Prepared by: Jerico D. Castillo, Teacher II, SHS in San Nicholas III, Bacoor City

TYPES OF COMPUTERS

(1) Personal Computer

(2) Workstation

(3) Mini computer

(4) Mainframe

(5) Super Computer

Personal Computer

- It is a *single user* computer system having moderately powerful microprocessor.

- Businesses use personal computers for word processing, accounting, desktop publishing, and for running spreadsheet and database management applications.

Workstation

- It is also a single user computer system, similar to personal computer however has a more powerful microprocessor.

- It is a computer used for engineering applications (CAD/CAM), desktop publishing, software development, and other such types of applications which require a moderate amount of computing power and relatively high quality graphics capabilities.

Mini Computer

- It is a multi-user computer system, capable of supporting hundreds (250) of users simultaneously.

Mainframe

- It is a multi-user computer system, capable of supporting hundreds of users simultaneously. Software technology is different from minicomputer.

Supercomputer

- It is an extremely fast computer, which can execute hundreds of millions of instructions per second.

- employed for specialized applications that require immense amount of mathematical calculations (number crunching).

- For example, weather forecasting, scientific simulations, (animated) graphics, fluid dynamic calculations, nuclear energy research, electronic design, and analysis of geological data (e.g. in petrochemical prospecting).

PARTS OF COMPUTER

Inside the System Unit

(1) Motherboard

(2) RAM

(3) CPU

(4) Cooling Fan with Heat Sink

(5) Video Card

(6) Wireless LAN Card

(7) Power Supply

(8) Floppy Disk Drive

(9) Hard Disk Drive

#1

MOTHERBOARD

- also known as mainboard, systemboard, MoBo
- main circuit board inside a computer that connects the different parts

TYPES OF MOTHERBOARD

- **(1) Non-integrated**

  - Assemblies such as I/O port connectors, hard drive connectors, CD drive connectors etc installed as expansion boards.

  - Takes lot of free space inside the case because of expansion slots.

  - If something goes wrong such as bend or broken pin or defective controller can be repaired with minor cost.

  - Are cheap and easy to produce.

  - Most of the olden motherboards were non-integrated.

TYPES OF MOTHERBOARD

- **(2) Integrated**

  - Assemblies are integrated or built right onto the board.

  - Serial and parallel ports, IDE, CD drive are directly connected to the motherboard.

  - This tends to free some space inside case and better accessibility to the components.

  - Cheaper to produce but are expensive to repair.

  - Fast, powerful, feature rich motherboard at reasonable price.
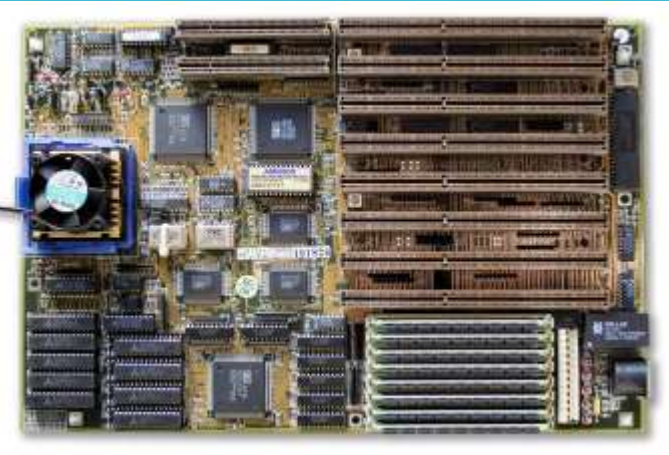
MOTHERBOARD FORM FACTORS

- **Form Factor**

  - determines general layout, size and feature placement on the motherboard

  - form factors such as physical size, shape, component placement, power supply connectors, etc.

  - *There are several specific form factors that most PC motherboards use so that they can all fit in standard cases.*
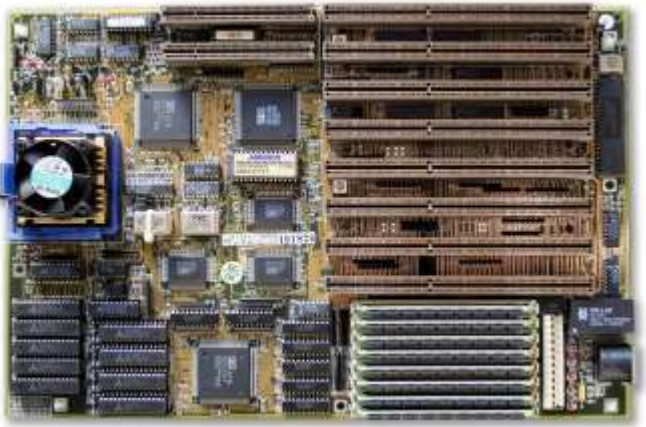
MOTHERBOARD FORM FACTORS

- **(1) AT (Advanced Technology)**

  - Oldest and biggest form factor and popular until Baby AT.

