellow	Motors and fans
② +5V	Red	Logic cards and RAM
③ +3.3V	Orange	In Processor
④ -0V	Black	Grounding
⑤ -5V	White	Floppy disk and drive
⑥ -12V	Blue	Serial port

Special output

① PG (Power Good) → Gray

④ It indicates the stability of output voltages.

~~BP~~

② PS_ON (Power Supply On) → Green

④ It makes the SMPS Power On. ✓

③ +5V SB (Stand By) → Purple

④ Provides continuous power to the motherboard and other components that need to be ready to "wake up" the system.

Q6 : How to test SMPS.

⇒ Step 1 : Connect the power cable to the SMPS.

① Connect the green color wire with black one
and switch on the SMPS

② Set the multimeter to the DC Voltage
mode. into 20V

③ Connect the black probe to the ~~black~~ and
connect the red probe to the other color
wire and check the reading

HJ
15.10.20

Identifying Monitor types, installing and sharing Printers

Q1: What is a Monitor?

- ⇒ ① This is the primary output device.
② It displays text, pictures and multimedia data.

Q2: Specifications of a Monitor?



- ① Size: Size is measured diagonally.
② Resolution: Resolution can be in terms of 2 numbers

~~For~~ Example: 1024×768 ,

1024 is the number of pixels in a row (horizontally)
and 768 is the number of pixels in a column (vertically)

③ Contrast Ratio: This is the comparison between
whitest white pixel and darkest black pixel

Example

Example: 1:20000, this is the current contrast ratio.

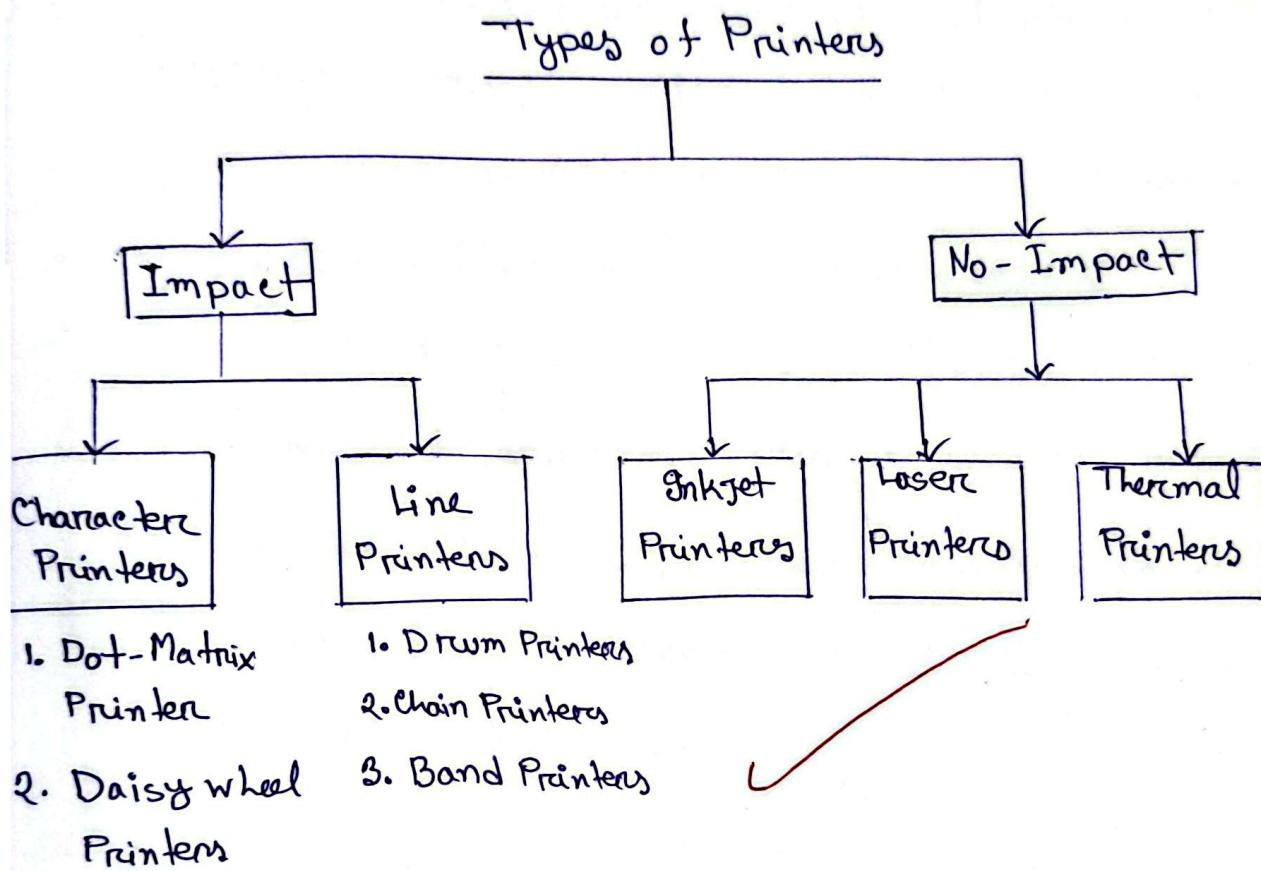
Q3: Types of Monitor?

- ⇒ ① CRT (Cathode Ray Tube)
② LCD (Liquid Crystal Display)
③ LED (Light Emitting Diode)

Q 4: What is a printer?

→ This is an output device which converts digital data to a printed form.

Q 5: Types of printers?



In case of impact printers physical connection is established between the print-head and the media, like press

36° How to install a printer virtual printer in VM Ware?

