**Module-5**

**Input Output Interface**

Computer works on Von-Neumann’s stored program principle. The processor can work with the data present in the main memory. To get the data from the users to main memory there is a need for input devices. Similarly output devices are needed to provide the processing results to the users from the main memory. The input/output sub-system of a computer, termed as I/O provides an efficient mode of communication between the memory and the outside world. The basic task of a computer system is to receive information from a user and to transmit the computed results in a meaningful form. To obtain input data and display/output the computed results, the CPU communicates via different Input/Output (I/O) devices connected through I/O modules.

The CPU can communicate with an external device using I/O ports. I/O ports are usually of two types as Type-1 (Bit-serial ports) and Type-2 (Parallel ports). In the simplest designs, each port has two registers as Control register (or data direction register) and data register.

Modules in a computer system like CPU, memory, I/O devices are interconnected by Buses. Buses are traditionally classified as Processor-memory bus and I/O bus. There are several schemes for handling the timing of data transfer over the I/O bus from CPU to peripheral devices and vice-versa. These can be broadly classified as, Synchronous bus transfer and Asynchronous bus transfer.

In general, in a computer system there are multiple I/O devices and each of them is identified by a unique address. Two types of addressing are generally used; Memory-mapped I/O and Isolated I/O.

There are three basic forms of exchanging data between I/O devices and CPU viz. a) Programmed I/O, b) Interrupt driven I/O and c) Direct Memory Access (DMA).