  - Capable of using 386 processor.

  - 12' inch size and was difficult to install, service and upgrade.

MOTHERBOARD FORM FACTORS

- **(2) BABY AT**

  - Standard in computer industries and still being used in Pentium class products.

  - CPU socket is placed in such a way that it can interfere with longer bus cards.

  - Limitation over peripheral card installation.

  - I/O ports are connected to pin-outs near the floppy drive which results in jumbling of ribbon cables.

MOTHERBOARD FORM FACTORS

- **(3) ATX (Advanced Technology Extended)**

  - 2004 – onwards

  - released by Intel in 1995 as a revision to AT design

  - 12" x 9.6" size

  - Improvement done in easy to use, support for current and future I/O, and also to current and future technology.

  - New mounting configuration for power supply.

  - Processor relocated away from expansion slots to allow full length add-in cards.

  - Provides air-flow through chassis and across the processor.

  - *This form factor is the most used today, especially on desktop computers, and after this technology was released several other factors where based on it.*

MOTHERBOARD FORM FACTORS

- **(4) Mini ATX**

  - 2001 – onwards

  - 5.9 " x 5.9" size

  - designed for mobile and desktop computers that operate on low power

 - mostly used in home theater systems, automobiles, and industrial devices

MOTHERBOARD FORM FACTORS

- **(5) Micro ATX**

  - 1997 – onwards

  - 9.6 " x 9.6" size

  - support both Intel and AMD processors

  - supports current and new processor technologies

  - AGP (Accelerated graphics port) to have high performance graphics

  - smaller in size and less power supply

MOTHERBOARD FORM FACTORS

- **(6) FLEX ATX**

  - 1999 – onwards

  - 9.0 " x 7.5" size

  - were released in 1999 by Intel

  - feature three expansion slots and used in in thin rack-mount servers
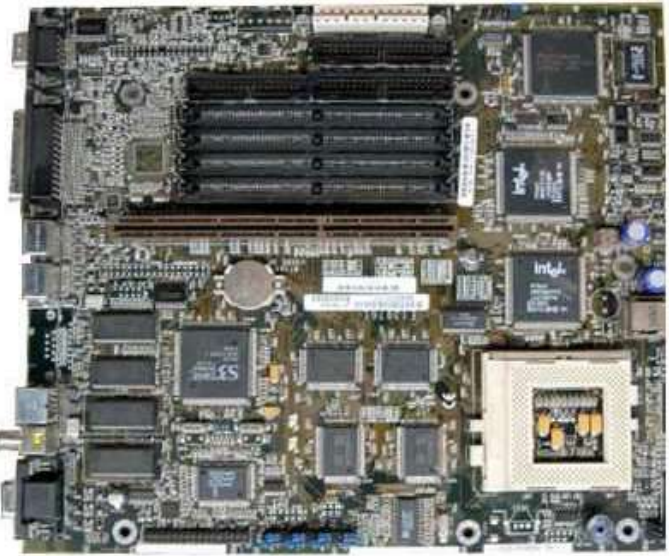
MOTHERBOARD FORM FACTORS

- **(7) LPX (Low Profile Extension) and Mini LPX**

  - 1980s – 1990s

  - 13 " x 9" size

  - based on design by western digital

  - usually found in desktop pc's

  - Case are slim-line, low profile case with riser card arrangement for expansion cards

  - Riser card arrangement means expansion boards are parallel rather than perpendicular.

  - This make smaller case but limits number of expansion slots to two or three.

  - High quality product at low cost but makes difficult to upgrade and repair.

MOTHERBOARD FORM FACTORS

- **(8) NLX (New Low Profile Extended)**

  - 1987 – Onwards

  - 13.6 " x 9" size

  - unlike desktop boards that hold expansion cards perpendicular to the board, NLX held them parallel to it

  - supports current and future processor technologies.

  - also supports new AGP and tall memory technology.

  - installing and upgrading the system is easy.

