UTM

UNIVERSITI TEKNOLOGI MALAYSIA

SECI1013-03 DISCRETE STRUCTURE

ASSIGNMENT 4 :
CHAPTER 5 FINITE AUTOMATA

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q1

a)

state	a	b	c
q_0	q_1	q_0	q_0
q_1	q_1	q_2	q_1
q_2	q_2	q_3	q_4
q_3	q_3	q_3	q_3
q_4	q_4	q_5	q_4
q_5	q_5	q_5	q_5

Start state : q_0

Final state :

$\{q_1, q_3, q_5\}$

b) Input string abcc

Input current state → next state

a = $q_0 \rightarrow q_1$

b = $q_1 \rightarrow q_2$

c = $q_2 \rightarrow q_4$

c = $q_4 \rightarrow q_4$

Final state is q_4.

c) Input current state → next state

a	=	$q0 \rightarrow q1$
b	=	$q1 \rightarrow q2$
c	=	$q2 \rightarrow q4$
b	=	$q4 \rightarrow q5$

Final state is $q5$.

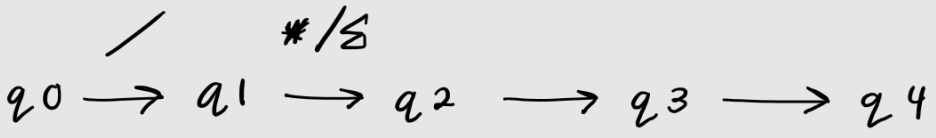
$q5 \in \{q1, q3, q5\}$, it is an accepting state.

Input string abcb accepted by DFA.

q2

State	/	*	Σ_{other}
q_0	q_1	q_d	q_d
q_1	q_d	q_2	q_2
q_2	q_2	q_3	q_2
q_3	q_4	q_3	q_d
q_4	q_d	q_d	q_d

q_d = reject



q3

	fs		fo	
state	0	1	0	1
S0	S1	S3	1	0
S1	S1	S2	1	1
S2	S3	S4	0	0
S3	S1	S0	0	0
S4	S3	S4	0	0

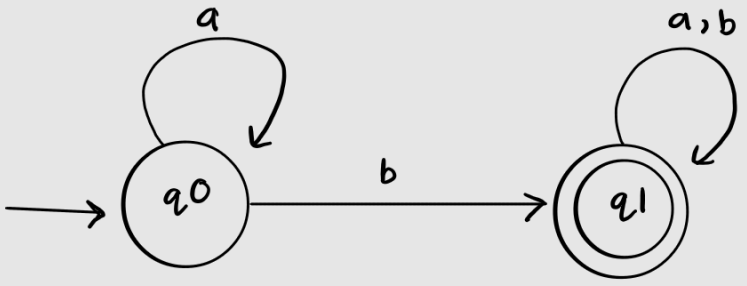
Output string 101011 :

step	current state	Next state	Input	Output
1	S0	S3	1	0
2	S3	S1	0	0
3	S1	S2	1	1
4	S2	S3	0	0
5	S3	S0	1	0
6	S0	S3	1	0

output string : 001000

q4

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



q5

a) Red light = ground floor

Green light = first floor

		Input	
State	Light	up	down
q0 (ground floor)	Red	q1	q0
(first floor)	Green	q1	q0

b)