

### Mainframe Computers

Mainframe computers are capable of handling all kinds of tasks. They are big in size and require more space. They are very dynamic and the transfer rate is very high. They are usually host computers. Mainframe Computers can support more than 500 terminals and are capable of accepting all high-level languages. The word lengths are of 24, 32, 48, 64 or 128 bits. The storage capacity is around 10 mega bytes. These computers are very expensive and require large room space. Cost of maintenance and power consumption are very high.

### Super computers

Super computers are capable of using several processors simultaneously. These are of very high cost and the capacity is also very high. They process at a rapid speed and the main memory ranges from 8 to 64 mega bytes. The capacity, function, speed, accuracy etc. are very high. The operations are done in parallel rather than sequential.

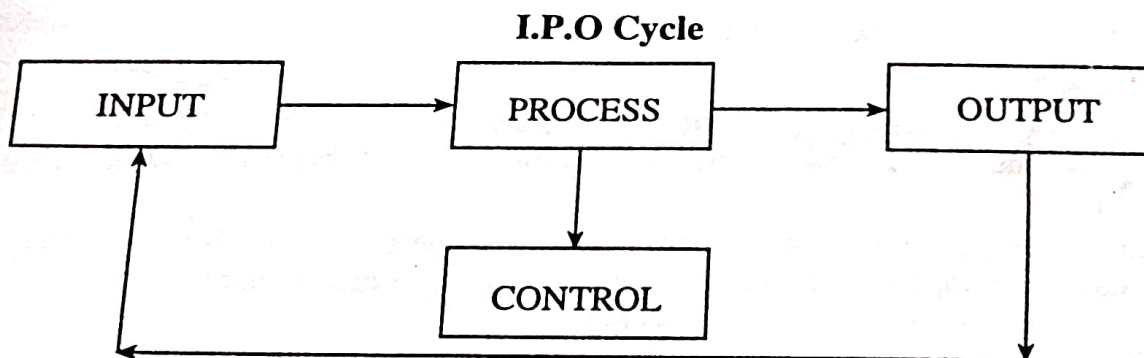
### Microcomputers—Features

Microcomputers differ from other computers in units and assembly. Micro electronic technology is applied in these computers. The structure and size are different from other types but the performance is similar to other types of computers. Microcomputers can be classified into single chip and multi-board microcomputers. In the single chip microcomputers, all the functions of central processing unit CPU are stored in a single small slice of silicon. The microprocessor part provides authentic and logic operation and its control unit coordinates the activities of a program embedded in a memory chip. These single chip computers are used in communication and instrumentation areas and in industrial process control. Computer hardware system is formed by connecting multi-board microchips and peripheral devices for the purpose of various applications and activities. These computers are of lesser cost and in smaller size. The reliability and performance are higher.

### 1.4. I-P-O CYCLE

I-P-O Cycle denotes the input process and output cycle. The major operations performed by digital computers are:

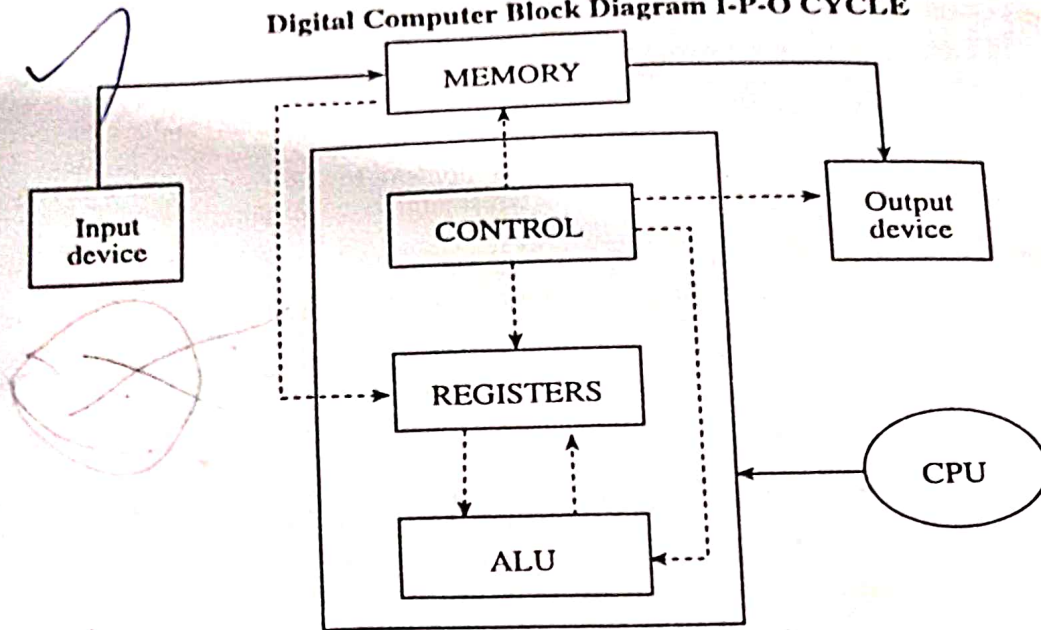
- (1) Input-receiving instructions and data,
- (2) Processing-manipulation of data based on instructions, and
- (3) Output—The processed information is given as output in the required format.



