

## Assignment 11

Class - SE IV

Roll NO - 21430

Batch - F4

DOS - 14/01/2020.

Title - Design and implement sequence generator (for prime Number / odd and even) using MS JK flip-flop.

Objective:-

1. Design and implement the following sequence generator circuit using IC-74LS76 and verify its truth table.

sequence (2 - 3 - 5 - 7)

Apparatus - Digital board, GP-4 patch cords, IC-74LS76, IC-74LS32, IC-74LS04, IC-74LS08 and required logic gates if any.

Theory:-

Sequence generator is sequential logic circuits which can be used to generate the pre-determined seq. can be Generator is classified into two categories counter can be constructed using IC - 74LS76. In case of ring counter output of last flip-flop is connected to the input JA input of first flip-flop and complementary output of last flip-flop - Output of first flip-flop ( $Q_A$  &  $\bar{Q}_A$ ) is connected to the inputs of second flip-flop ( $J_B$  &  $K_B$ ) and so on. And connect set & reset pin to Vcc

# \* PIN DIAGRAM -

$\overline{\text{CLK1}}$	1	16	1K
$\overline{\text{PRE1}}$	2	15	1Q
$\overline{\text{CLR1}}$	3	14	1 $\overline{\text{Q}}$
1J	4	13	2K GND
VCC	5	12	2 $\overline{\text{Q}}$
$\overline{\text{CLK2}}$	6	11	2Q
$\overline{\text{PRE2}}$	7	10	2 $\overline{\text{Q}}$
$\overline{\text{CLR2}}$	8	9	2J

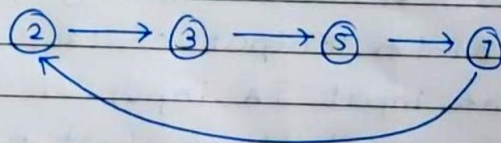
## Procedure:-

1. Make the connections as per the logic circuit of sequence generator circuit using IC-74LS76 and verify its truth table.

Sequence : 2-3-5-7

since highest state is 7 (111) we have to use 3 JK FF

State Diagram:- Prime no from 0 to 7.



\* State Diagram:-

FlipFlop O/P's			State
A	B	C	
0	1	0	2
0	1	1	3
1	0	1	5
1	1	1	7



## \* Truth Table:-

Present State			Next State			Flip flop Inputs					
$Q_A$	$Q_B$	$Q_C$	$Q_{A+1}$	$Q_{B+1}$	$Q_{C+1}$	$J_A$	$K_A$	$J_B$	$K_B$	$J_C$	$K_C$
0	1	0	0	1	1	0	x	x	0	1	x
0	1	1	1	0	1	1	x	x	1	x	0
1	0	1	1	1	1	x	0	1	x	x	0
1	1	1	0	1	0	x	1	x	0	x	1
0	0	0	x	x	x	x	x	x	x	x	x
0	0	1	x	x	x	x	x	x	x	x	x
1	0	0	x	x	x	x	x	x	x	x	x
1	1	0	x	x	x	x	x	x	x	x	x

## \* K-Map Simplification:-

$Q_A \backslash Q_C$	00	01	11	10
0	x	x	1	0
1	x	x	x	x

$$J_A = Q_C$$

$Q_A \backslash Q_C$	00	01	11	10
0	x	x	x	x
1	x	1	x	x

$$J_B = 1$$

$Q_A \backslash Q_C$	00	01	11	10
0	x	x	x	x
1	x	0	1	x

$$K_A = Q_B$$

$Q_A \backslash Q_C$	00	01	11	10
0	x	x	1	0
1	x	x	0	x

$$K_B = \overline{Q_A} - Q_C$$

$Q_A \backslash Q_C$	00	01	11	10
0	x	x	0	x
1	x	0	1	x

$$K_C = Q_A Q_B$$

$Q_A \backslash Q_C$	00	01	11	10
0	x	x	x	1
1	x	x	x	x

$$J_C = 1$$





