CPSC 362 Lecture - poof

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September 10, 2020

Timestamps

07:38:48 PM
Okay so he's talking mainly about the project and how far along people are. People tend to not be incredibly far only a handful of people have created an FSM. He said he is considering adjusting the project depending on our position and understanding of the project.

07:48:16 PM
Now he is going back to talking about how to implement a DFSM into code. He's sorta doing psuedo-code mentioned below. *Figure 4*

08:06:36 PM
Taking a break then going to go over non-deterministic FSM (and NFAs).

08:13:54 PM
You can get 90% on the project if you document a FSM and diagram it without code. FYI. Basically 90% for desired output, 100% for intended FSM.

08:48:38 PM
Basically he's been making corrolations between video game idles and NFSM. He also mentioned that this will be useful for regexp next week.

09:11:51 PM
Next time, we are converting NFSM to DFSM. So make sure to understand FSM. lol

[*]Dedicated to @QuesoGrande

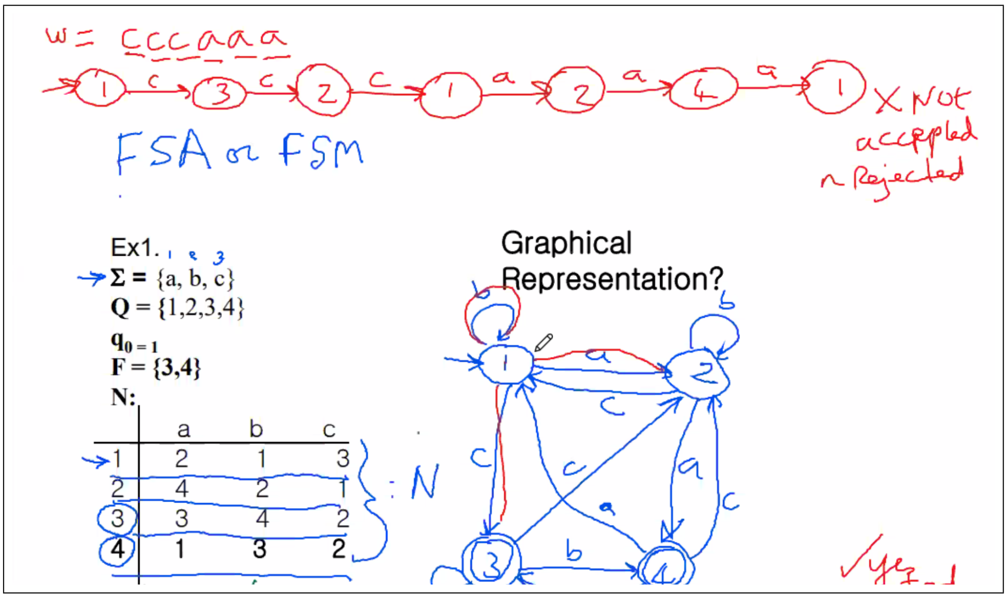
Contents

1 FSM Recap

A finite-state machine (FSM) or finite-state automaton (FSA, plural: automata), finite automaton, or simply a state machine, is a mathematical model of computation. It is an abstract machine that can be in exactly one of a finite number of states at any given time. The FSM can change from one state to another in response to some inputs; the change from one state to another is called a transition.

An FSM is defined by a list of its states, its initial state, and the inputs that trigger each transition. Finite-state machines are of two types—deterministic finite-state machines and non-deterministic finite-state machines.

A deterministic finite-state machine can be constructed equivalent to any non-deterministic one.



