Comptia A+ Assignment

**Module -1, 2 [Hardware and its components]**

* **What is input device?**

Input devices are equipments which are used to enter data into pc.

Eg. Mouse, Keyboard, USb, Scaner Etc.

* **What are output device?**

Output devices are equipments which are used to send any data or file to another devices or users.

* **What is CPU?**

The CPU (Central Processing Unit) is The component of a computer system that controls the interpretation and execution of instructions. The CPU of a PC consists of a single microprocessor, while the CPU of a more powerful mainframe consists of multiple processing devices, and in some cases, hundreds of them.

* **What are the types of CPU?**

#### Single-core CPU

* It is the oldest CPU type available and employed in most personal and official computers. The single-core CPU can execute only one command at a time, which is inefficient in multitasking. It signifies a markable declination in performance if more than a single application is executed. If one operation is started, the second process should wait until the first one is finished. But if it is fed with multiple operations, the computer’s performance is drastically reduced. The performance of a single-core CPU is based on its clock speed by measuring its power.

#### 2. Dual-core CPU

* It is a single CPU that comprises two strong cores and functions like a dual CPU acting like one. Unlike CPUs with a single core, processors with dual-core must switch back and forth within a variable array of data streams. When more threads execute, the dual-core CPU effectively manages to multitask. To utilize the dual-core CPU effectively, the running programs and operating system should have a unique code called simultaneous multi-threading technology embedded in it. A dual-core CPU is more rapid than a single-core, but it is not as robust as a quad-core CPU.

#### 3. Quad-core CPU

* The quad-core CPU is a refined model of multiple-core CPU features and design with four cores on a single CPU. Like a dual-core CPU, which divides the workload between the cores, quad-core enables effective multitasking. It doesn’t signify any operation that is four times faster than others. Unless the applications and program executed on it by SMT code will fasten the speed and becomes unnoticeable. People who must execute multiple programs simultaneously, such as gamers, use CPUs with multiple cores. The series of Supreme Commander is optimized for multiple-core CPUs.

#### 4. Hexa Core processors

* It is another multiple-core processor with six cores and can execute the task, which works more rapidly than the quad-core and dual-core processors. For users of a personal computer, the processors of Hexacore is simple, and now Intel launched with Inter core i7 in 2010 with Hexa core processor. But here, the users of smartphones use only quad-core and dual-core processors. Nowadays, smartphones are available with hexacore processors.

#### 5. Octa-core processors

* Trending octa-core processors comprise a dual set of quad-core processors that divides activities between the various types. The dual-core is built with two cores, and four are built-in quad-core. Hexa comes with six cores, whereas the octal processors are usually developed with eight independent cores to execute an effective task that is efficient and even acts more rapidly than quad-core processors. Manufacturers often use minimum-powered core sets to perform advanced tasks. The rapid four sets of cores will be kicked in if there is any emergency or requirement. To be precise, manufacturers define octa-core processors with dual-code cores that adjust accordingly to provide effective performance.

#### 6. Deca-core processor

* The processor with a double core comprises two cores, 4 cores are available with quad cores; six cores are available in hexacore processors. Manufacturers deploy ten independent systems in Deca-core processors to execute and manage tasks, making them more efficient than other processors developed until now. A PC or device equipped with a deca-core processor is the best option. It is faster than other processors and very successful in multitasking. Deca-core processors are trending with their advanced features. Nowadays, manufacturers equip most smartphones with affordable Deca-core processors that never become outdated quickly. They continuously update the gadgets in the market with new processors to provide people with more useful features and capabilities.
* **What do we need to keep the CPU Healthy?**

**To keep the CPU (Central Processing Unit) healthy and running efficiently, there are several important factors to consider. Here are some key aspects:**