Additional Readings/ References

How Motherboards Work
https://computer.howstuffworks.com/motherboard1.htm

Motherboard
http://www.codesandtutorials.com/hardware/computerfundamentals/motherboard-types-form_factor.php

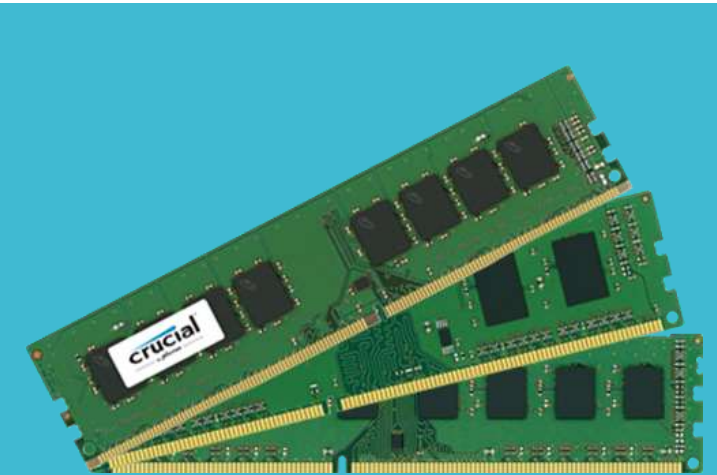**From AT to BTX: Motherboard Form Factors**

https://www.webopedia.com/DidYouKnow/Hardware_Software/motherboard_form_factors.asp

#2

**RAM
or
MEMORY
MODULE**

RAM stick or
RAM Module

- Random Access Memory
- also known as memory, main memory, system memory
- It is volatile means any data stored will be lost once the computer is turned off.

RAM

- **Compatibility Guidelines**

  - Older-generation computers are unlikely to accommodate the more recent types of RAM technology

  - Laptop memory won't fit in desktops (and vice versa)

  - RAM is not always backward compatible

  - A system generally can't mix and match different types/generations of RAM together

TYPES OF RAM

- **(1) DRAM (Dynamic RAM)**

  - DRAM has to be refreshed (given a new electronic charge) every few milliseconds to retain data

  - *Typical sizes:* 1 GB to 2 GB in smartphones and tablets; 4 GB to 16 GB in laptops

  - *Place where present:* present on motherboard

TYPES OF RAM

- **(2) SRAM (Static RAM)**

  - keeps data in the memory as long as power is supplied to the system

  - faster but also more expensive

  - *Typical size:* 1 MB to 16 MB

  - *Place where present:* present on processors or between processor and main memory

TYPES OF DRAM

- **(3) Synchronous DRAM (SDRAM)**

  - "synchronizes" the memory speed with CPU clock speed so that the memory controller knows the exact clock cycle when the requested data will be ready.

  - allows the CPU to perform more instructions at a given time.

  - Typical SDRAM transfers data at speeds up to 133 MHz.

TYPES OF DRAM

- **(4) Rambus DRAM (RDRAM)**

  - takes its name after the company that made it, Rambus.

  - It was popular in the early 2000s and was mainly used for video game devices and graphics cards, with transfer speeds up to 1 GHz.