### Instruction

The computers accept data through various input devices. The data are processed as per the instructions provided. Output in the desired form is produced. For the purpose of basic operations such as accepting inputs, memory manipulation, arithmetic operations, logical decision-making and for required output, the computers have to work in an coordinated way.

Digital Computer Block Diagram I-P-O CYCLE



I-P-O Cycle commences from Input data preparation to Information output through the output device.

### Input Concepts

Input process involves the following three stages. They are: 1. Data preparation, 2. Processing, and 3. Accuracy check.

#### 1. Data preparation

Data preparation has two concepts. They are online and offline data preparation. Online refers to an operation or device in which data are transferred directly to or from a computer. Offline refers to an operation or device in which data are not immediately transferred to or from a computer. The end product of an offline input operation may be used as data for an online operation.

Input data are prepared in two ways. They are:

- (1) Transcriptive data entry, and
- (2) Source data entry

[In Transcriptive data entry, the data are prepared on document at the source of the data. The data must be transcribed to another medium that can be read and interpreted by a computer.]

[In source data entry, the data are prepared at the source in a machine readable form that can be used by a computer without a separate intermediate data transcription step. Its number of errors in input process is reduced in this type.]

### Processing

Data processing can be done in two ways. They are : (1) Batch processing, and (2) Transaction Processing

[Batch processing is a method in which data are gathered and batched through either an online or offline data gathering process and processed periodically without user intervention.]

INTRODUCTION

[Transaction files are updated processing through interchange pro

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Transaction processing is an online method in which data are processed immediately and files are updated as a transaction takes place. Users can communicate with the computer during processing through interchange programs. The process can be modified or controlled through interchange programs. This process is called as Real Time Processing.

### Accuracy Check

Accuracy checks are the checks made to eliminate errors at the time of data entry. It involves verification by the user and validation performed by the program in the computer.

Verification is the process of checking the data by corroborating the data entered against a known source: Validation is the process done by computers. The computers can be programmed to accept only a certain range of data. Validation is checking for data items that deviate from the range.

### Data Processing

Processing of data is the main objective of using computers. The users reuse processed information for taking decisions. The input data may be a simple one (But complex operations are to be performed for setting required results. The steps involved in processing are shown for the purpose of understanding.)

1. Reading 2. Recording 3. Editing 4. Sorting 5. Calculating 6. Recording results 7. Output retrieved

Classification can also be done in the following ways.

1. Source Documentation 2. Data Input 3. Data Manipulation 4. Output of information 5. Data storage

Source document is to be obtained and relevant facts are to be collected for the purpose of analysis. The data are to be classified for providing easy input of data. Data input is providing information to the computers through various input devices from the source documents. The input device may be a keyboard, magnetic disk or punched card. Data manipulation means the processing of provided information with the instructions given. Manipulation processes the data and provides the required or desired information for output.

### Output

The objective of processing information is to set the desired results. The result or output should be clear, meaningful, accurate and reliable. Results are to be given in a simple form for taking prompt decisions.

