

B.com 6th Semester
Information Technology
Unit 2

Device management in operating system implies the management of the I/O devices such as a keyboard, magnetic tape, disk, printer, microphone, USB ports, scanner, camcorder etc. as well as the supporting units like control channels. The basics of I/O devices can fall into 3 categories:

- **Block device:** it stores information in fixed-size block, each one with its own address. For example, disks.
- **Character device:** delivers or accepts a stream of characters. The individual characters are not addressable. For example printers, keyboards etc.
- **Network device:** For transmitting data packets.

Functions of device management in an operating system:

- Keep tracks of all devices and the program which is responsible to perform this is called I/O controller.
- Monitoring the status of each device such as storage drivers, printers and other peripheral devices.
- Enforcing preset policies and taking a decision which process gets the device when and for how long.
- Allocates and Deallocates the device in an efficient way. De-allocating them at two levels: at the process level when I/O command has been executed and the device is temporarily released, and at the job level, when the job is finished and the device is permanently released.
- Optimizes the performance of individual devices.

Sub-system / Techniques of I/O management

1. Buffering

Buffer is a memory area maintained by **Kernel I/O Subsystem** that stores data while they are transferred between two devices or between a device with an application. Buffering is done for three reasons.

1. One reason is to adapt to devices that have different data transfer sizes.

2. A second use of buffering is to support copy semantics for an application I/O. An application wants to write data on disk which is stored in its buffer, it is called “copy semantic”. it calls the write() system call, providing a pointer to the buffer and the integer specify the number of bytes to write.
3. A third one is to cope with the speed mismatch between the producer and consumer of the data stream.

2. Spooling

A spool is a type of buffer that holds output for a device. It is the process in which jobs from the cards are read directly onto the disk and the location of that card in the disk is recorded in a table by the operating system. When that job is required for execution, it is read from the disk.

For example, several applications may wish to print their output concurrently, so spooling solves this problem by maintaining a queue for the output. A printer does not accept interleaved data. The output of all application is spooled in a separate disk file. When an application finishes printing then the spooling system queues the corresponding spool file for output to the printer.

3.Interrupts

The **interrupt-based I/O method** controls the data transfer activity to and from connected I/O devices. It allows the CPU to continue to process other work instead and will be interrupted only when it receives an input signal from an I/O device. For example, if you strike a key on a keyboard, the interrupt I/O will send a signal to the CPU that it needs to pause from its current task and carry out the request from the keyboard stroke.