1. Proper Cooling: Adequate cooling is crucial to maintain the CPU temperature within safe limits. Ensure that your computer has sufficient airflow, clean the cooling fans regularly, and consider using additional cooling solutions such as CPU coolers or liquid cooling systems if necessary.
2. Clean Environment: Keep the computer and its surroundings clean to prevent dust buildup. Dust can clog cooling fans and heat sinks, leading to higher temperatures and reduced performance. Regularly clean the case, fans, and heat sinks to maintain optimal airflow.
3. Good Thermal Interface: Ensure that the CPU is correctly installed with an appropriate amount of thermal paste or thermal pad between the CPU and the heatsink. This interface material helps conduct heat away from the CPU effectively.
4. Adequate Power Supply: Ensure that your computer's power supply is sufficient to meet the requirements of your CPU. An inadequate power supply can lead to stability issues and potentially damage the CPU or other components. Consult the CPU manufacturer's specifications and choose a power supply accordingly.
5. Regular Updates: Keep your computer's operating system, drivers, and firmware up to date. Software updates often include bug fixes, performance improvements, and security patches that can benefit CPU performance and stability.
6. Safe Overclocking (if applicable): If you plan to overclock your CPU, do so responsibly and within safe limits. Overclocking can enhance performance, but it also generates additional heat and stress on the CPU. Follow proper overclocking guidelines, monitor temperatures, and ensure stability.
7. Proper Shutdown and Startup: Avoid abrupt shutdowns by properly shutting down your computer or using the restart option. Sudden power loss or frequent hard resets can negatively impact CPU health over time.
8. Avoid Overloading: Do not overload the CPU with excessive tasks or run heavy processes continuously without breaks. High CPU usage for prolonged periods can generate excessive heat and stress, potentially degrading its lifespan.
9. Anti-Malware Protection: Protect your computer from malware and viruses with reliable antivirus software. Malware can negatively impact CPU performance, stability, and overall system health.
10. Monitoring and Maintenance: Utilize software tools to monitor CPU temperature, clock speed, and performance regularly. Monitor temperatures during heavy usage and ensure they remain within safe operating limits. Perform routine maintenance tasks such as disk cleanup, defragmentation, and system optimization to keep the CPU and overall system performance optimal.
    1. By considering these factors, you can help keep your CPU healthy, maximize its lifespan, and ensure smooth operation.

* **Do a practical to remove processor and apply thermal paste in it and install it again**
* **Done**
* **Do a practical to Identify CPU and its Sockets.**
* **Done**
* **What is memory?**

Memory is the process of taking in information from the world around us, processing it, storing it and later recalling that information, sometimes many years later.

* **What are the types of memory?**

1. [**Cache memory**](https://www.techtarget.com/searchstorage/definition/cache-memory)**.** This temporary storage area, known as a [cache](https://www.techtarget.com/searchstorage/definition/cache), is more readily available to the processor than the computer's main memory source. It is also called *CPU memory* because it is typically integrated directly into the CPU chip or placed on a separate chip with a [bus](https://www.techtarget.com/searchstorage/definition/bus) interconnect with the CPU.
2. **RAM.** The term is based on the fact that any storage location can be accessed directly by the processor.
3. **Dynamic RAM.** [DRAM](https://www.techtarget.com/searchstorage/definition/DRAM) is a type of semiconductor memory that is typically used by the data or program code needed by a computer processor to function.
4. **Static RAM.** [SRAM](https://www.techtarget.com/whatis/definition/SRAM-static-random-access-memory) retains data bits in its memory for as long as power is supplied to it. Unlike DRAM, which stores bits in cells consisting of a capacitor and a transistor, SRAM does not have to be periodically refreshed.
5. **Double Data Rate SDRAM.** DDR SRAM is SDRAM that can theoretically improve memory clock speed to at least 200 [MHz](https://www.techtarget.com/searchnetworking/definition/MHz).
6. **Double Data Rate 4 Synchronous Dynamic RAM.** DDR4 RAM is a type of DRAM that has a high-bandwidth interface and is the successor to its previous DDR2 and DDR3 versions. DDR4 RAM allows for lower voltage requirements and higher module density. It is coupled with higher data rate transfer speeds and allows for dual in-line memory modules ([DIMMS](https://www.techtarget.com/searchstorage/definition/DIMM)) up to 64 GB.
7. **Rambus Dynamic RAM.** DRDRAM is a memory subsystem that promised to transfer up to 1.6 billion bytes per second. The subsystem consists of RAM, the RAM controller, the bus that connects RAM to the microprocessor and devices in the computer that use it.
8. **Read-only memory.** [ROM](https://www.techtarget.com/whatis/definition/read-only-memory-ROM) is a type of computer storage containing nonvolatile, permanent data that, normally, can only be read and not written to. ROM contains the programming that enables a computer to start up or regenerate each time it is turned on.
9. **Programmable ROM.** [PROM](https://www.techtarget.com/whatis/definition/programmable-read-only-memory-PROM) is ROM that can be modified once by a user. It enables a user to tailor a microcode program using a special machine called a *PROM programmer*.
10. **Erasable PROM.** EPROM is programmable read-only memory PROM that can be erased and re-used. Erasure is caused by shining an intense ultraviolet light through a window designed into the memory chip.
11. **Electrically erasable PROM.** [EEPROM](https://www.techtarget.com/whatis/definition/EEPROM-electrically-erasable-programmable-read-only-memory) is a user-modifiable ROM that can be erased and reprogrammed repeatedly through the application of higher than normal electrical voltage. Unlike EPROM chips, EEPROMs do not need to be removed from the computer to be modified. However, an EEPROM chip must be erased and reprogrammed in its entirety, not selectively.
12. [**Virtual memory**](https://www.techtarget.com/searchstorage/definition/virtual-memory)**.** A memory management technique where secondary memory can be used as if it were a part of the main memory. Virtual memory uses hardware and software to enable a computer to compensate for physical memory shortages by temporarily transferring data from RAM to disk storage.

