**Digital Electronics and Computer Applications Laboratory**

**Assignment Number: 03**

**PROBLEM STATEMENT:**

Design and Implement asynchronous counter using JK- Flip flop.

**Objectives:**

* To understand the operation of Asynchronous counter
* To design and implement MOD-N asynchronous counter using JK- Flip flop

**IC’s Used:**

**PLATFORM USED:**[**Digital**](https://www.deldsim.com/simulator/) **Trainer Kit**

**Theory:**

* Counters
* Asynchronous Counter
* Types of Counters

**Design and Implementation:**

Following points can be included

## Circuit and Operation of Asynchronous Counter:

1. I) Circuit diagram of a 3-bit asynchronous counter: (**3 Bit Asynchronous –UP Counter / Modulus 8**)

II) The timing diagram of the 3-bit asynchronous counter:

III) State diagram and the truth table of 3 Bit Asynchronous UP Counter.

1. Circuit diagram of a 3-bit asynchronous counter: (**3 Bit Asynchronous –DOWN Counter / Modulus 8**)

II)State diagram and the truth table of 3 Bit Asynchronous DOWN Counter.

1. Advantages of Asynchronous counters
2. Applications of Asynchronous counters
3. Draw Circuit Diagram **MOD 5 (101**) UP Asynchronous Counter – (Truncated Counter) using JK- Flip flop

**Procedure:**

1. Design Sequential circuit logic circuit as per given problem statement.
2. Connect the IC 74LS76 and other basic logic gate ICs as per diagram.
3. Give VCC supply and ground connection to each IC.
4. Give clock to first JK FF.
5. Observe the output and verify the truth table.
6. Switch off the power supply of trainer kit.

**Conclusion:**

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**Post Lab Questions:**

1. One of the major drawbacks to the use of asynchronous counters is?
2. How many flip-flops are required to construct a decade counter?
3. The terminal count of a typical modulus-10 binary counter is \_\_\_\_\_\_\_\_\_\_\_\_?

**Additional links for more information:**

1.https://nptel.ac.in/courses/117/106/117106086/2.

2. https://www.youtube.com/watch?v=LHAbLXfRYXk

3.https://www.electricaltechnology.org/2018/05/digital-asynchronous-counter-ripple-counter-types.html