2 Chapter 2.2 - Deterministic FSM

Ex. Given the following FSM

M = (

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

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

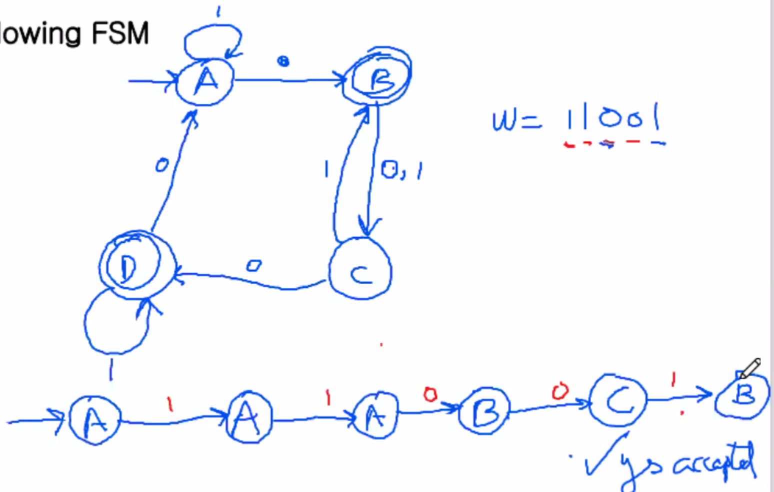
$q_0 = A$

$F = \{B,D\}$

N:

	0	1
A	B	A
B	C	C
C	D	B
D	A	D

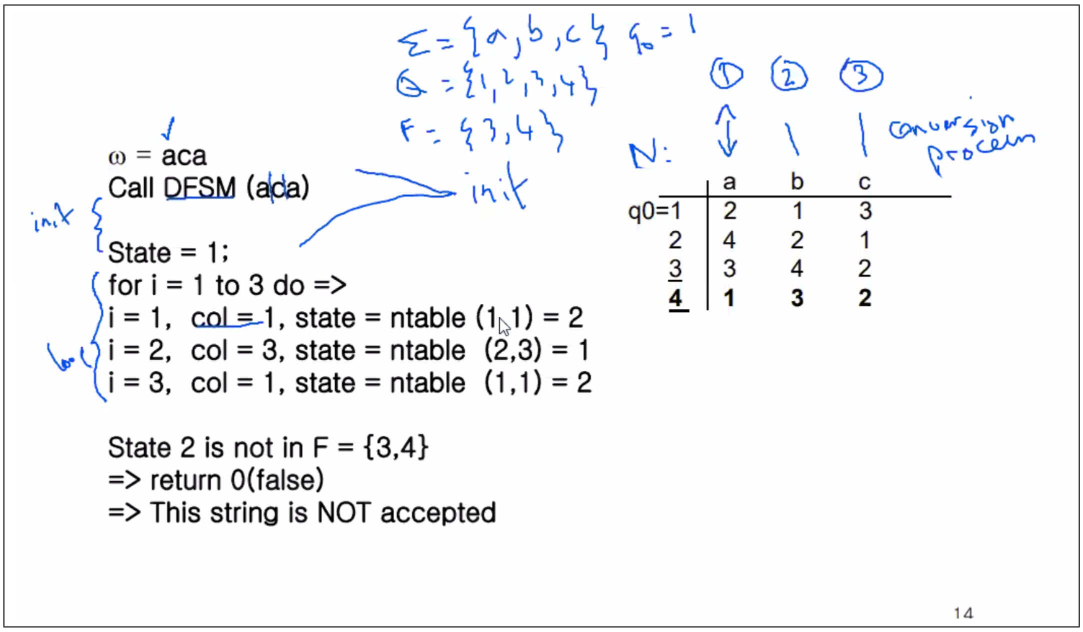
)



11

c) Implementation of a DFSM

```
function DFSM (ω : string)
table = array [1..nstates, 1..nalphabets] of integer; /* Table N
                                                         for the transitions*/
{
state = 1; (the starting state)
for i = to length (ω) do
    {
    col = char_to_col (ω[i]);
    state = table[state, col];
    }
if state is in F then return 1   /* accept */
else return 0
}
```



