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## NET, IAS, State-SET (KSET, WBSET, MPSET, etc.), GATE, CUET, Olympiads etc. Hardware

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### Central Processor Unit (CPU)

Heart of the PC-it contains the microprocessor. The CPU is a set of miniaturized circuits that does all the “thinking” It controls the interpretation (arithmetic-logic unit) and execution (control unit) of instructions. The CPU in conjunction with Random Access Memory (RAM) comprise the computer’s “brain” The CPU does the “thinking/calculating” while RAM contains the instructions or “memories”

It is the CPU that largely determines the operating speed of the computer. The type of processor on your PC will determine the nature of functions it can carry out and the speed at which instructions are carried out. For example, while a 286 processor would struggle to load Windows 3.1, a 486 processor loads it easily. Additionally, a 286 processor is obviously incapable of running most new software. Pentium processor are now as fast as 200 MHz.

Now the good stuff. Lets read on and want delve into great complexity. Now it's time to delve deeper into the heart of the computer. The central processing unit or CPU is the “brains” of every computer. On the PC, the CPU is simply a tiny integrated circuit. It is the control center and contains two circuit elements to perform tasks plus several special locations or memory areas called registers which hold instructions.

Registers, located within the CPU chip are temporary storage locations which hold instructions. Secondly, the arithmetic logic unit or ALU is the location within the CPU where basic math and logic operations take place (such as addition and subtraction.) Finally, the control unit is a portion of the CPU which directs all elements of the computer. It does not add or subtract like the ALU, it only directs the activity.

Despite this seeming complexity, a basic fact remains: All digital computers can only add and subtract two numbers: Zero and one! let's back up a bit. For purposes of digital computer electronics, internally a computer can only respond to two things: On and off-just like a light switch. These electronic states of being might actually be a positive and negative voltage or a high and low voltage stored in a series of transistors etched in silicon on a chip, but to the computer the logic is on or off. Two conditions, that is all.

Back in the human world we can represent these as one and zero (1 and 0) . A special branch of mathematics deals with calculations of numbers represented by 1 and 0 which is called binary arithmetic.

We rarely think of 0 as a number since we consider it NOTHING. To computers ZERO is always a number. To a computer these binary numbers march together in a long string, one after another. Remember, the CPU has only two numbers to work with: 1 and 0. Human Decimal 0 1 2 3 4 5 6 7 8 9 10 11 12 and Computer Binary 0 1.

## What is the Difference between a Bit and a Byte?

The IBM PC and its clones generally use 8 bits (electrical pulses) to make up a byte (computer word.) A ninth “odd bit” is used for error checking (parity testing) to make sure the other eight bits are not accidentally erased or lost during storage or use by the computer.

Bits are like alphabet characters and bytes are like the words made up from alphabet characters. Bits and Bytes are used to measure information by the computer.

**BIT:** Smallest unit of information recognized by the computer. BIT is short for Binary Digit. A Binary Digit can be either a 0 or a 1. Several bits make up a byte.

**BYTE:** A group of 8 BITS. This grouping of adjacent binary digits (bits) is operated on by the computer as a unit. Computers use 1 BYTE to represent 1 character such as a letter of the alphabet, a number, a punctuation mark, a space, etc. A BYTE is also a unit of measure since it represents 1 character.

For example, when the letter “A” is pressed, the keyboard actually sends the following to RAM: 10000001 – a set of 8 bits.

## Random Access Memory (RAM)

Think of a computer as a human brain. Your brain is a memory sponge. It contains a lifetime of memories that cause us to act or react based on inputs. Inputs come through our 5 senses. If you see and smell hot suya burning on the grill (inputs) you know how to react based on previous experiences. A set of miniaturized circuits which represents the working memory of the computer. This is where application programs (software) can be loaded from the outside and then executed. The larger the RAM the better. A typical single user computer system may contain approximately 8,000, 000 bytes of RAM.

(This is often abbreviated as 8MB RAM.)

The computer’s brain consists of the RAM and the CPU. The CPU and RAM work together as the computer’s “brain” Each day when we start up the computer one of the first tasks will be to fill RAM with instructions to give it an ability to do work. This work may be in the creation of documents or tracking accounting data.

You control which instructions will go into the computer’s brain. You control the sets of experiences you will provide the computer. Once in RAM, the computer will evaluate inputs from many devices and react. The most typical input device is a keyboard. As you type commands, the computer evaluates them. Based on the set of instructions within its RAM, it will follow some action: Print a document, calculate, send information over a telephone line, etc.

At some later point you may empty the computer's brain and install a different set of instructions, thus giving it a different ability.

The RAM is emptied when the computer is turned off-thus it is often called "volatile" memory. WHAT YOU SEE ON YOUR COMPUTER MONITOR IS ACTUALLY IN RAM ONLY-a temporary storage location. To make it permanent we "save" it or "write" it to a floppy disk or hard drive. These devices are non volatile storage-they do not require electricity.

Each time the computer is turned off, all information within RAM is lost. RAM is called volatile memory because of the electricity requirement.

## Read Only Memory (ROM)

This is a special section of memory that contains instructions which are activated each time the computer is turned on. These instructions are set at the factory and cannot be changed-thus, they can only be "read" not written to. ROM

instructions perform equipment checks and initialization of the computer prior to each use.