



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

SCHOOL OF COMPUTING
Faculty of Engineering

ASSIGNMENT 5

SUBJECT:
DISCRETE STRUCTURE (SECI1013-03)

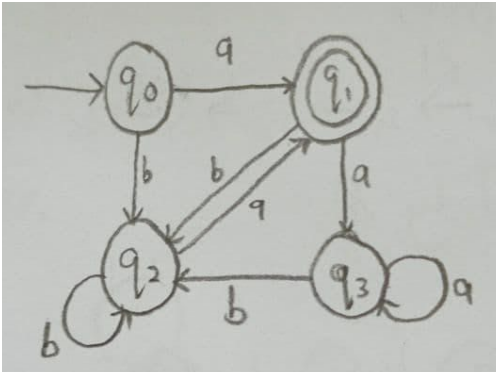
TOPIC:
FINITE AUTOMATA

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QUESTION 1



I.

- II. DFA can be applied to verify the password of an email. DFA can be used to first match the email and after that the password can be matched using the DFA with the password stored for an email address. Besides, DFA can help to determine whether a password is invalid or not like there should be one integer at least and one alphabet, there cannot be any special character as it would lead to a dead state. Minimum length password DFA could be built in order to accept a password with minimum length and all specifications.

QUESTION 2

I.

f_s	a	b
S_0	S_2	S_1
S_1	S_3	S_1
S_2	S_4	S_3
S_3	S_3	S_3
S_4	S_2	S_3

II. a) $w = aaaaaa$

$$S_0 \xrightarrow{a} S_2 \xrightarrow{a} S_4 \xrightarrow{a} S_2 \xrightarrow{a} S_4 \xrightarrow{a} S_2 \xrightarrow{a} S_4$$

Not accepted by w because S_4 is not a final state.

III. b) $w = ababab$

$$S_0 \xrightarrow{a} S_2 \xrightarrow{b} S_3 \xrightarrow{a} S_3 \xrightarrow{b} S_3 \xrightarrow{a} S_3 \xrightarrow{b} S_3$$

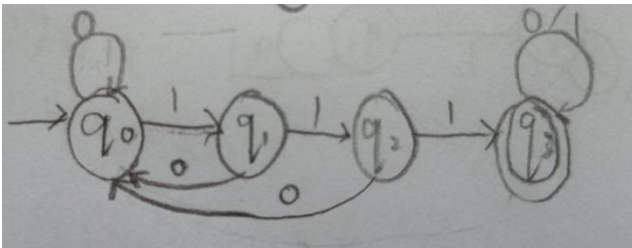
Accepted by w because S_3 is final state.

QUESTION 3

- I. $S = \{S_0, S_1, S_2, S_3, S_4, S_5\}$
 $I = \{0, 1\}$
 $q_0 = S_0$
 $F = \{S_0, S_1, S_5\}$

$S_0 \xrightarrow{0} S_0 \xrightarrow{0} S_0 \xrightarrow{1} S_1 \xrightarrow{1} S_2 \xrightarrow{1} S_3 \xrightarrow{0} S_5 \xrightarrow{1} S_5 \xrightarrow{1} S_5 \xrightarrow{0} S_4 \xrightarrow{0} S_4$

0011101100 is not accepted by M because S_4 is not the final state.



II.

QUESTION 4

Let $M = \{S, I, 0, q_0, f_s, f_o\}$

$S = \{\text{WANDER, EVADE, ATTACK}\}$

$I = \{\text{not enemies, enemies \& not vulnerable, enemies \& vulnerable}\}$

$O = \{\text{shoot, not shoot}\}$

$q_0 = \text{WANDER}$

Let WANDER = W

EVADE = EV

ATTACK = A

not enemies = e'

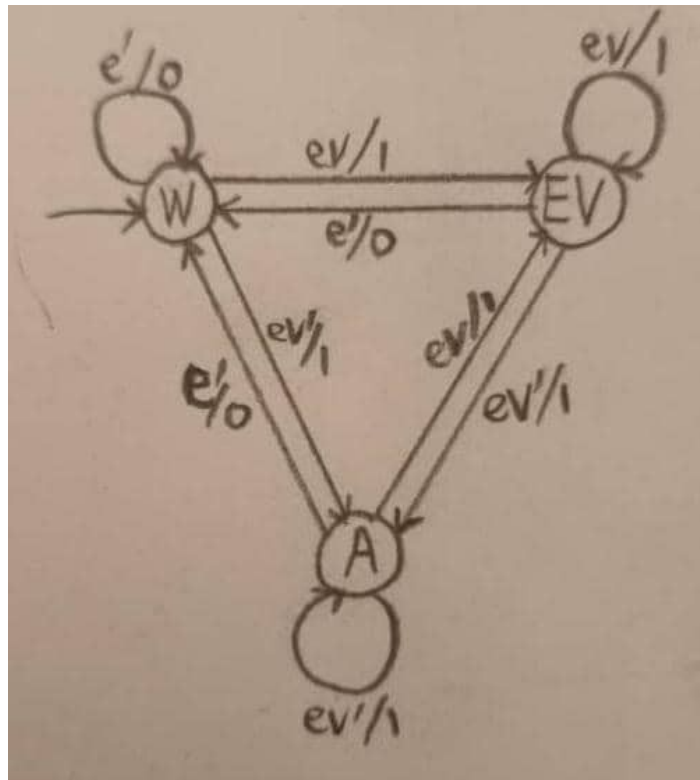
enemies & not vulnerable = ev'

enemies & vulnerable = ev

shoot = 1

not shoot = 0

	f_s			f_o		
	e'	ev'	ev	e'	ev'	ev
W	W	A	EV	0	1	1
EV	W	A	EV	0	1	1
A	W	A	EV	0	1	1



QUESTION 5