TYPES OF DRAM

- **(4) Double Data Rate SDRAM (DDR SDRAM)**

  - is a type of synchronous memory that nearly doubles the bandwidth of a single data rate (SDR) SDRAM running at the same clock frequency by employing a method called "double pumping," which allows transfer of data on both the rising and falling edges of the clock signal without any increase in clock frequency.
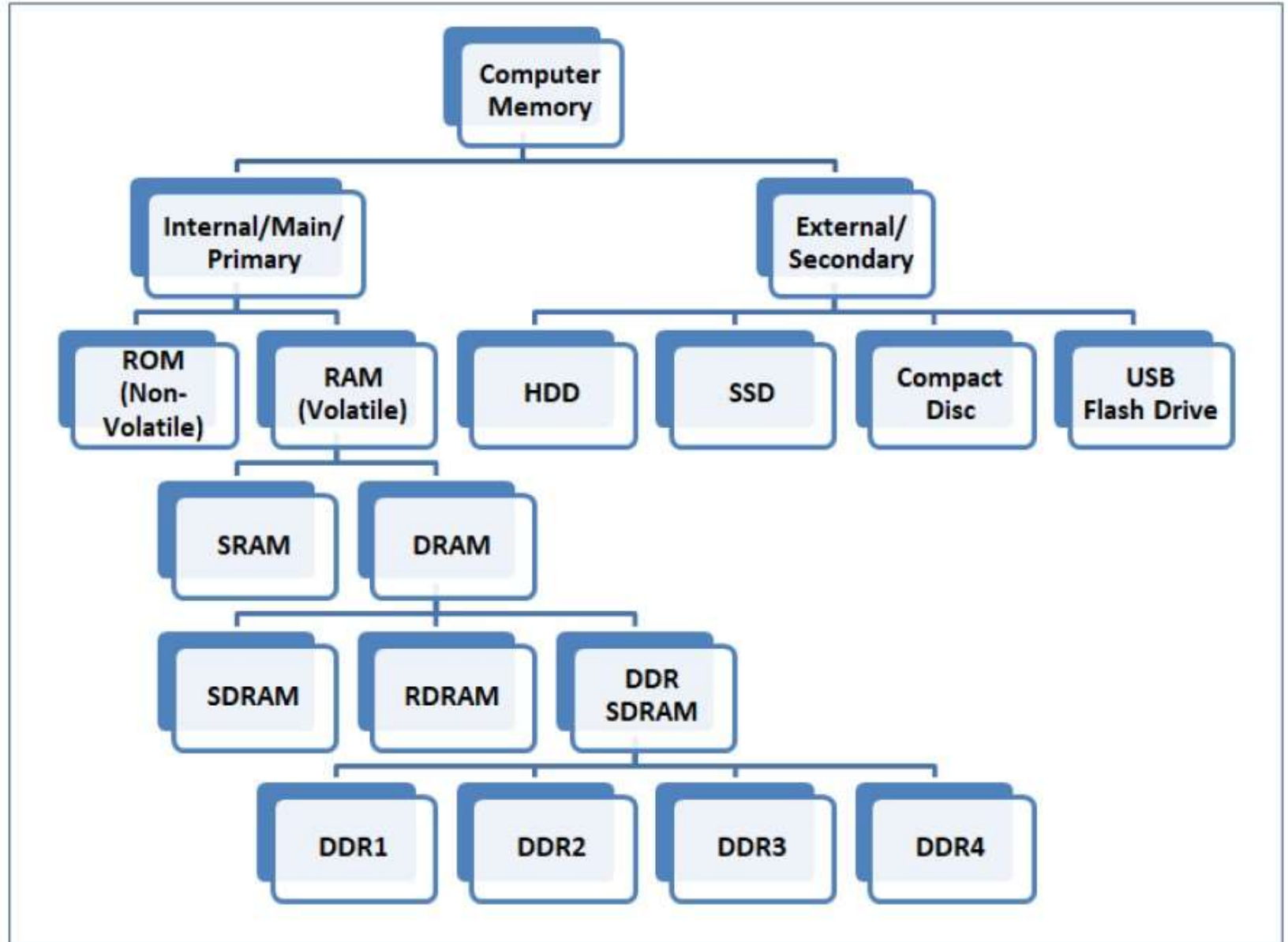
TYPES OF DRAM

- **(5) DDR1 SDRAM**

  - has been succeeded by DDR2, DDR3, and most recently, DDR4 SDRAM. Although operating on the same principles, the modules are not backward-compatible. Each generation delivers higher transfer rates and faster performance. The latest DDR4 modules, for example, feature fast transfer rates at 2133/2400/2666and even 3200 MT/s.

TYPES OF COMPUTER MEMORY

TYPES OF DRAM PACKAGES

- **(1) Single In-Line Memory Module (SIMM)**

  - SIMM modules were widely used from the late 1980s to 1990s, and are now obsolete. They typically had 32-bit data bus and were available in two physical types—30- and 72-pin.

TYPES OF DRAM PACKAGES

- **(2) Dual In-Line Memory Module (DIMM)**

  - Current memory modules come in DIMMs. "Dual in-line" refers to pins on both sides of the modules. A DIMM originally had a 168-pin connector supporting 64-bit data bus, which is twice the data width of SIMMs.

  - The wider bus means that more data can pass through a DIMM, translating to faster overall performance. Latest DIMMs based on fourth-generation double data rate (DDR4) SDRAM have 288-pin connectors for increased data throughput.

Additional Readings/ References

The RAM types that run today's computers

https://www.lifewire.com/types-of-ram-4150713

The RAM types that run today's computers

https://www.atpinc.com/blog/computer-memory-types-dram-ram-module

#3

CPU

- Central Processing Unit
- also known as microprocessor, a CPU is the brain of the computer

FOUR PRIMARY FUNCTIONS OF THE CPU

- **Fetch:** Each instruction is stored in memory and has its own address. The processor takes this address number from the program counter, which is responsible for tracking which instructions the CPU should execute next.

- **Decode:** All programs to be executed are translated to into Assembly instructions. Assembly code must be decoded into binary instructions, which are understandable to your CPU. This step is called decoding.

- **Execute:** While executing instructions the CPU can do one of three things: Do calculations with its ALU, move data from one memory location to another, or jump to a different address.

- **Store:** The CPU must give feedback after executing an instruction, and the output data is written to the memory.

CPU CLOCK SPEED

- number of instructions it can process in any given second, measured in gigahertz

- For example, a CPU has a clock speed of 1 Hz if it can process one piece of instruction every second.

- Extrapolating this to a more real-world example: a CPU with a clock speed of 3.0 GHz can process 3 billion instructions each second.

