SSN College of Engineering
Dept of Computer Science and Engineering
UCS1301: Digital Principles System Design

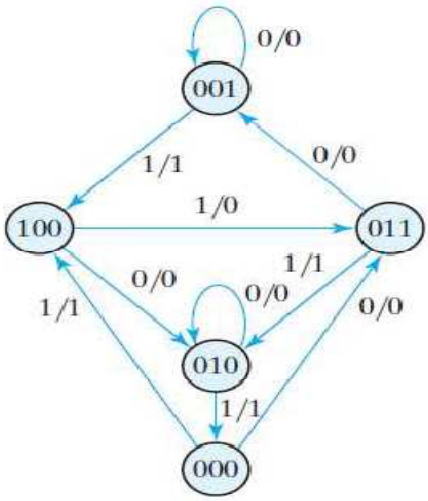
1. A Sequential circuit has **two JK** flip flops **A and B**, **two** inputs **x and y**, and **one** output **Z**. The flip flops input equations and circuit output equation are

JA = Bx + B'y' **KA= B'xy'**
JB = A'x **KB= A + xy'**
Z = Ax'y' + Bx'y'

i. Draw the logic diagram of the circuit.
ii. Derive the state equations for A and B.
iii. Tabulate the state table.
iv. Draw state diagram

2. Design a sequential circuit with two *JK* flip-flops *A* and *B* and two inputs *E* and *F* . If *E* = 0, the circuit remains in the same state regardless of the value of *F* . When *E* = 1 and *F* = 1, the circuit goes through the state transitions from 00 to 01, to 10, to 11, back to 00, and repeats. When *E* = 1 and *F* = 0, the circuit goes through the state transitions from 00 to 11, to 10, to 01, back to 00, and repeats.

3. A sequential circuit has three flip-flops *A, B, C* ; one input *x_in* ; and one output *y_out* . The state diagram is shown in the below figure. The circuit is to be designed by treating the unused states as don't-care conditions. Analyse the circuit obtained from the design to determine the effect of the unused states. Design using T flip Flop.



4. Design a BCD to 2421 code convertor using PROM , PAL, and PLA.