Finite State Automatons

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Finite State Automaton

M = (Q, Σ, δ, q0, f) There is a set of states Q which M manipulates by δ over Σ and the string is accepted if it lies in f $\subset$ Q, starting from q0.

q0 $\in$ Q, f $\subset$ Q

M always reads the entire input.

Accepting a string

Given a string, S = c0,c1...cn, M accepts S iff $\exists$ r0, r1, ... rn+1 $\in$ Q, st 1. r0 = q0 2. ri + 1 = δ(ri, ci) 3. rn+1 $\in$ f

A language is recognized by M, iff L = {s | M accepts s}.

Example

1. Define a Finite State Automaton that recognizes the language L = 101, Σ = {0,1}. Look at Fig 1 for implementation.

Side note

FSAs can be implemented in more than one ways. Is there a minimal implementation?

2. Define a Finite State Automaton that recognizes the language L = {s | s has equal 0s and 1s}, Σ = {0,1}

Pigeonhole Principle

r0 $\rightarrow$ r1 $\rightarrow$ ... $\rightarrow$ ri $\rightarrow$ ... $\rightarrow$ rn

Continued in next class...

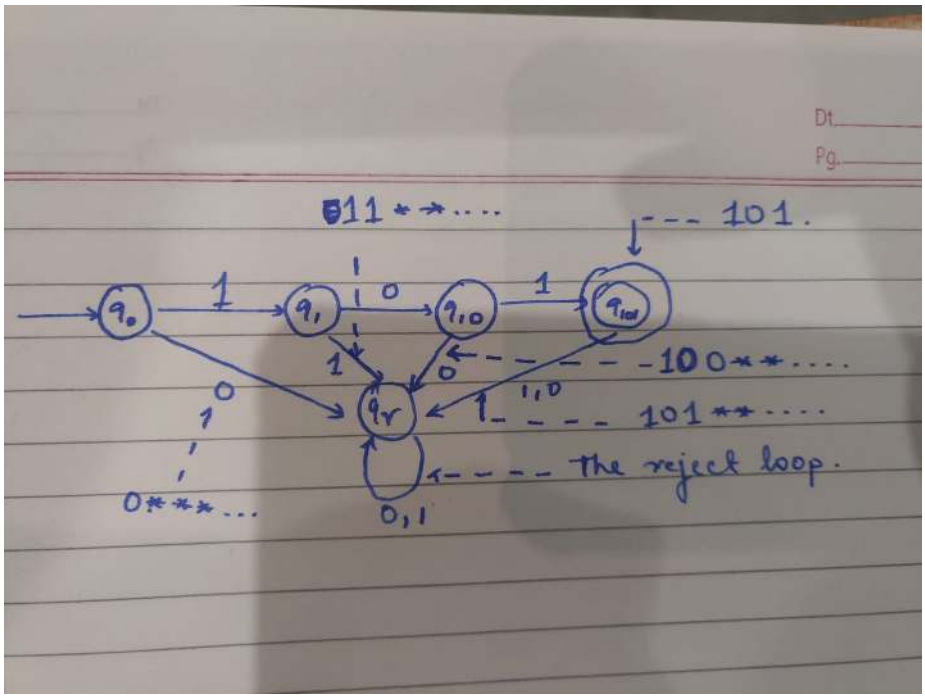

Figure 1: FSA