

Different Models of DFA

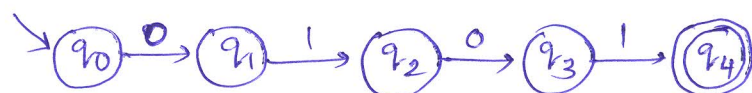
- ✓ Model - 1: Sub-strings containing with
- Model - 2: Starts with
- Model - 3: Ends with
- Model - 4: Even (or) Odd
- Model - 5: Not containing/Complement

By
RC1353_001

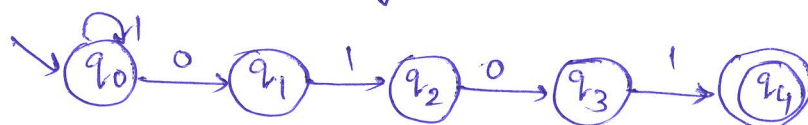
SUB-STRINGS

1. Construct a DFA for the language that contains 0101 as a substring.

Step 1: Find the minimum string. Here the minimum string is 0101.

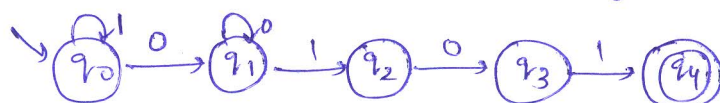


Step 2: For state q_0 , apply symbol '1' then it will not lead to transition since any number of 1's at the start of string are accepted.

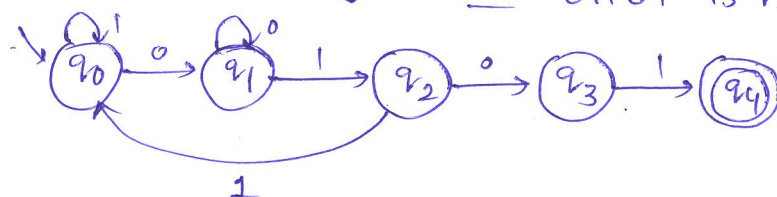


For q_0 , all transitions are completed.

Step 3: For q_1 , apply symbol '0', here it will not lead to any transitions since one '0' is already obtained.

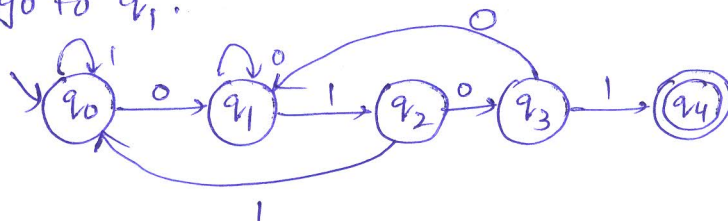


Step 4: Now apply symbol 1 on state q_2 then it go to the previous state q_0 . For ex:- 01101 is not accepted



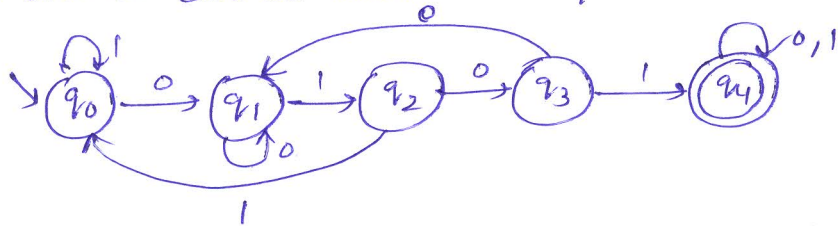
For q_2 , all transitions are completed.

Steps: Apply symbol '0' on q_3 , it will go the previous state q_1 since we have already an a zero at state q_1 since by so by applying '0' on q_3 , it will go to q_1 .



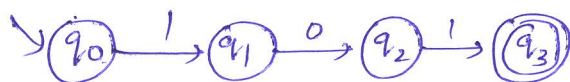
For q_3 , all transitions are completed.

Step 6: For state q_4 , since we are already in a final state, 0 and 1 can be occurred many times.

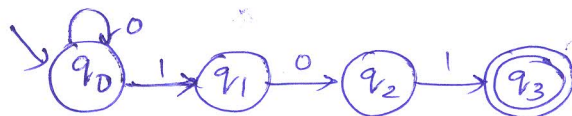


2. Design a DFA for the language containing string 101, $\Sigma = \{0, 1\}$ as substring.

Step 1: Minimum string for the language is 101.

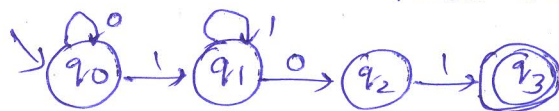


Step 2: For state q_0 , apply input '0' on it then it will not lead to any change in transition. So it can be encountered many times.



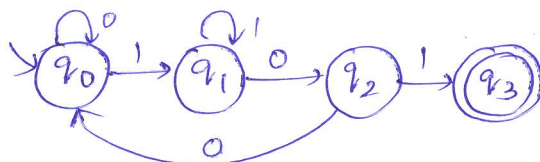
For q_0 state, all transitions are completed.

Step 3: For state q_1 , apply '1' then since we came here by taking symbol 1, so if '1' is occurred many times it will not lead to final state.



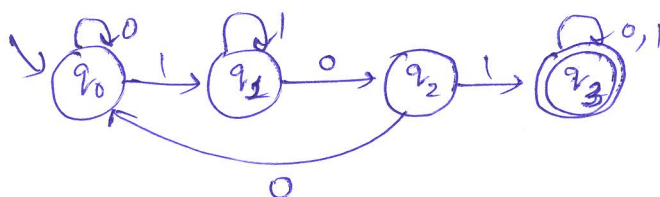
So for state q_1 , all transitions are completed.

Step 4: For q_2 state, apply '0' on it then it go the previous state q_0 . Ex: 1001 is not accepted.



So for q_2 , all transitions are completed.

Steps: Since q_3 is a final state, once 101 string is obtained if 0,1 occurs then there is no problem.

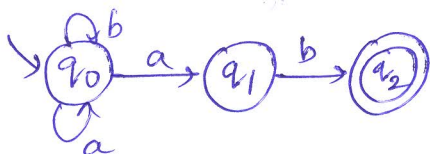


3. ~~Design~~ Design an NFA for the language that consists of 'ab' as substring.

Step1: Find the minimum string. Here minimum string is ab.



Step2: Since it is a backtracking procedure, apply 'a', 'b' on will not lead to any transitions.



Step3:

Once the string ~~ab~~ is obtained, then a, b can be occurred many times since we reached final state.

