UNIVERSITI TEKNOLOGI MALAYSIA

UNIVERSITI PENYELIDIKAN

Group Assignment Cover Page

Course Code	: SECL1013
Course Name	: Discrete Structure
Section	: Section 09
Lecturer's Name	: Dr Tarmizi Bin Adam
Session/Semester	: 20252026/1
Assignment Title	: Assignment 1
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In submitting this work for grading, we confirm:

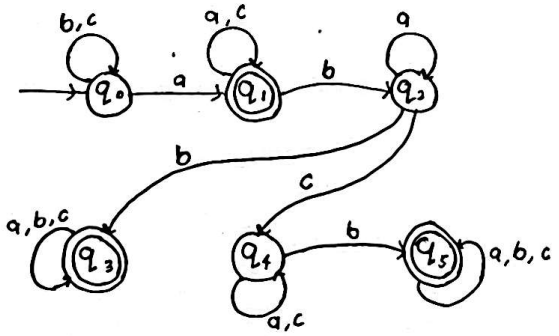
- That the work is original, and due credit is given to others where appropriate.

1. Let M = ({$q_0, q_1, q_2, q_3, q_4, q_5$}, {a,b,c}, q_0, f, {q_1, q_2, q_5}).

$f(q_0,a) = q_1$	$f(q_0,b) = q_0$	$f(q_0,c) = q_0$
$f(q_1,a) = q_1$	$f(q_1,b) = q_2$	$f(q_1,c) = q_1$
$f(q_2,a) = q_2$	$f(q_2,b) = q_3$	$f(q_2,c) = q_4$
$f(q_3,a) = q_3$	$f(q_3,b) = q_3$	$f(q_3,c) = q_3$
$f(q_4,a) = q_4$	$f(q_4,b) = q_5$	$f(q_4,c) = q_4$
$f(q_5,a) = q_5$	$f(q_5,b) = q_5$	$f(q_5,c) = q_5$

a)

f	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



b) abcc

$q_0 \xrightarrow{a} q_1 \xrightarrow{b} q_2 \xrightarrow{c} q_4 \xrightarrow{c} q_4$ $\quad F = \{q_4\}$

c) abcb

$q_0 \xrightarrow{a} q_1 \xrightarrow{b} q_2 \xrightarrow{c} q_4 \xrightarrow{b} q_5$

accepted by M

Question 2

$M = (Q, \Sigma, F_s, q_0, F)$ $\quad \Sigma = \{a-z, *, /\}$

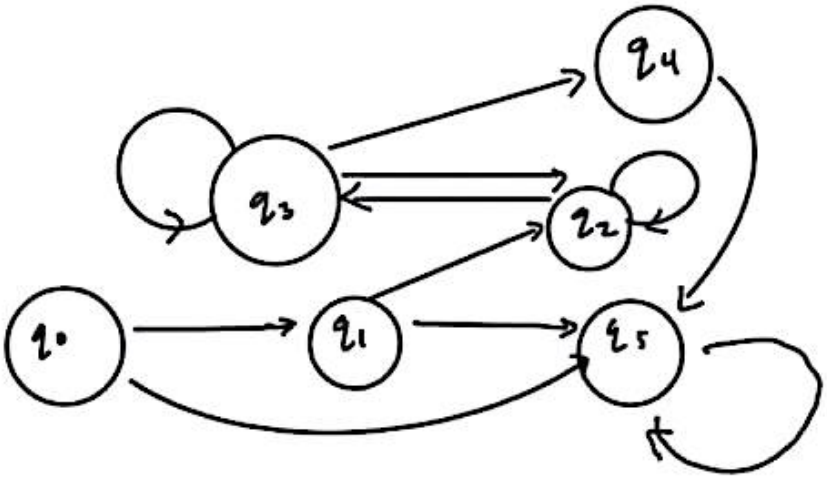
$Q = \{q_0, q_1, q_2, q_3, q_4, q_5\}$

q_0 = start $\quad$ q_2 = Inside comment $\quad$ q_4 = Comment closed

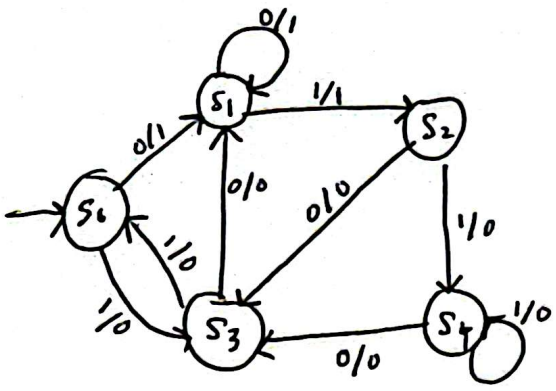
q_1 = saw (/) $\quad$ q_3 = * inside comment $\quad$ q_5 = Dead state.

$F = [q_4]$

	/	*	a-z
q_0	q_1	q_5	q_5
q_1	q_5	q_2	q_5
q_2	q_2	q_3	q_2
q_3	q_4	q_3	q_2
q_4	q_5	q_5	q_5
q_5	q_5	q_5	q_5



Question 3



input string : 101011

S	f_3		f_0	
	0	1	0	1
S_0	S_1	S_3	1	0
S_1	S_1	S_2	1	1
S_2	S_3	S_4	0	0
S_3	S_1	S_0	0	0
S_4	S_3	S_4	0	0

input :

$$S_0 \xrightarrow{1} S_3 \xrightarrow{0} S_1 \xrightarrow{1} S_2 \xrightarrow{0} S_3 \xrightarrow{1} S_0 \xrightarrow{1} S_3$$

output :

$$S_0 \longrightarrow S_3 \longrightarrow S_1 \longrightarrow S_2 \longrightarrow S_3 \longrightarrow S_0 \longrightarrow S_3$$

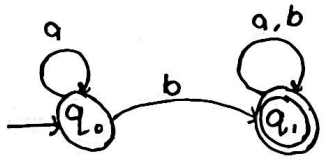
0 0 1 0 0 0

output string : 001000

4. Let q_0 : not have b

q_1 : at least have one b

f_s	a	b
q_0	q_0	q_1
q_1	q_1	q_1



strings that accepted by M:

$q_0 \xrightarrow{b} q_1$

$q_0 \xrightarrow{a} q_0 \xrightarrow{b} q_1$

$q_0 \xrightarrow{b} q_1 \xrightarrow{b} q_1$

Question 5

Let

Ground - G

First floor - F

Up - u

Down - d

Green light - 1

Red light - 0

a.

S	fs		fo	
	u	d	u	d
G	F	G	1	0
F	F	G	1	0

b.