Vidyavardhini's College of Engineering and Technology
Department of Artificial Intelligence & Data Science

Experiment No. 4	
Study of flip flop IC	
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Aim - Study of flip flop IC

Objective –

The basic function of flip flop is to **store data**. They can be used to keep a record or what value of variable (input, output or intermediate). Flip flop are also used to exercise control over the functionality of a digital circuit i.e. change the operation of a circuit depending on the state of one or more flip flops.

Components required –

1. IC MC74HC73A (Dual JK flip-flop) – 1No.

2. LM7805 – 1No.

3. Tactile Switch – 4No.

4. 9V battery – 1No.

5. LED (Green – 1; Red – 1)

6. Resistors (1kΩ - 4; 220kΩ -2)

7. Breadboard

8. Connecting wires

Theory –

Flip-flop is a circuit that maintains a state until directed by input to change the state. A basic flip-flop can be constructed using four-NAND or four-NOR gates. Flip flop is popularly known

as the basic digital memory circuit. It has its two states as logic 1(High) and logic 0(low) states. A flip flop is a sequential circuit which consist of single binary state of information or data. The digital circuit is a flip flop which has two outputs and are of opposite states. It is also known as a Bistable Multivibrator.

Types of flip-flops:
1. SR Flip Flop
2. JK Flip Flop
3. D Flip Flop
4. T Flip Flop

Logic diagrams and truth tables of the different types of flip-flops are as follows:

S-R Flip Flop :

In the flip flop, with the help of preset and clear when the power is switched ON, the states of the circuit keeps on changing, that is it is uncertain. It may come to set($Q=1$) or reset($Q'=0$) state. In many applications, it is desired to initially set or reset the flip flop that is the initial state of the flip flop that needs to be assigned. This thing is accomplished by the preset(PR) and the clear(CLR).

In **JK flip flops**, the diagram over here represents the basic structure of the flip flop which consists of Clock (CLK), Clear (CLR), Preset (PR).

Conclusion –

The J-K flip-flop, the most widely used flip-flop design, is considered as the universal flip-flop circuit. Its sequential operation is the same as the S-R flip-flop with set and reset inputs. But it has no forbidden or invalid input states of the S-R Latch, when both inputsSandR,are both equal to logic 1. Due to its added clocked input circuitry, a JK flip-flop has four possible input combinations, "logic 1", "logic 0", "no change" and "toggle". When both inputs are low, then no change occurs but if both are high, the output will toggle from one state to the other. It can perform the functions of the set/reset flip-flop and has the advantage that there are no ambiguous states.