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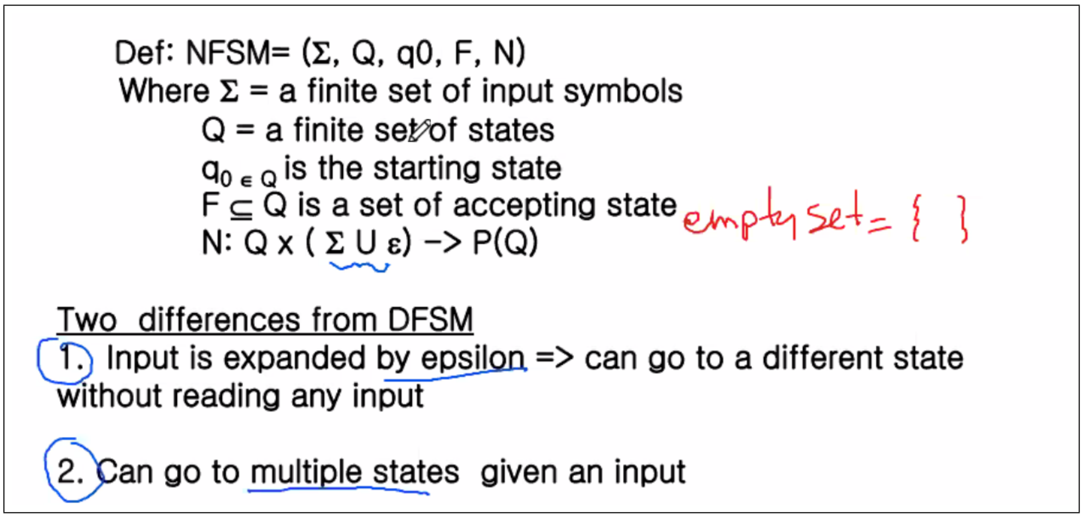
3 Chapter 2.3 - Non-Deterministic FSM (NFSM)



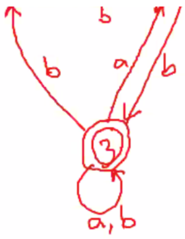
$w = baabab$

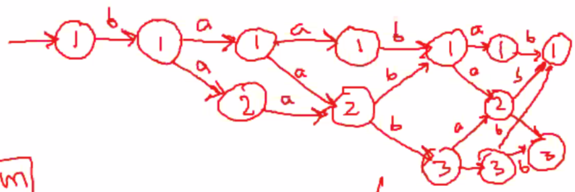
Ex 1. NFSM with Multiple States Transitions

M = (Σ = {a,b}, Q = {1,2,3}, $q_{0=1}$, F = {2,3}

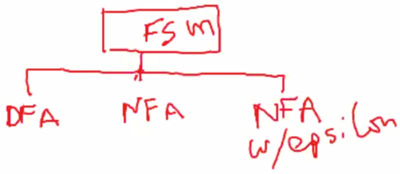
N:

	a	b
→ 1	{1,2}	{1}
2	{2}	{1,3}
3	{2,3}	{1,3}





✓ yes accepted

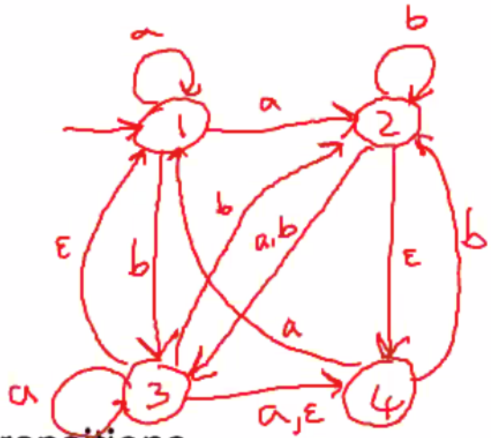


$\Sigma = \{a, b, \varepsilon\}$

$Q = \{1, 2, 3, 4\}$

$q_0 = 1$

$F = \{3\}$



EX2) NSFM with Epsilon transitions

	a	b	ε
q0= 1	{1,2}	{3}	{ }
2	{3}	{2,3}	{4}
3	{3,4}	{2}	{1,4}
4	{1}	{2}	{ }

EX2) NSFM with Epsilon transitions

epsilon

	a	b	ε
q0= 1	{1,2}	{3}	{ }
2	{3}	{2,3}	{4}
3	{3,4}	{2}	{1,4}
4	{1}	{2}	{ }

empty set

w = a b a