Storage is the process of storing the input data or results for future activities. Data storage is the speciality of computers and the data processed are stored in memory for future reference or for comparisons or for further manipulations.

## 1.5. COMPONENTS OF COMPUTER

The important components of a computer system are : (1) Central Processing Unit, (2) Input devices, and (3) Output devices. Central Processing Unit is the heart of the computer system. This controls and monitors the functioning of the computer. The three important parts of the CPU are :

- (1) Arithmetical and logical unit to monitor the mathematical functions and logical unit to monitor the mathematical functions and logical decisions.
- (2) Control unit to monitor the sequence of operations.
- (3) Memory unit to store the information.

Input devices transmit data to the computer. They are stored in the computer. These activities are done as per the directions of the control unit. For processing, the data are

## 17. INPUT DEVICES AND OUTPUT DEVICES

### Input Devices

The input devices are used to feed information to the computer. There are several types of input devices. They are :

- |                         |                          |
|-------------------------|--------------------------|
| (1) Key board           | (2) Floppy disk          |
| (3) Tape drives         | (4) Punched card readers |
| (5) Paper tape reader   | (6) Cassette circuit     |
| (7) Magnetic tape       | (8) MICR, OMR, OCR, BCR, |
| (9) Visual Display Unit | (10) Light Pen           |
| (11) Mouse Joystick     | (12) Touch Screen        |
| (13) Microphone         | (14) Compact Disk        |

### Punched Cards

Punched cards are developed by Herman Hollith in 1889. The standard rigid card is divided into 12 rows and 80 columns with only one character being represented in one column. The card passes between a 'light' source and set of photo electric cells. The functioning of the card reader is slow compared to that of CPU speed, some readers can read 2,000 cards per minute. The pattern of punched holes is used to represent characters on the card and it is called as Hollerith code. At present 96 column cards are also available. The punched cards are easy to read and are of less cost. They are simple to operate. However the cards are big and bulky and more space is required to store. They are easily perishable and transfer of data is slow.

### Paper Tape

Perforated paper tapes are formed on pianola rolls and used by tape setters. The tape is 1" wide and has 300 metres length. Information on paper tape is recorded in punched holes in rows across the width of the tape with one row as one character. The maximum number of holes in the row is called as channels compared to the punched card. It is less weight and easy to mail. However inserting data is a difficult task and takes more time. The papers can be torn easily and are not durable in nature. Data are processed sequentially.

### Keyboard

Keyboard is an important input device. Like typewriters, the keyboard has 26 alphabet keys and is arranged in the same manner as in the typewriter machine. There are 10 numeric keys above the character keys. There is separate number keypad in modern key boards. There are many special character keys such as + - × ÷ / \ ] [ ( ). Some special function keys are also available in the keyboard.

Some of the special keys are Home, End, Insert, Delete, Space Bar, Backspace, Caps lock, Tab, Page up, Page down, F1, F2, ..... F12 function keys, Shift, Sleep, wait, awake, etc.

Standard keyboard is the most familiar input device.

### Keys:

1. Alphabet keys
2. Number keys
3. Function keys
4. Numeric keyboard
5. Arrow keys

### INTRODUCTION TO

Special keys:  
Caps lock, Shift,

### Joystick

Joystick is a device centered. The handle of the joystick moves in any direction. The movement of the joystick is recorded. The joystick is a popular device used for pointing signals and a signal.

### Track Ball

Track ball is used for pointing in any direction. Direction of movement is controlled.

### Touch Screen

Touch screen is a device that records infra red beams crossed by the user. They are used by computers.

### Light Pen

Light pen is a device that contains a photocell to respond to the menu option. It is used to point easily by light pen. Digitizer is similar to light pen. Digitizer is similar to digitizer pads.

### Mouse

Mouse is a device used for games and an important input device. It is connected to the computer through its surface, with a small ball in the center. The mouse has become a popular device.

### Floppy Disk

Floppy disk is a device introduced by IBM. It is available in different sizes. The floppy disks are used at the center hole. The floppy disk can rotate 360 revolutions per minute. It can move from