Input-output (I/O) systems

Input-output (I/O) system transfer information between computer main memory and outside world. An I/O system is composed of I/O devices, I/O control units and software to carry out the I/O transactions through a sequence of I/O operations.

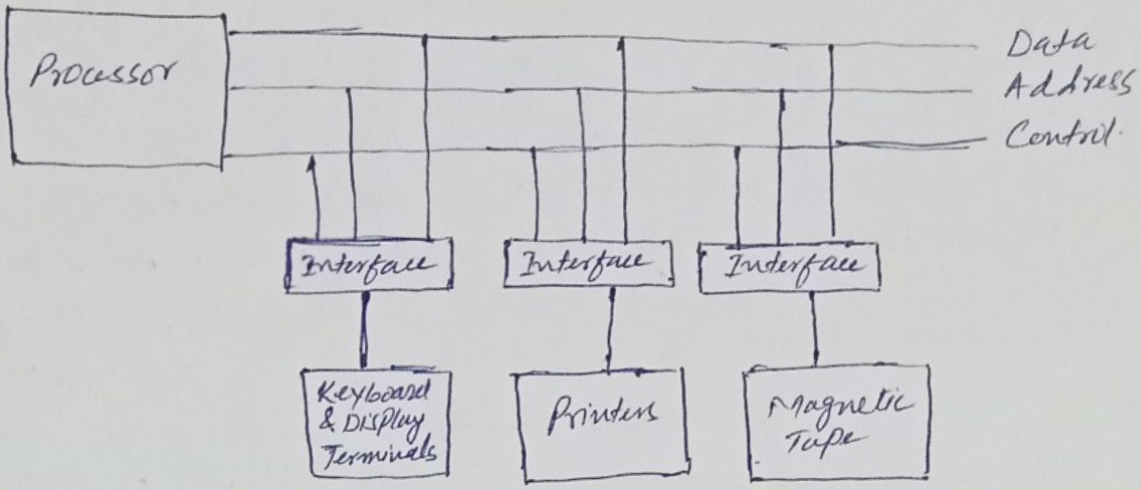
Peripheral Devices :-

Input or output devices that are connected to computer are called Peripheral devices. There are three types of Peripherals:

1. Input Peripherals: This allows user input from outside world to the computer. Example: Keyboard, Mouse etc.
2. Output Peripherals:- This allows information output from computer to outside world. Example Printer, Monitors etc.
3. Input-output Peripherals:- This allows both input (From outside world to computer) as well as output output (from computer to the outside world). Example, Touch screen.

Input-output Interface :-

Peripherals connected to a computer need special communication links for interfacing with CPU. In computer system, there are special hardware components between the CPU and Peripherals to control or manage the input-output transfers. These components are called input-output interface units because they provide communication links between Processor bus and Peri-pherals. They provide a method for transferring information between internal system and input-output devices.



Connection of I/O bus to I/O device

Needs of I/O interfacing:-

The I/O interface is required because their exists many differences between the central computer and each peripheral while transferring information. Some are:

(i) The data transfer rate of peripherals is usually slower than the transfer rate of CPU, and consequently, a synchronisation mechanism is needed.

(ii) Data codes and formats in peripherals differ from the word format in the CPU and memory.

(iii) The operating modes of each peripherals are differ from ~~the word format~~ each other and each must be controlled so as not to distrub the operation of other peripherals connected to CPU.

These differences are resolved through input-output interface. Interface unit contains various components, each of which performs one or more vital function for smooth transforming of information between CPU and peripherals.

Device Controller :-

A device controller is a system that handles the incoming and outgoing signals of the CPU. A device is connected to the computer via a plug and socket and the socket is connected to a device controller. Device controller uses binary and digital codes. An I/O device contains mechanical and electrical parts. A device controller is the electrical part of the I/O device.

The device controller recives the data from a connected device and stores it temporarily in some special purpose registers inside the controller. Then it communicates the data with a device driver. Device controller is a hardware whereas device driver is a software. The controller's job is to convert serial bit stream to block-bytes and perform error correction if necessary.

Device Driver :-

A device driver is a computer program that operates or controls a particular type of device that is attached to a computer. A driver provides software interface to hardware devices, enabling operating systems and other computer programs to access hardware functions.

The main purpose of device drivers is to provide abstraction by acting as a translator between hardware device and applications or operating systems that uses it.