CPU CORES
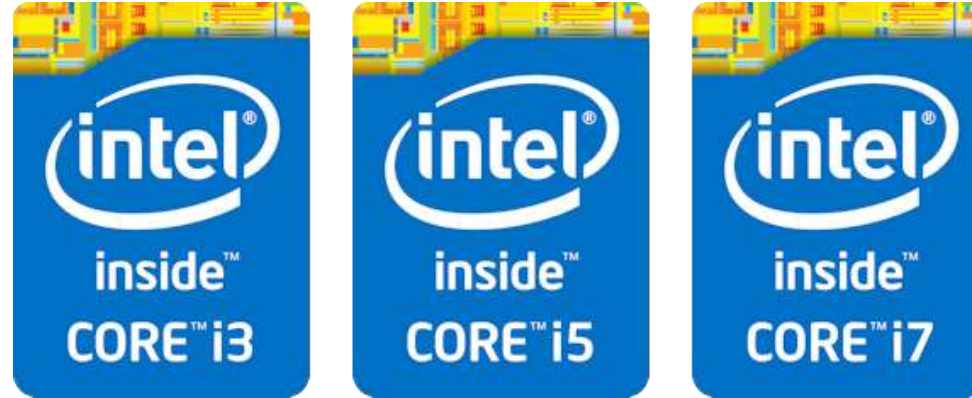
- A core is part of a CPU that receives instructions and performs calculations, or actions, based on those instructions. A set of instructions can allow a software program perform a specific function.

- Processors can have a single core or multiple cores. A processor with two cores is called a dual-core processor, four cores is quad-core, etc. all the way up to eight cores. The more cores a processor has, the more sets of instructions the processor can receive and process at the same time, which makes the computer faster.

- If you want a plain and simple answer, then generally speaking, Core i7s are better than Core i5s, which are in turn better than Core i3s. Nope, Core i7 does not have seven cores nor does Core i3 have three cores. The numbers are simply indicative of their relative processing powers.

Additional Readings/ References

What is a CPU? A beginner's guide to processors

https://www.trustedreviews.com/news/what-is-a-cpu-2950255

What is CPU?

https://www.digitaltrends.com/computing/what-is-a-cpu/

SOLVED: Demystifying Intel's 2015 2016 Processors – What Is the Difference Between an Atom, Celeron, Pentium and Core i Series CPU's

https://www.urtech.ca/2015/10/solved-demystifying-intels-2015-2016-processors-what-is-the-difference-between-an-atom-celeron-pentium-and-core-i-series-cpus/
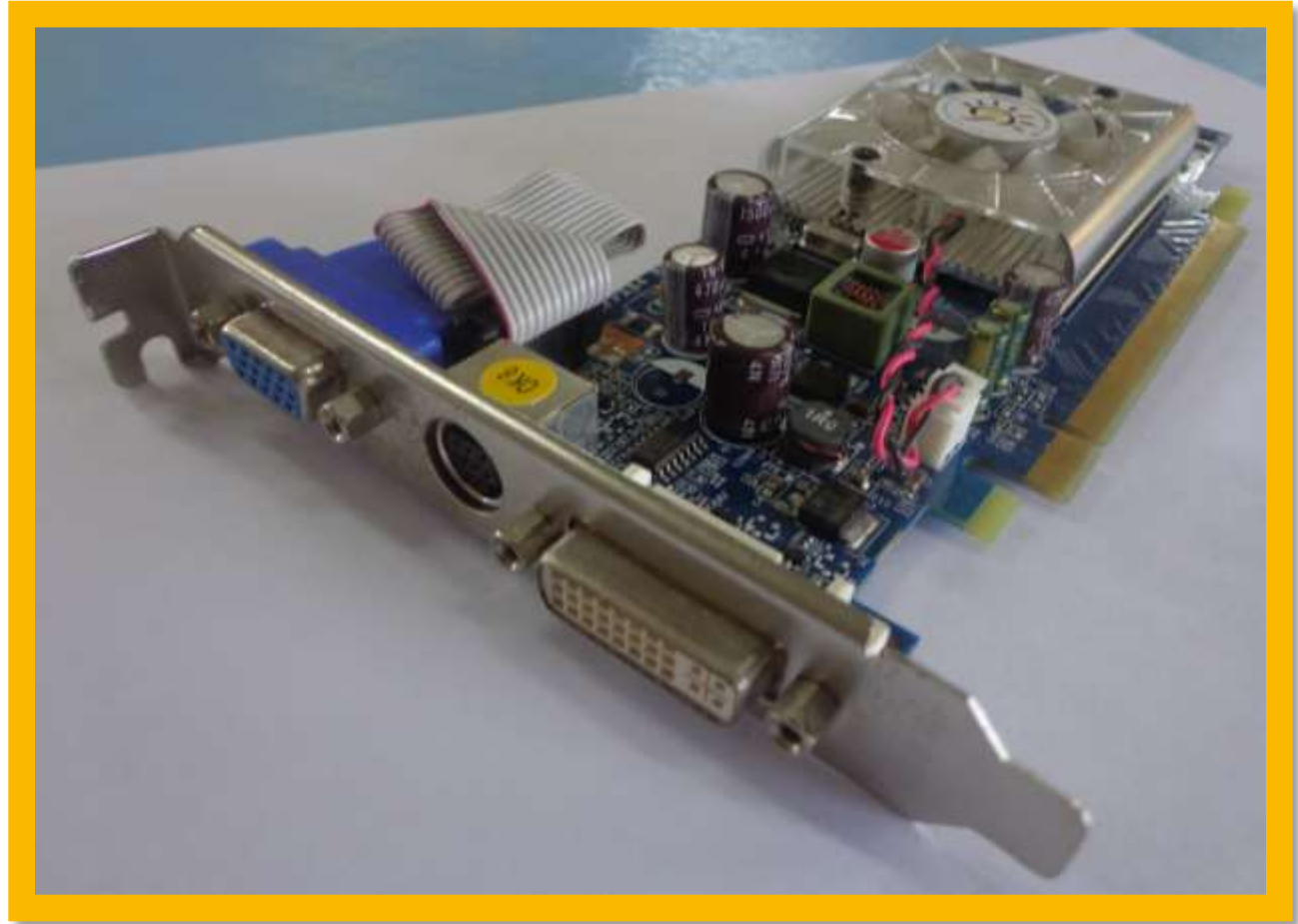
#4

