The input unit is comprised of different input devices that take the input in different forms and pass them in digital form to CPU for processing.

Some common input devices are :

(*i*) **Keyboard.** Keyboard is a typewriter like device which is used to type in the letters, digits and commands.

(*ii*) **Mouse.** Mouse is pointing device with either a roller on its base or some laser mechanism. Mouse controls movement of *pointer* (also called ***mouse pointer***) on screen.

(*iii*) **Microphone (Mic).** We can send sound input to computer through a special input device called **microphone** or **mic** in short. A **mic** converts the sound received into computer's format, which is called ***digitized sound*** or ***digital audio.***

A **mic** can work if your computer has a special hardware known as **sound card.**

1.2.2 Output Unit

The output unit is formed by the output devices attached to the computer. The output coming from the CPU is in the form of electronic binary signals which needs conversion in some form which can be easily understood by human beings *i.e.*, characters, graphical or audio visual form. This function of conversion is performed by output units.

Output Unit converts the output in binary form to human readable form.

Some popular output devices are :

(*i*) **Monitors. Monitor** (or "screen") is the most common form of output from a computer. It displays information in a similar way to that shown on a television screen. The picture on a monitor is made up of thousands of tiny coloured dots called **pixels.**

(*ii*) **Printers.** Printers are the devices that deliver information by means of printed characters on paper.

(*iii*) **Speakers.** Speakers receive the sound in form of electric current from the sound card and then convert it to sound format audible to user.

1.2.3 The CPU (Central Processing Unit)

The CPU or the Central Processing Unit is the main control centre and processing unit. It is also called brain of the computer as it guides, directs, controls and governs the performance of a computer. The CPU has some sub-components that help in carrying out the processing of a task. These are :

(*i*) Arithmetic Logic Unit (ALU) (*ii*) Control Unit (CU) (*iii*) Registers

(*i*) Arithmetic Logic Unit (ALU)

The ALU performs all the four arithmetic (+, −, *, /) and some logical (<, >, =, < =, >=, !=) operations. When two numbers are required to be added, these numbers are sent from memory to ALU where addition takes place and the result is put back in the memory. In the same way, other arithmetic operations are performed (through ALU only).

For logical operations also, the numbers to be compared are sent from memory to ALU where the comparison takes place and the result is returned to the memory. The result of a logical operation is either TRUE or FALSE. These operations provide the capability of decision-making to the computer.

ALU performs arithmetic (+, −, *, /) and logic operations.

(ii) Control Unit (CU)

The CU **controls and guides** the interpretation, flow and manipulation of all data and information. The CU sends control signals until the required operations are done properly by ALU and memory. Another important function of CU is the **program execution** *i.e.*, carrying out all the instructions stored in the program. The CU gets program instructions from memory and executes them one after the other. After getting the instructions from memory in CU, the instruction is decoded and interpreted *i.e.*, which operation is to be performed. Then the asked operation is carried out. After the work of this instruction is completed, control unit sends signal to memory to send the next instruction in sequence to CU.

CU acts as a supervisor by controlling and guiding the operation taking place.

The control unit even controls the flow of data from input devices to memory and from memory to output devices.

(iii) Registers

Registers or processor registers are small units of data holding places. The CPU uses registers to temporarily hold some important processing-information during the time the processing is taking place. CPU may store some part data or some memory address or some instruction in its processor registers.

1.2.4 The Memory [Main Memory/Primary Memory]

The memory of a computer is more like a predefined working place, where it temporarily keeps information and data to facilitate its performance. Each memory location has a unique memory address. When the task is performed, it clears its memory and memory space is then available for the next task to be performed. When the power is switched off, everything stored in the memory gets erased and cannot be recalled.

The memory of a computer can be thought of as 'cells'. Each of these cells is further broken down into smaller parts known as *bits* (see Fig. 1.2). A bit means a *b*inary digi*t* *i.e.*, either 0 or 1. A number of bits together are used to store data instructions by their combination.

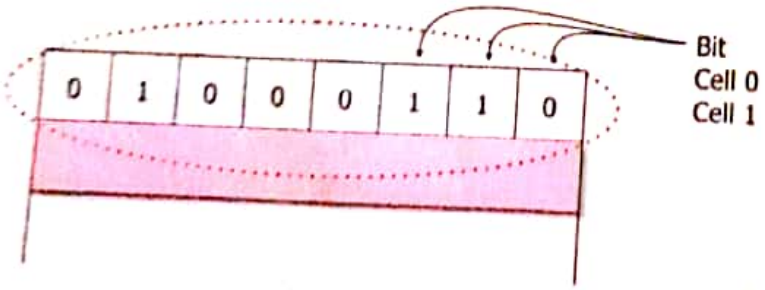

Figure 1.2 Memory cells.

NOTE

The memory of computer is often called main memory or primary memory.

A bit is an elementary unit of the memory. Eight bits together form a *byte.*

BYTE OR NIBBLE

A group of 8 bits is called a *byte* and a group of 4 bits is called a *nibble*.

One byte is the smallest unit which can represent a data item or a character. Other units of memory are KB, MB, GB, TB.

Every higher memory unit is equal to 2^{10} of its lower unit.

Following Table 1.1 lists various memory units used.

Table 1.1 *Units of Computer Memory Measurements*

Unit	Short Name	Full Name	Unit	Short Name	Full Name
1 Bit	Bit	Binary Digit	2^{10} *i.e.*, 1024 GB	1 TB	Terra Byte
8 Bits	1 Byte	Byte	2^{10} *i.e.*, 1024 TB	1 PB	Peta Byte
2^{10} *i.e.*, 1024 Bytes	1 KB	Kilo Byte	2^{10} *i.e.*, 1024 PB	1 EB	Exa Byte
2^{10} *i.e.*, 1024 KB	1 MB	Mega Byte	2^{10} *i.e.*, 1024 EB	1 ZB	Zetta Byte
2^{10} *i.e.*, 1024 MB	1 GB	Giga Byte			

Since computer's main memory (primary memory) is temporary, secondary memory space is needed to store data and information permanently for later use. Some most common secondary storage media are the hard disk, CD-RWs, pen drive etc. The secondary memory devices are also known as **storage devices.**