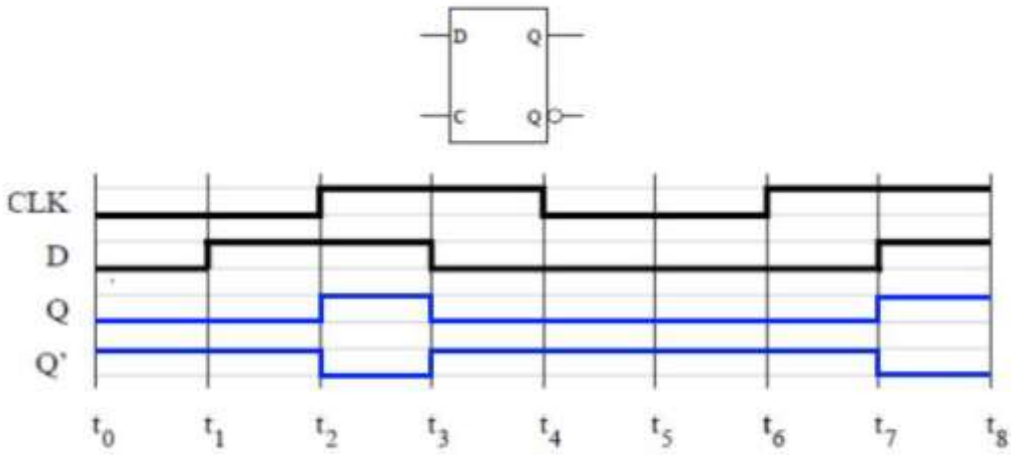
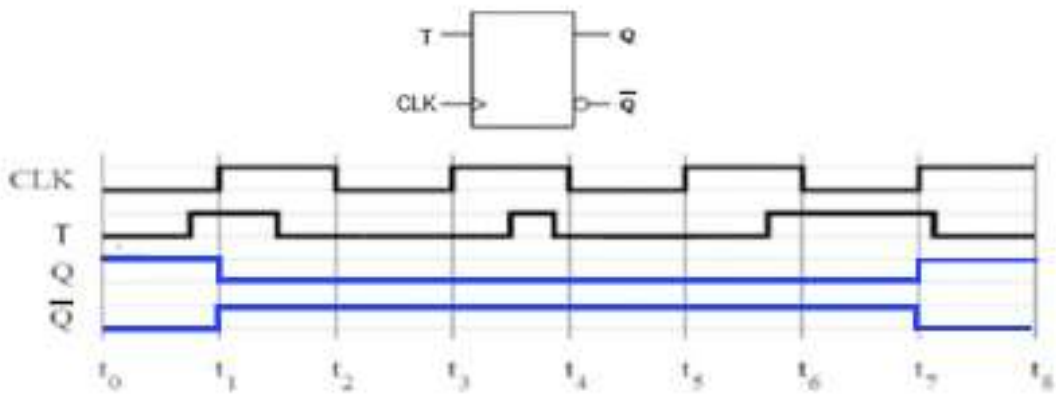
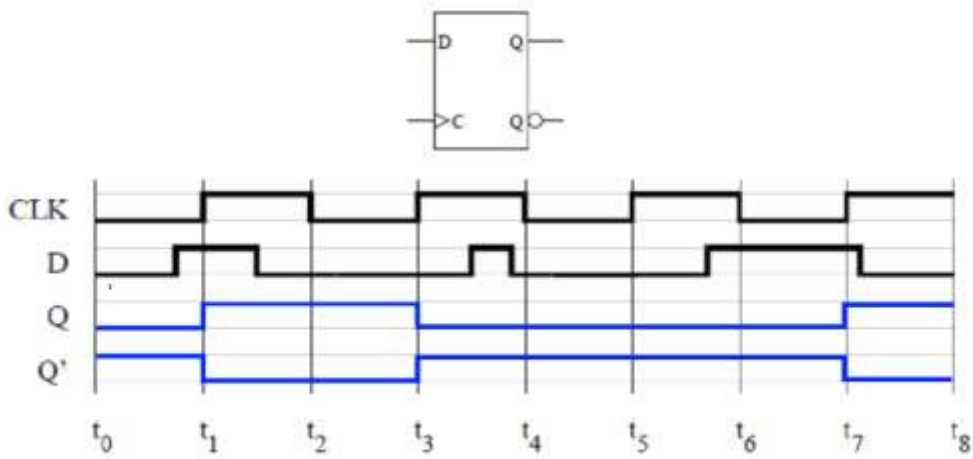


1.