COOLING FAN WITH HEAT SINK

- cooling device that installed in the computer to stop from getting overheated
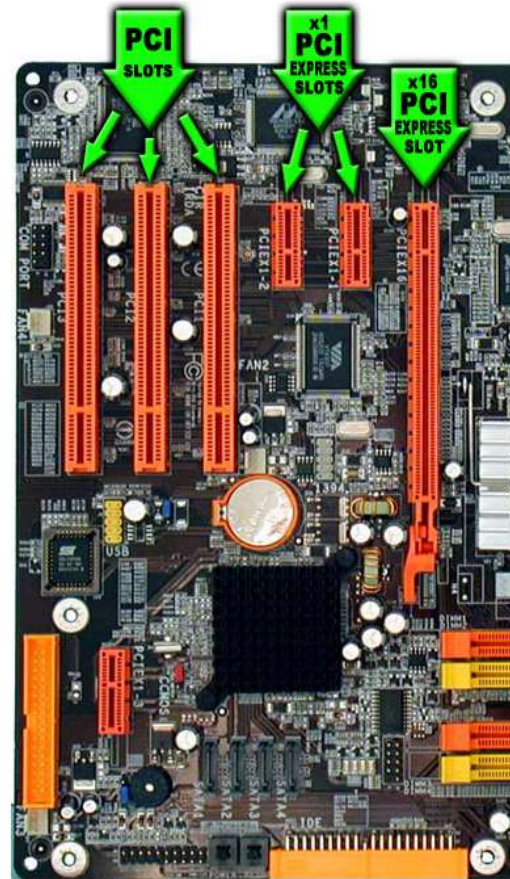
#5

VIDEO CARD
or
GRAPHICS CARD

- generates output images to a display, different cards offer different added functions (e.g. video capture or TV output)

CARD TYPES OF VIDEO CARD or GRAPHICS CARD

- **PCIE (Peripheral Component Interconnect Express)**

  - newest standard type of connection for internal devices allow larger amounts of bandwidth

  - Generally, PCI Express refers to the actual expansion slots on the motherboard that accept PCIe-based expansion cards and to the types of expansion cards themselves.

CARD TYPES OF VIDEO CARD or GRAPHICS CARD
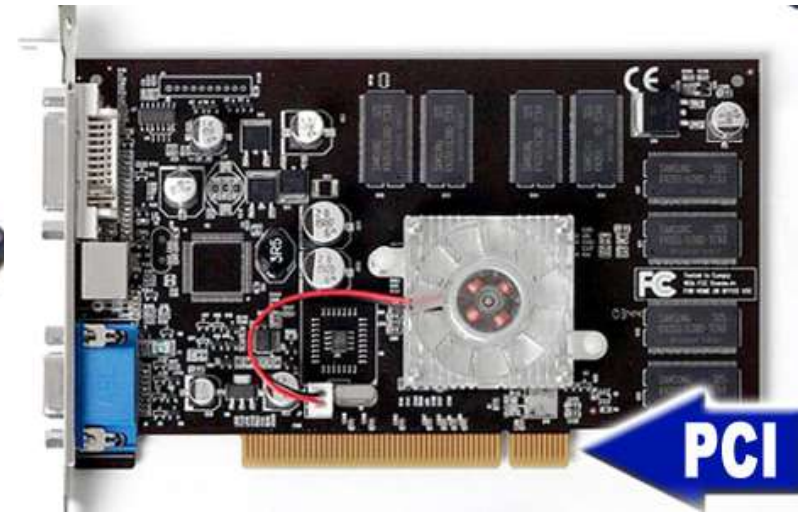
- **PCI (Peripheral Component Interconnect)**

