Chp: 5 . I/O Management.

The most challenging task for an OS is to manage the I/O devices in a computer system. It acts as an interface betn devices & other type of device.

Types of Devices.

External devices that engage in I/O with computer systems can be roughly grouped into three categories:

i) Human readable : Suitable for communicating with the computer user. Eg: printers & video display terminals, latter consisting of display, keyboard, mouse.

ii) Machine readable : Suitable for communicating with electronic equipment. Eg: disk, tape drive, sensors, controllers & so on.

iii) Communication : Suitable for communicating with remote devices. Eg: digital line drivers & modems.

Fig 1

## * Organization of the I/O Function:

There are three techniques by which an I/O operation can be performed on a device. These are known as I/O communication techniques. These techniques are used to have a mode of communication between the user request & the device, taking device characteristic into account.

i) Programmed I/O: The processor issues an I/O command on behalf of a process, to an I/O module, that process then busy waits for the operation to be completed before proceeding.

ii) Interrupt-driven I/O: The processor issues an I/O command on behalf of a process, continues to execute subsequent instructions, and is interrupted by the I/O module when the latter has completed its work. The subsequent instructions may be in the same process if it is not necessary for that process to wait for the completion of the I/O. Otherwise, the process is suspended pending the interrupt & other work is performed.

iii) Direct memory access (DMA): A DMA module controls the exchange of data between the main memory and an I/O module. The processor sends a request for the transfer of a block of data to the DMA module and is interrupted only after the entire block has been transferred.

## * I/O Buffering:

An I/O Buffer is a memory area where data are stored temporarily during an I/O operation. A buffer is an area where the data, being read or written are copied in it, so that the operation on the device can be performed with its own speed.