(a)

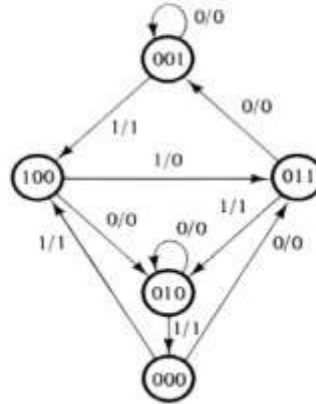


(b)

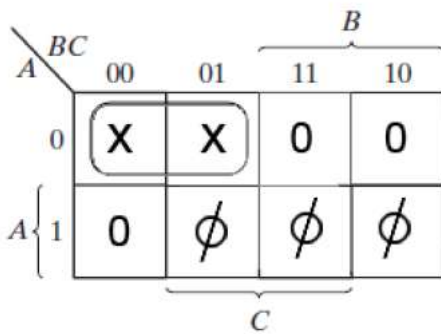


CSE241 Digital Systems Homework 3 Solution 2016

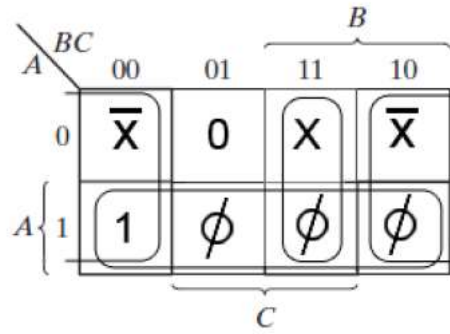
A sequential circuit has 3 flip-flops, A, B, C; one input x; one output z. The state diagram is shown below. Use D flip-flops in the design. (Draw the K maps for the next state values of A, B, C and Z and simplify; hardware diagram not needed). Identify if this machine is a Moore or Mealy machine. Explain your answer with reasoning.



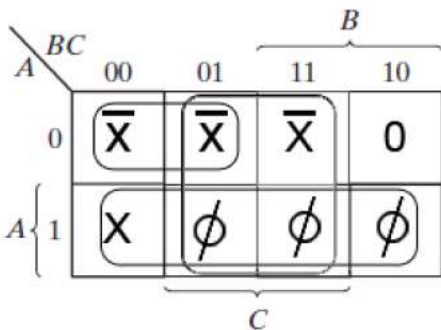
2.5.19



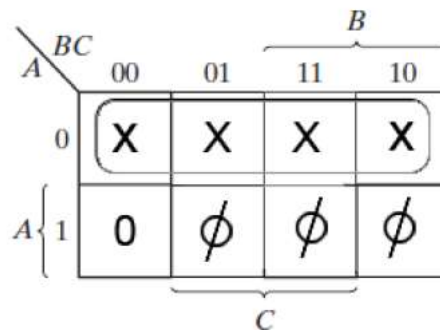
$$D_A = A'B'X$$



$$D_B = A + C'X' + BCX$$



$$D_C = AX + A'B'X' + CX'$$

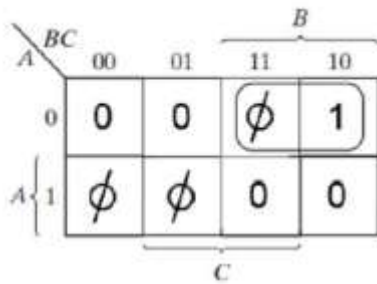
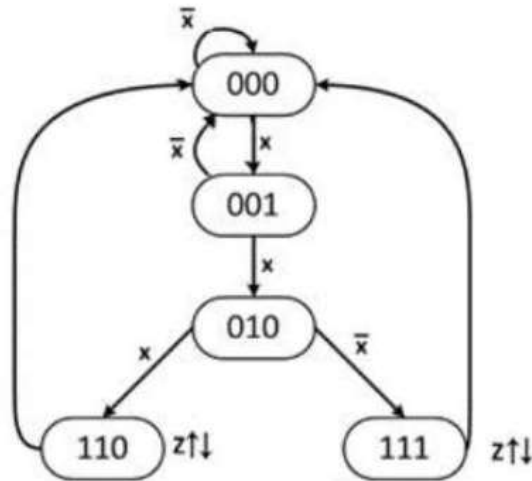


$$Z = A'X$$

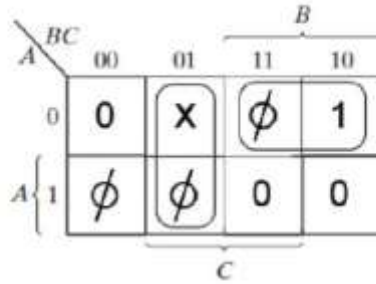
It is a Mealy Machine because the output Z depends on the input x, rather than only the state variables A, B and C.

3.

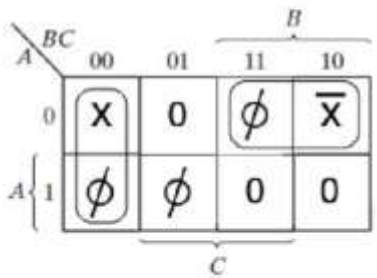
For the state machine, draw the K-map for the three state variables, A, B and C as a three variable map, with input x as entered variable. Also draw the K map for the output Z. Simplify all the K maps. Identify if this machine is a Moore or Mealy machine. Explain your answer with the reasoning.



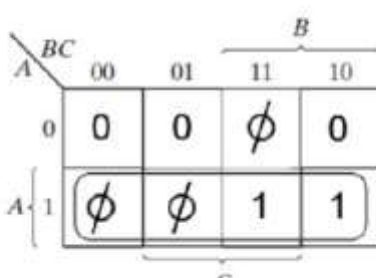
$$D_A = A'B$$



$$D_B = B'CX + A'B$$



$$D_C = B'C'X + A'BX'$$



$$Z = A$$

It is a Moore machine because the output value does not depend on the input x. It is only decided by state variables A, B and C.