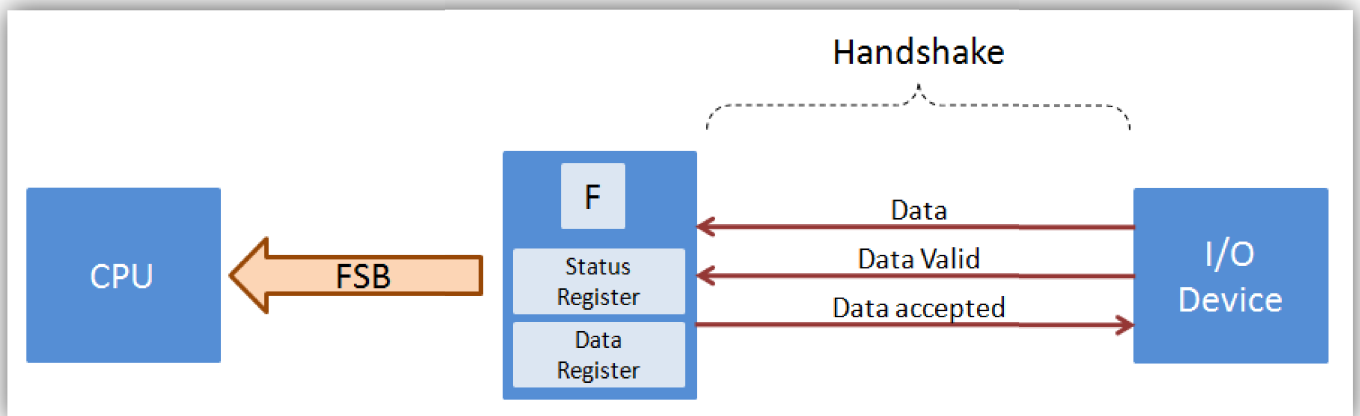


Modes of Transfer: Computer machines do work with several peripherals and there can be two types of transfer taking place any time. The one is input and the other is output. Although machines use common controllers but still devices use their own particular interfaces Following are the three different modes of I/O transfer.

- 1.** Programmed I/O
- 2.** Interrupt Driven I/O
- 3.** DMA (Direct Memory Access)

Programmed I/O: In this mode, devices put their data onto the interface; set a 'data available' status in status register and set a flip flop 'f' by '1' These three things are the part of respective interfaces.

CPU, while concurrently working on its processes regularly checks the flag bit. If it is '0', CPU continues its own process and checks again after a while. When 'f' is '1', it reads the status register and then reads the data from data register. Here flag is just a notification whereas status register is a record.



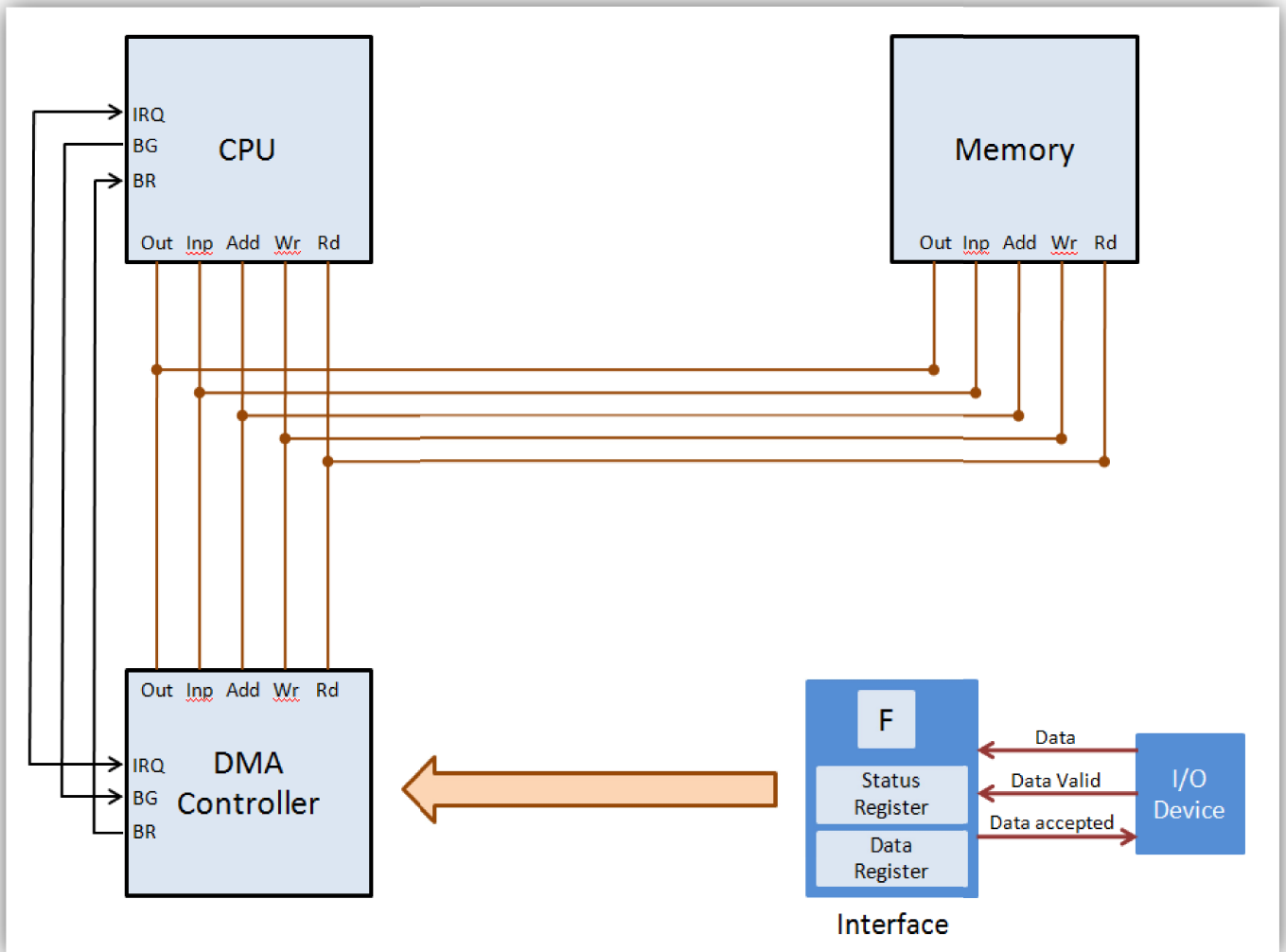
Interrupt Driven I/O: Interrupt driven I/O is a little complex because an I/O instruction suddenly intervenes the CPU in such a way that it has to pause its running task and process the I/O instruction. After processing it, CPU returns to the paused task.

I/O instruction always comes from some kind of I/O devices. Some of these devices have such a privilege that the instruction of interrupt from those devices will be stored on a specific location in the memory. These instructions are called interrupt instructions.

DMA (Direct Memory Access): Both Programmed and Interrupt driven I/O are quite time consuming for CPU. DMA in this reference, is the best ever method for performing I/O operations.

In DMA, a separate chip called 'DMA controller' works parallel to the CPU and performs all I/O transfer related tasks thereby letting the CPU be free for other memory and register reference operations.

Consider the following circuit-



Assignment:

- 1.** Differentiate between Programmed I/O and Interrupt I/O.
- 2.** Briefly describe DMA.