* **Do a practical to identify memory types.**
* **Done**
* **Do a practical to install memories in system**
* **Done**
* **Do a practical to identify main memory frequencies.**
* **Done**
* **What is bios**

BIOS (basic input/output system) is the program a computer's microprocessor uses to start the computer system after it is powered on. It also manages data flow between the computer's operating system (OS) and attached devices, such as the hard disk, video adapter, keyboard, mouse and printer.

* **Describe working process of BIOS.**

The Basic Input/Output System (BIOS) is a firmware that is built into the computer's motherboard. It is responsible for initializing and configuring various hardware components when the computer is powered on. Here is a general description of the working process of BIOS:

1. Power-On Self-Test (POST): When you turn on the computer, the BIOS initiates a Power-On Self-Test (POST). During this process, the BIOS checks the integrity and functionality of various hardware components such as the CPU, memory, hard drives, graphics card, keyboard, and other peripherals. If any issues are detected, the BIOS generates error codes or error messages to indicate the problem.
2. Boot Device Selection: After the POST is completed successfully, the BIOS determines the boot device from which the operating system will be loaded. It checks the boot order specified in the BIOS settings to identify the primary boot device, which is typically the computer's internal hard drive. If the primary boot device is not available or doesn't contain a bootable operating system, the BIOS moves to the next boot device in the sequence, such as a USB drive or a CD/DVD drive.
3. Loading the Bootloader: Once the boot device is identified, the BIOS reads the first sector of the boot device, known as the Master Boot Record (MBR) or the boot sector. The MBR contains the bootloader, which is a small program responsible for loading the operating system. The BIOS transfers control to the bootloader code, allowing it to take over the boot process.
4. Bootloader and Operating System Initialization: The bootloader proceeds to load the operating system into memory. It may present a boot menu if multiple operating systems are installed or initiate the boot process automatically. The bootloader prepares the environment for the operating system by configuring system parameters, setting up memory management, and initializing device drivers.
5. Handover to the Operating System: Once the bootloader has loaded the operating system, it transfers control to the operating system's kernel. From this point forward, the BIOS no longer plays an active role in the system's operation. The operating system takes over and continues the startup process, initializing additional components, loading drivers, and presenting the user interface.
6. It's worth noting that modern computers often use a more advanced firmware called Unified Extensible Firmware Interface (UEFI), which is gradually replacing the traditional BIOS. UEFI provides more advanced features and a graphical interface compared to the text-based BIOS. However, the fundamental working process described above remains largely similar, with slight variations depending on the specific BIOS or UEFI implementation.

* **Do a practical to reset bios when system is on.**
* Done
* **Do a practical of Hard resetting the BIOS.**
* **Done**
* **Do a practical of identifying BIOS chip from the motherboard**
* **Done**
* **What is CMOS?**

CMOS stands for Complementary Metal-Oxide-Semiconductor. In the context of computer systems, CMOS refers to a type of technology used to construct a small amount of non-volatile memory that stores the system's BIOS or UEFI settings. This memory is commonly referred to as the CMOS memory or CMOS RAM.

The CMOS memory is powered by a small battery, usually a coin cell battery, located on the computer's motherboard. This battery ensures that the CMOS settings are retained even when the computer is powered off. The CMOS memory is implemented using low-power CMOS technology, which allows it to retain data for an extended period without relying on a constant power supply.

The CMOS memory stores critical system configuration information, including settings related to the computer's hardware, such as the date and time, boot order, CPU settings, memory timings, and various other parameters. These settings are accessed and utilized by the BIOS or UEFI during the boot process to properly initialize the hardware and establish the system's configuration.

Additionally, the CMOS memory contains a special area known as the CMOS Setup Utility or BIOS Setup, which allows users to modify and customize the BIOS or UEFI settings. Accessing the CMOS Setup typically involves pressing a specific key or combination of keys (e.g., Del, F2, or F10) during the boot process to enter the BIOS or UEFI interface.

Overall, CMOS plays a vital role in maintaining and storing the system's configuration information, allowing for flexible customization and ensuring that the BIOS or UEFI can initialize the hardware correctly each time the computer is powered on.