  - older standard (1993) which provides less bandwidth for expansion cards

  - refers to a computer bus (used by the computer to connect to peripheral add-on devices, such as PCI video card, network cards, sound cards, TV tuners and many other types of extension cards

CARD TYPES OF VIDEO CARD or GRAPHICS CARD
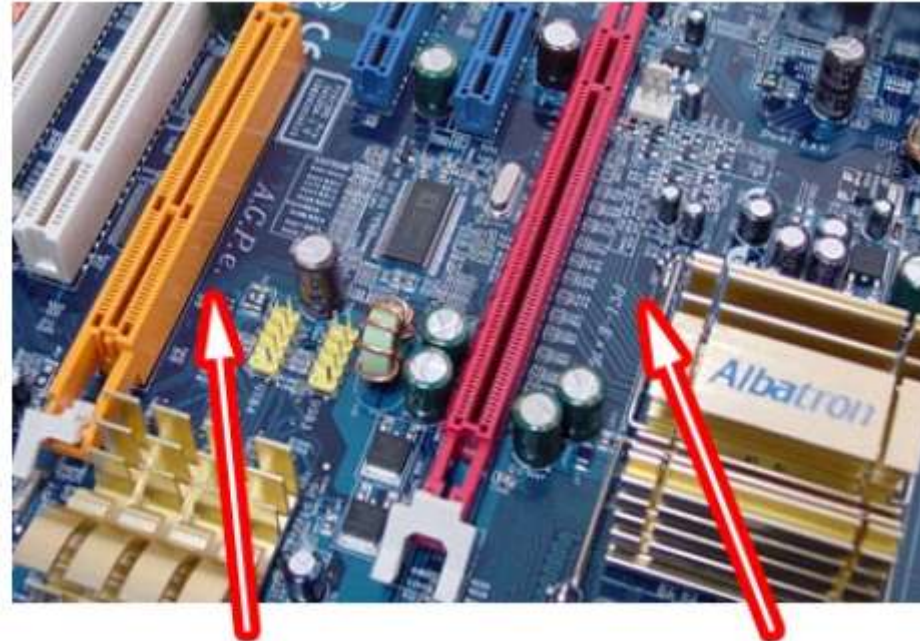
AGP Graphics Slot

PCI-E 16 Express Slot

AGP

- **AGP (Accelerated Graphics Port)**

  - older standard (1993) which provides less bandwidth for expansion cards

  - allows to connect a graphics card to the computer and achieve better and faster graphics will playing video games

VIDEO CARD
or
GRAPHICS CARD

(MANUFACTURERS)

- **AMD (Advanced Micro Devices)** produce their own graphics cards which are mostly targeted towards budget gaming and business but also product their own integrated graphics solutions unlike NVidia.

- **Nvidia** are a top producer of graphics cards that make cheap budget graphics cards all the way up to high performance gaming graphics costing upwards of £700 they only make dedicated graphics cards as they are not a CPU vendor.

- **Intel** only produce Integrated graphics solutions as they already take up a High Percentage of the CPU market providing mobile and desktop solutions

VIDEO CARD
or
GRAPHICS CARD

(OUTPUT SUPPORT)

- **DVI (Digital Visual Interface)**
  - video only, perfect for older systems
  - display devices at resolution as high as 2560 x 1600
  - Common devices: computer monitors and projectors
  - DVI-A (Analog only), DVI-D (Digital only), or DVI-I (both Digital and Analog)

- **S-Video (Super Video)**
  - older type of video signal that's transmitted in varying electrical signals over wires to represent the original video

  - uses a round connector interface, and cable that transmits video luminance (Y) and chrominance (C) signals separately

- **VGA (Video Graphics Adapter/ Array)**
  - popular display standard developed by IBM and introduced in 1987
  - standard VGA connection has 15 pins and is shaped like a trapezoid
  - provides 640 x 480 resolution color display screens

