Types of main memory;

The memory unit can be implemented using a variety of memory chips- different speeds, different manufacturing technology, and different sizes. The main memory types are:

1- Read Only Memories (ROM):

ROMs allow only read operation to be performed. This memory is non-volatile. Most ROMs are programmed and cannot be altered.

This type of ROM is cheaper to manufacture than other types of ROM. The program that controls the standard I/O functions (called BIOS) and configuration software are kept in ROM,.

Other types of ROM include:

A- Programmable ROM (PROM).

B- Erasable PROM (EPROM) is read only memory that can be reprogrammed using special equipment.

C- EAPROM, Electrically Alterable Programmable ROM is a
    Read Only Memory that is electrically reprogrammable.

2- Read/Write Memory (RAM):-

Read/Write memory is commonly referred to as Random Access Memory (RAM), it is divided into static and dynamic.

A-Static RAM (SRAM): used for implementing CPU registers and used for special high speed memory called cache memory this greatly improves system performance. Static RAM keeps its value without having to be refreshed.

B-Dynamic RAM (DRAM), the bulk of main memory in a typical computer system consists of dynamic Ram. DRAM is where programmed, data are kept when a program is running. It must be refreshed with in less than a millisecond or losses its contents.

The differences between RAM AND ROM

RAM	ROM
1-Stand foe Random - Access memory	1- stand for Read Only Memory
2- Read /Write memory	2-READ Only Memory
3-Sending data (writing) to RAM memory address is called destructive write because the new data erases whatever was there before	3-Sending data to ROM memory address is in effective because the contents of ROM can not changed (write not allowed) because this memory for read only
4-form of primary storage(main memory) for holding temporary data and instruction	4-form of primary storage(main memory) for holding permanent data and instruction
5- Volatile : program and data are erased when the power is off	5-Permanent : program and data are intact even power is off

6- Type of RAM is
   a- Static RAM
   b- Dynamic RAM
	6-Type of ROM is
	 a- PROM
	 b-EPROM
	 c- EAPROM

NOTE: The Main Memory is called also primary memory or primary storage

Other type of memory

1--Cache Memory:

many modern computer applications (Microsoft office 98, for example) are very complex and have huge numbers of instructions it takes considerable RAM capacity (usually a minimum 16MB) to store the entire instruction set. Or you may be using an application that exceeds your RAM. In that case, your computer has to go into secondary storage to retrieve the instruction. To alleviate this problem, software is often written in smaller blocks of instruction. As need, these blocks can be brought from secondary storage into RAM; this is still slow however, cache memory is the place closer to the CPU where the computer can temporarily store those blocks used most often. Those used less often remain in RAM until they are transferred to cache; those used infrequently stay stored in secondary storage.

Cache memory is faster than RAM. Because, the instructions travel a shorter distance to the CPU.

2- Virtual Memory:

If your computer lacks the random access memory (RAM) needed to run a program or operation, Windows uses virtual memory to compensate. Virtual memory combines your computer's RAM with temporary space on your hard disk. When RAM runs low, virtual memory moves data from RAM to a space called a *paging file*. Moving data to and from the paging file frees up RAM to complete its work. The more RAM your computer has, the faster your programs will generally run. If a lack of RAM is slowing your computer, you might be tempted to increase virtual memory to compensate. However, your computer can read data from RAM much more quickly than from a hard disk, so adding RAM is a better solution.

Motherboard (System Board)

. It contains the processor, main memory, connectors, and expansion slots for optional cards. The slots and connectors provide access to such components as ROM, RAM, hard disk, CD-ROM drive, additional memory, video unit, keyboard, mouse, parallel and serial device, sound adapter and cache memory . A bus with wires attached to the system board connects the components. It transfers data between the processor, memory and external devices.

Bios::   Short for (Basic Input / Output System), Bios is a chip located on all computer motherboard that contains instructions and setup for how your system should boot and how it operates. To the right is a picture of what a BIOS chip may look like in your computer. The BIOS includes instructions on how load basic computer hardware and includes a test referred to as a POST (Power On Self Test) that helps verify the computer meets requirements to boot up properly, if the computer does not pass the POST, you will receive a combination of beeps indicating what is malfunctioning within the computer.

 In most PCs, the BIOS have four main functions:-

1-POST: - Test computer hardware, ensuring hardware is properly functioning before starting process of loading operation system. Additional information on the POST can be found on our POST/Beep Code Page.

2- Bootstrap Loader:- Process of location the operating system. If capable operation system located, BIOS will pass the control to it.

3-BIOS:-Software/Drives that interface between the operating system and your hardware. When running DOS or Windows you are using complete BIOS support.

4-BIOS/CMOS Setup:- Configuration program that allows you to configure hardware setting including system setting such as computer password, time, and data.

المحاضرة الرابعة

تقنيات الحاسبة

المرحلة الاولى

ا