* **What is motherboard?**

The motherboard is the backbone that ties the computer's components together at one spot and allows them to talk to each other. Without it, none of the computer pieces, such as the CPU, GPU, or hard drive, could interact. Total motherboard functionality is necessary for a computer to work well.

* **Describe types of motherboard.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Form Factor** | **Manufacturer/Date** | **Dimensions** | **Applications** |
| Standard-ATX | Intel 1995 | 12 × 9.6in | Workstation/Desktop |
| Micro-ATX | Intel 1997 | 9.6 × 9.6 in | Small Form Factor |
| Mini-ITX | VIA 2001 | 6.7 × 6.7 in | Small Form Factor |
| Nano-ITX | VIA 2003 | 4.7 × 4.7 in | Embedded Systems |
| Pico-ITX | VIA 2007 | 3.9 × 2.8 in | Embedded Systems |
| Mobile-ITX | VIA 2009 | 2.4 × 2.4 in | Embedded Systems |

* **Do a practical by identifying parts of motherboard.**
* **Done**
* Do a practical by removing all removable parts from the motherboard.
* Done
* What is system bus

A system bus is a single computer bus that connects the major components of a computer system, combining the functions of a data bus to carry information, an address bus to determine where it should be sent or read from, and a control bus to determine its operation.

* What is chipset and types of chipset?

It's the traffic controller between the CPU, GPU, RAM, storage, and peripherals. Experts have referred to it as the “glue” of the motherboard. The chipset is basically the electronics on the motherboard that communicate with all the connected components.

**It’s Types**

* 1. **Northbridge**
  2. **Southbridge**
* Describe how does the Northbridge chipset work?

A northbridge is connected directly to a CPU via the front-side bus (FSB) to handle high-performance tasks, and is usually used in conjunction with a slower southbridge to manage communication between the CPU and other parts of the motherboard.

* what is SMPS?

A SMPS is a device which provides current/Power to every components or part of the CPU.

* DO a practical to install SMPS.
* Done
* How to check smps?

Turn on the SMPS with the wire inserted.

The SMPS should be running now. If it does not turn ON, insert

the paper clip firmly and try once more. If still your SMPS didn't turn ON,

your SMPS might be faulty.

* List out the types of storage devices.

1.RAM

2.HDD

3.SSD

4.USB

* Describe the working process of storage devices.

A storage device is any type of computing hardware that is used for storing, porting or extracting data files and objects. Storage devices can hold and store information both temporarily and permanently. They may be internal or external to a computer, server or computing device

* Do a practical to Remove storage devices and reinstall it and make a gpt disk.
* Done
* What is SATA?

Serial ATA (Serial Advanced Technology Attachment or SATA) is a command and transport protocol that defines how data is transferred between a computer's motherboard and mass storage devices, such as hard disk drives (HDDs), optical drives and solid-state drives (SSDs).

* Describe the working of SATA.

SATA transfers data one bit at a time between a drive and its host, using a seven-pin data cable and 15-pin drive power connector cable. The SATA cable results in a higher signaling rate, which corresponds to faster data throughput.

* Do a practical to install SATA.
* Done
* What is SI storage and type of scsi?

SCSI (pronounced SKUH-zee and sometimes colloquially known as "scuzzy"), the Small Computer System Interface, is a set of American National Standards Institute (ANSI) standard electronic interfaces that allow personal computers (PCs) to communicate with peripheral hardware such as disk drives, tape drives, CD-ROM.

* What is I/O ports?

(Input/Output port) An I/O port is a socket on a computer that a cable is plugged into. The port connects the CPU to a peripheral device via a hardware interface or to the network via a network interface.

* Do a practical to identify the I/O ports
* Done
* What is Boot Process?

the process of starting a computer as initiated via hardware such as a

button or by a software command.

* Describe the boot process in Linux?

The boot loader catches the kernel image over the disk and ships it into memory to begin the computer. The kernel boots the devices and drivers. The kernel mounts the common filesystem. The kernel begins a program called init with a zero method ID.

* List out the types of display?

1.LED

2.LCD

3.Projector

4.Monitor

* What is printer? And type of printers

A printer is a device that accepts text or graphic output from the computer and transfer information to paper.

* Types of printers
  + 1. Laser printer
    2. Solid ink printer
    3. Led printer
    4. 3d printer
    5. Dot matrix printer
* Do a practical to install the printer
* Done
* Do a practical to Troubleshoot the improper printing.
* Done
* What are the parts of laptop.

1. Display Screen
2. Keyboard
3. Touch pad
4. RAM
5. Speaker
6. Top Panel
7. Battery

* Do a practical to disassemble the laptop
* Done