VIDEO CARD
or
GRAPHICS CARD

(OUTPUT SUPPORT)
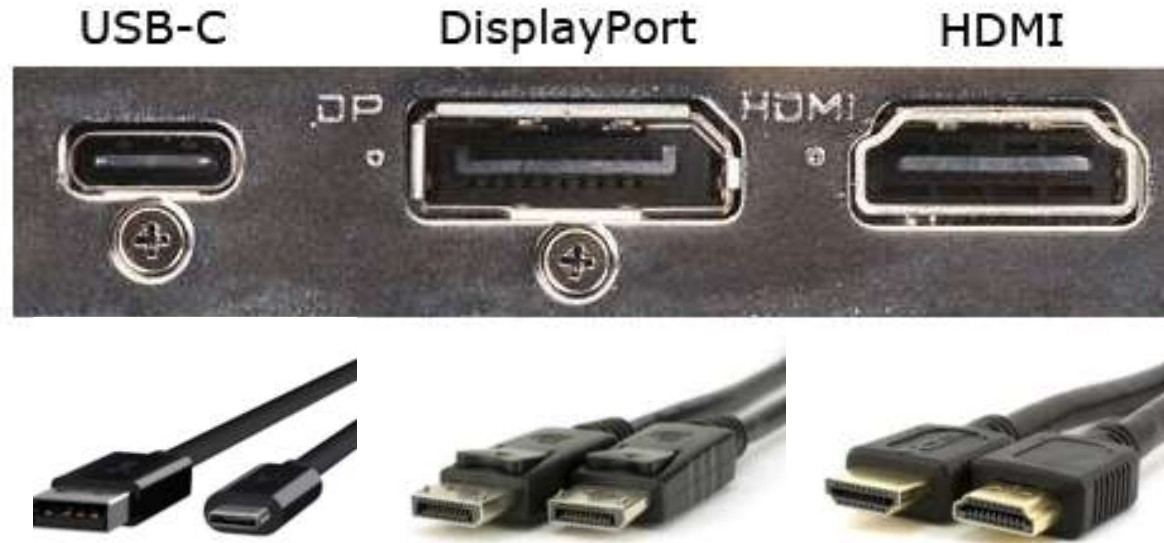
- **USB Type C**
  - is symmetrical, which means you never have to worry about plugging in the cable the wrong way
  - newest audio, video, data and power connector, the best laptop connection

- **Display Port**
  - digital audio and video interface created by VESA

- **HDMI (High Definition Multimedia Interface)**
  - connector and cable capable of transmitting high-quality and high-bandwidth streams of audio and video between devices

VIDEO CARD
or
GRAPHICS CARD

(REFERENCES)

Graphics Cards Explained

https://www.encore-pc.co.uk/blog/graphics-cards-explained/

Motherboard Expansion Slots: Types and Uses

https://www.brighthub.com/computing/hardware/articles/69174.aspx

Video and Graphic Cards Explained, Latest Prices and Guides

https://www.pchardware.co.uk/graphiccards.php

#6

WIRELESS LAN CARD

- provides wireless connectivity to the Local Area Network (LAN) in the home or office

#7

POWER SUPPLY

- main source of power and it crucial for the computer to run unless it can run off its own battery life

POWER SUPPLY

- Power supplies, often referred to as "switching power supplies", use switcher technology to convert the AC input to lower DC voltages. The typical voltages supplied are:

  - 3.3 volts
  - 5 volts
  - 12 volts

- The 3.3- and 5-volts are typically used by digital circuits, while the 12-volt is used to run motors in disk drives and fans.

- The main specification of a power supply is in watts. A watt is the product of the voltage in volts and the current in amperes or amps.

#8

FLOPPY DISK DRIVE

Diskette

- computer disk drive that enables a user to save data to removable diskettes

#9

HARD DISK DRIVE

- part of the computer system where you can store Operating System (e.g. Windows, Apple OS, Linux), programs, games, documents and media (e.g. music, images, videos)

Additional Readings/ References

What Is a Hard Disk Drive?

https://www.lifewire.com/what-is-a-hard-disk-drive-2618152

SELF-CHECK 2.0

- Read and answer the questions carefully. Write your answer on your notebook.

Modified True or False

Directions: Read each statement carefully. If the statement is true, write True. If it is false, replace the underlined word(s) with the word(s) that will make the statement true.

1. <u>Read Only Memory</u> is part of the computer where you can store Operating System.

2. <u>Motherboard</u> is the main circuit board inside a computer that connects the different parts.

3. <u>Power Supply</u> is a cooling device that installed in the computer to stop from getting overheated.

4. <u>Random Access Memory</u> is the main chip in a computer responsible for carrying out all tasks.

5. <u>Video Card</u> is the device in a computer that outputs visual information to the monitor.

Key to Correction

1. Hard Disk Drive
2. True
3. Cooling Fan with Heat Sink
4. CPU or Central Processing Unit
5. True

End of presentation

Prepared by: Jerico D. Castillo, Teacher II, SHS in San Nicholas III, Bacoor City