Theoretical Computer Science
Tutorial I (Finite State machine)

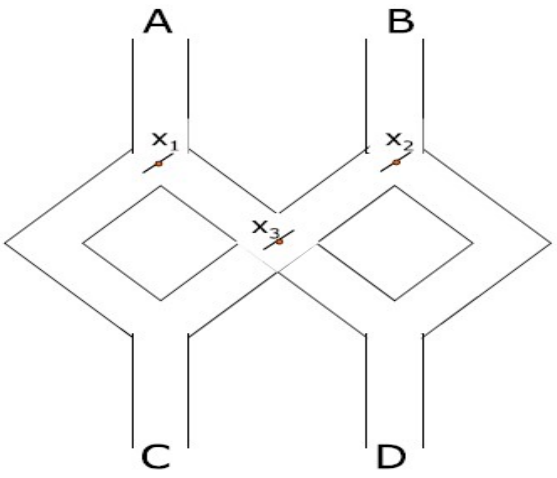
1) Design FSM for testing divisibility by 5 for decimal numbers.

2) Design FSM to check whether given unary number is divisible by 3 or not.
Hint: ∑={a} $(3)_{10}$={aaa} $(5)_{10}$={aaaaa} Length of string = value of number.

3) Design DFA for the following language over alphabet ∑={a,b}

   a) String that should contain 3 consecutive b's.
   b) Strings in which occurrence of every 'a' is preceded by the occurrence of 'b'.
   c) String which contain 'a' at every even position in the String.
   d) Strings with at least 3 a's.
   e) Even number of a's and odd number of b's.
   f) Strings that ends in either "110" or "101" over ∑={0,1}.
   g) String does not contain any occurrence of three consecutive b's .
   h) String starts with three consecutive a's.
   i) String starts with either "011" or "110" over ∑={0,1}.

Advanced Learners Section



Consider this marble toy.

1) Model it as a FSM:

- marble in A is 0 input
- marble in B is 1 input
- sequence of marbles is accepted if the last marble comes out of D

2) What is the language accepted by this toy?