

Assignment 1

COL 352

Introduction to Automata & Theory of Computation

Problem 1

1.1. $L = (0|1)^*(101)(0|1)^*$

The NFA represents the language which contains 101 as a substring

1.2. $L = (0|1)^*$

The NFA accepts all the strings defined over the alphabet $\Sigma = (0|1)$

1.3. Complementing the states of NFA does not necessarily complement the language accepted by the original NFA. However, the above claim is true for a Deterministic Finite State Automata.

Problem 2

Following is the DFA for

$L = \{w \in \{0,1\}^* | w \text{ contains the substring } 110 \text{ or } 0001\}$ where

$Q = \{A, B, C, D, E, F\}$

$\Sigma = \{0,1\}$

$q_0 = A$

$F = \{G\}$

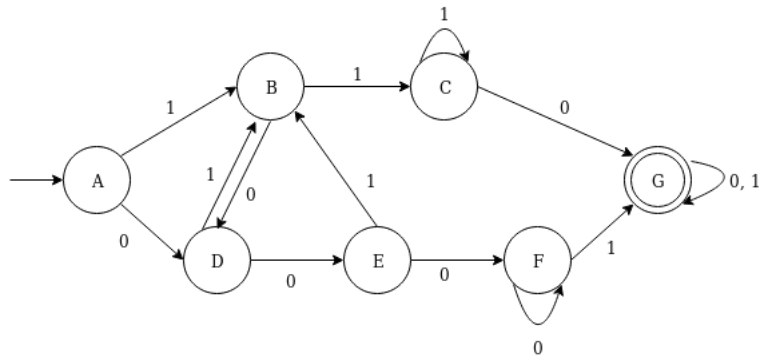


Figure 1: DFA for L

A: starting state

B: indicates '1' or '01' has been encountered, i.e, one '1' has been encountered

C: indicates '11' has been encountered

D: indicates '0' or '10' has been encountered, i.e, one '0' has been encountered

E: indicates '00' has been encountered

F: indicates '000' has been encountered

G: indicates either '110' or '0001' has been encountered and thus a final state

Thus this DFA accepts only L