Computer science

Lecture Noor Hassan

Lecture Lubna

Computer hardware:

Computer hardware refers to the physical components that make up computer system, such as the case, central processing unit (CPU), monitor, mouse, keyboard,computer data storage, graphics card, sound card, speakers and motherboard.

Software:

is a set of instructions and documentation that tells a computer what to do or how to perform a task. Software includes all different programs on a computer, such as applications and the operating system.

Applications:are programs that are designed to perform a specific operation.

operating system: we will be talking about it later.

List of computer hardware;

- Motherboard
- Video
- Sound card
- Hard drive
- Optical drive
- USB ports

Power supply

Motherboard:

The motherboard is the main component of a computer. It is a board with integrated circuitry that connects the other parts of the computer including the CPU, Primary Memory, Secondary Memory.

central processing unit (CPU):

is the electronic circuitry within a computer that executes instructions that make up a computer program, Or is the computer component that's responsible for interpreting most of the commands from the computers other hardware and software also called a central processor, main processor or just processor.

The CPU is comprised of three main parts:

1- Arithmetic Logic Unit (ALU): Executes all arithmetic and logical operations.Arithmetic calculations like as addition, subtraction, multiplication and division.Logical operation like compare numbers, letters, or special characters.

2- Control Unit (CU): directs the operation of the processor. It tells the computer's memory, arithmetic logic unit and input and output devices how to respond to the instructions that have been sent to the processor.

3- Registers: Stores the data that is to be executed next.

Primary Memory:

Random-access memory (RAM): Is the physical hardware inside a computer that temporarily stores data, serving as the computer working memory.

additional RAM allows a computer to work with more

information at the same time, which usuallyhas a dramatic effect on total system performance.

Read-only memory (ROM): is a permanent form of storage. ROOM stays active regardless of whether power supply to it is turned on or off. ROM devices do not allow data stored on them to be modified.

Secondary Memory:

1- Hard drive

2- Optical Disk

3- Flash Disk

The generations of computers.

This section traces the history of computers from their mechanical era.Our treatment is very brief.

- The first generation: Back to the beginning; the first generation of computing engines was comprised of the mechanical devices (called calculating machines). They were built using gears and powered by a hand-operated crank. The abacus, the adding machine, the punch card reader for textile machines fit into this category. Perhaps the most well-known mechanical system, called the difference engine, was built by Charles Babbage.

The second generation: The next generation spanned the period from 1940-1960.Here electronic devices-vacuum tubes-were used as the active device or switching element. Even a vacuum tube is millions of times larger than the transistor on a silicon wafer. It consumes millions of times the power of the transistor, and its useful lifetime is hundreds or thousands of times less than a transistor. Although the vacuum tube computers were much faster than the mechanical computers of the preceding generation,they are thousands of times slower than the computers of today.Program instructions were given in machine language, which is a code composed entirely of Os and 1s. These computers were slow, unreliable, expensive, and tedious to program.

- The third generation: The third generation covered roughly the period of time from 1960 to 1968. Here the transistor replaced the vacuum tube, and suddenly the computers began to be able to do real work. Companies such as

IBM®,Burroughs® and Univac® built large mainframe computers. The IBM 360 family is a representative example of the mainframe computer of the day. Also at this time, Xerox® was carrying out some pioneering work on the human/computer interface at their Palo Alto Research Center, Xerox PARC.Here they studied what later would become computer networks,Windows® operating system. Programmers stopped programming in machine language and assembly language and began to use FORTRAN,COBOL and BASIC.

- The fourth generation: The fourth generation, roughly 1969-1977 was the age of the minicomputer. The minicomputer was the computer of the masses.It wasn't quite the PC, but it moved the computer out of the sterile environment of the "computer room," protected by technicians in white coats,to a computer in your lab. The minicomputer also represented the replacement of individual electronic parts, such as transistors and resistors,mounted on printed circuit boards (called discrete devices), with integrated circuits (IC), or collections of logic functions in a single package. It is small,faster, and more reliable than separate transistors. Here was the introduction of the small and medium scale integrated circuits. Companies such as Digital Equipment Company (DEC), Data General and Hewlett- Packard all built this generation of minicomputer. Also, within this timeframe,simple integrated-circuit microprocessors were introduced and commercially produced by companies like Intel, Texas Instruments, Motorola, MOS Technology and Zilog. Early microcomputer devices that best represent this generation are the 4004, 8008 and 8080 from Intel, the 9900 from Texas Instruments and the 6800 from Motorola. The computer languages of the fourth generation were: assembly, C, Pascal, Modula, Smalltalk and Microsoft BASIC.

The fifth generation: We are currently in the fifth generation, although it could be argued that the fifth generation ended with the Intel® 80486microprocessor and the introduction of the Pentium® represents the sixth generation. We'll ignore that distinction until it is more widely accepted. The

advances made in semiconductor manufacturing technology best characterize the fifth generation of computers.

Today's semiconductor processes typify what is referred to as Very Large Scale Integration,or VLSI technology. Ever since ICs were made possible,the density has been growing at a phenomenal rate. By the mid-1970s, more than 10,000 components could be fabricated on a single chip. The next step,Ultra Large Scale Integration, or ULSI is either here today or right around the corner. The fifth generation also saw the growth of the personal computer and the operating system as the primary focus of the machine. Standard hardware platforms controlled by standard operating systems enabled thousands of developers to create programs for these systems. In terms of software, the dominant languages became ADA,C++,JAVA,HTML and XML.In addition, graphical design language, based upon the universal

modeling language (UML),began to appear.