- ① Goto PC1 ~~on~~ ^{Goto} Control Panel → Hardware and Sound → Devices and Printers → Add a printer → The printer that I want isn't listed → Add a Local printer or network printer with manual settings → Next → Choose a printer port: Use an existing port: LPT1: (Printer Port) → Next → Manufacturer: Microsoft, Printer: Microsoft PS Class Driver → Next → Printer ~~Name~~: Microsoft PS Class Driver → Next → Printer Sharing: Share this printer; Share name: Microsoft PS Class Driver → Next → Finish

✓
29.10.25

Troubleshooting PC hardware, software and networking issues

Problem	Cause	Solution
No Power Issue	① Faulty wall outlet ② Faulty power cable ③ SMPS issue ④ Loose or stuck power button in the cabinet	① Use the multimeter to check the status of the power outlet ② Use the Multimeter to check the output Voltage ③ Replace or repair the outlet if required.  ① Check the power cable continuity using multimeter ② Replace the power cable if required
	⑤ Loose or stuck power button in the cabinet	① Pull out the power button using a toothpick. For the time being shut the P+ and P- Pins from the front panel connector

Problem	Cause	Solution
	⑥ Motherboard Failure	① Replace the Motherboard
⑦ Hanging issue or frozen PC	① CPU overheating	① Clean the CPU socket and heatsink fan using a hot airgun ② Use thermal paste or heat-sink compound ③ Check for over-clocking of CPU in bios BIOS.
	⑧ Insufficient RAM	① Upgrade the RAM (Match the size and frequency)
	⑨ Hard-Disk Almost Full	① Use the Disk-Maintenance tools like disk cleanup and disk defragmentator ① Delete unnecessary files and application. ② Use an external harddisk Drive. ④ Upgrade the harddisk Drive. (Match the interface and size)
	⑩ SMPS Wattage issue	① Upgrade the SMPS Wattage.
	⑪ New hardware found.	① Uninstall the new hardware component and use a compatible one

Problem	Cause	Solution
① Random Restart issue	① CPU overheating	① Solve as discuss above
	② Faulty SMPS	① "
	③ New Hardware found	① "
	④ Faulty RAM Module	① Test the Memory using any memory diagnostic tools
	⑤ Older Version of BIOS	① Update the BIOS
① No Display issue	① Cable Connection issue	① If there is an error message no signal is being displayed on the screen, Connect the display connector cable properly. If the problem still exist change the display.
		② If we are facing the problem again then change the display port or buy a display card.
	② Monitor setting issue	① Check the monitor is on or off ② Check the brightness of the monitor ③ If there is an error message "Out of Range", it means the current resolution is not being supported by the monitor. To change the resolution we have to enter into the safe mode.

Problem	Cause	Solution
	③ RAM issue	<p>① Uninstall the RAM module, clean its connectors using the student eraser, clean the DIM slot using a brush and reinstall the RAM stick properly.</p>

YB
25.11.25

Cone Hardware

Lab - 3

20/08/2023

exam

exam

Error

Solution

- ① By default machine UEFI mode
- ② power off your virtual machine → go to the virtual machine → go to the edit virtual machine → select the option Tab and goto advance and choose ③ select BIOS mode and ok

④

Microsoft account.

- ① We have to disable our physical Machi.
LAN
- ② Goto Run type command `ncpl.cpl`
Select and Right

③

`firewall.cpl`

How to check your machine resource

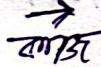
- ① cmd → msinfo32
- ② Run → dxdiag
Right click
- ③ This pc → RC → Properties.

Control Panel

* What is Virtualization

→ Example, → VMware, Hyper-V, Microsoft, Oracle - VB]

* What is OS?



* Functions of OS

Concerns

① Memory management:

- ↳ memory allocation
- ↳ de allocation
- ↳ Re allocation.

② Input-Output management

③ Process Management

- ↳ execution of a program
- need memory, CPU timing / clock

④ File Management

⑤ scheduling

⑥

Identifying the Motherboard & Component

④ Form factors of Motherboard

The form of a motherboard refers to its size, shape, and physical specifications, including its layout, mounting holes, and electrical power connections. Standardized form factors ensure that motherboards can be easily interchanged between different computer cases.

Common motherboard form factors

- ① ATX (Advanced Technology Extended) : 12×9.6 inch
- ② Micro-ATX (mATX) : 9.6×9.6 inch ✓
- ③ Mini-~~ATX~~ ITX (mITX) : 6.7×6.7 inch ✓
- ④ Extended ATX (EATX) : Larger than ATX

* Types of Motherboard? (non-integrated and integrated)

Motherboards are classified as integrated, featuring built-in components like CPU and graphics, or non-integrated, which use expansion slots for adding separate components such as video and sound cards. Non-integrated boards, common in desktops, allow for component upgrades, while integrated boards, found in laptops and some specialized computers, are cost-effective and compact.

Date _____

On board components of MB

① Processor socket

② NorthBridge (NCH) : functions of (NCH)

↳ Communication by busses [FSB.]

↳ Managed by Northbridge

③ South Bridge (ICH) : functions of (ICH)

Its deal with Harddrive
and usb ports,

④ BIOS : manage the all hardware components
and managing the booting of
OS

⑤ Super I/O

SIMM

⑥ Sound CODEC

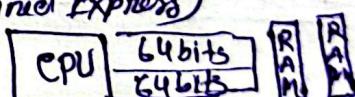


⑦ ATX/BTX (20/24 pins) (Advanced Technology extender)
Balanced

⑧ DIMM (Dual Inline Memory module)

⑨ PCI (Peripheral Component Interconnect) SIMM

⑩ PCIe (Peripheral component Interconnect Express)



⑪ PATA/IDE (40/80 pins) (Parallel Advanced Technology
Attachment)

⑫ SATA (7 pins) (Serial Advanced Technology Attachment)