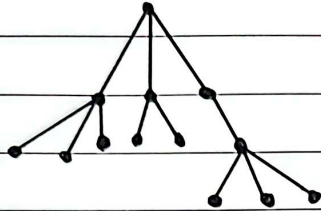


Assignment 4

Group Members:

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1. (a)



(b) Edges = 12

Vertices = 13

(middle node)

(c) No, because third node doesn't have 3 children

(d) Yes, because all leaves are at level 3 or 2

2 (a) a, h and i

(b) l, g

(c) 4

(d) $j = 1.2.1$

(e) Preorder: a, b, d, h, n, o, i, e, j, k, c, f, l, m, g

Inorder: n, h, o, d, i, b, j, e, k, a, l, f, m, c, g

Postorder: n, o, h, i, d, j, k, e, b, l, m, f, g, c, a

$$3. 2 + (2 * 3) + (4/2)$$

$$= 2 + 6 + 2$$

$$= 10$$

$$4. \quad m=4$$

$$i=1000$$

$$l=?$$

$$n=?$$

$$n=mi+1$$

$$=4(1000)+1$$

$$=8001$$

$$l=n-i$$

$$=8001-1000$$

$$=7001$$

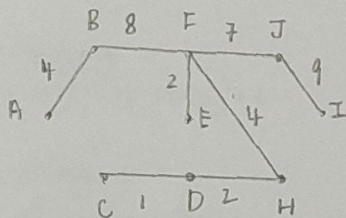
QUESTION 5

a) It is incorrect because it does not obey Kruskal's algorithm.

It form a cyclic and incomplete graph where AB and I are not connected to CDEFHJ and CDEFHJ form a cyclic.

b)

edge	weight	cycle (Y/N)	select (Y/N)
CD	1	N	Y
DH	2	N	Y
EF	2	N	Y
AB	4	N	Y
FH	4	N	Y
DE	6	Y	N
CE	7	Y	N
FJ	7	N	Y
BF	8	N	Y
AC	8	Y	N
IJ	9	N	Y
HI	10	Y	N
BC	11	Y	N
HJ	14	Y	N

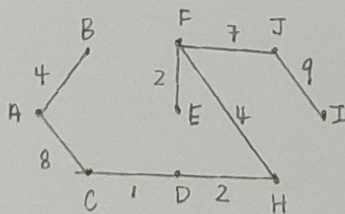


$$\text{Total weight} = 1 + 2 + 2 + 4 + 4 + 7 + 8 + 9 = 37 \text{ meter}$$

$$\text{Total cost} = 37 \times \text{RM}100$$

$$= \text{RM}3700.00$$

c)



$$\text{Total weight} = 1 + 2 + 2 + 4 + 4 + 7 + 8 + 9 = 37 \text{ meter.}$$

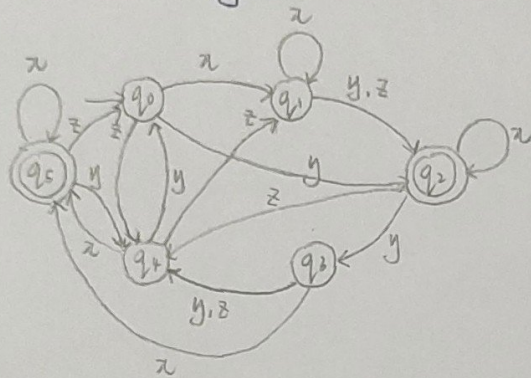
Yes, there is possibility, more than one distinct MST obtained for the Figure 3. The network have equal minimum weight to the network obtained in (b) and it also obey Kruskal's algorithm yet it is non-cyclic and complete graph.

Question 6

(i) Transition table:

q_i	x	y	z
q_0	q_1	q_2	q_4
q_1	q_1	q_2	q_2
q_2	q_2	q_3	q_4
q_3	q_5	q_4	q_4
q_4	q_5	q_0	q_1
q_5	q_5	q_4	q_0

transition diagram:

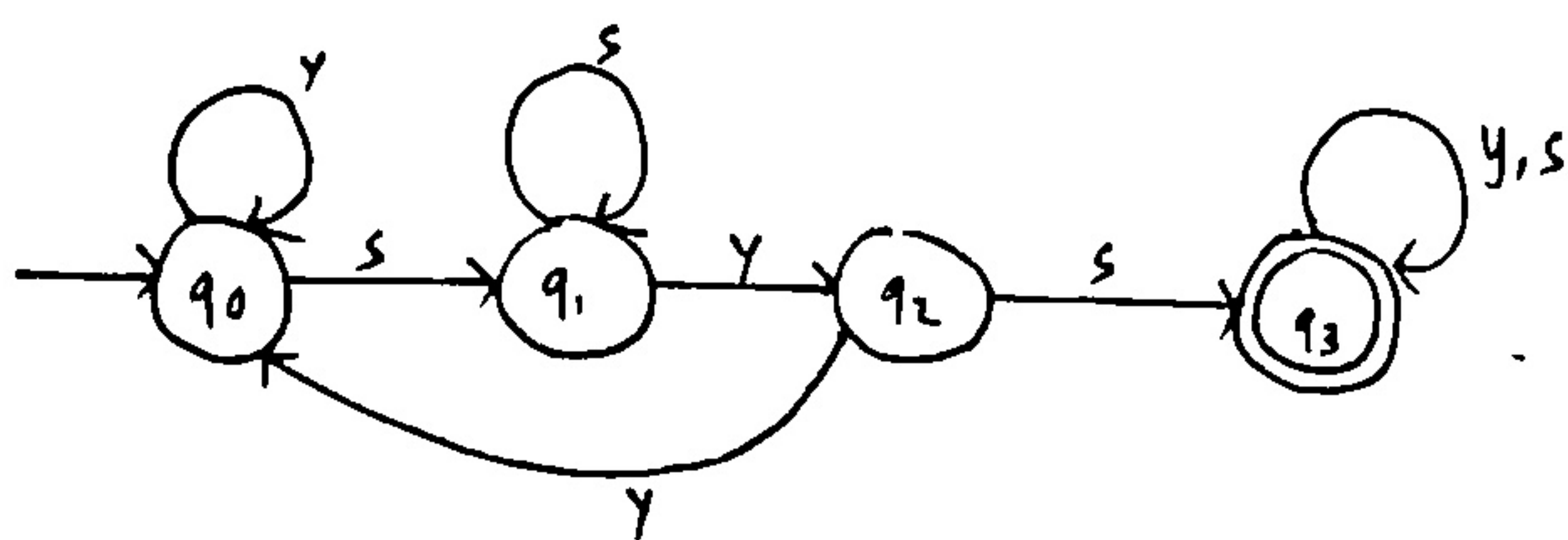


(ii) minimum string = y
minimum length of string = 1

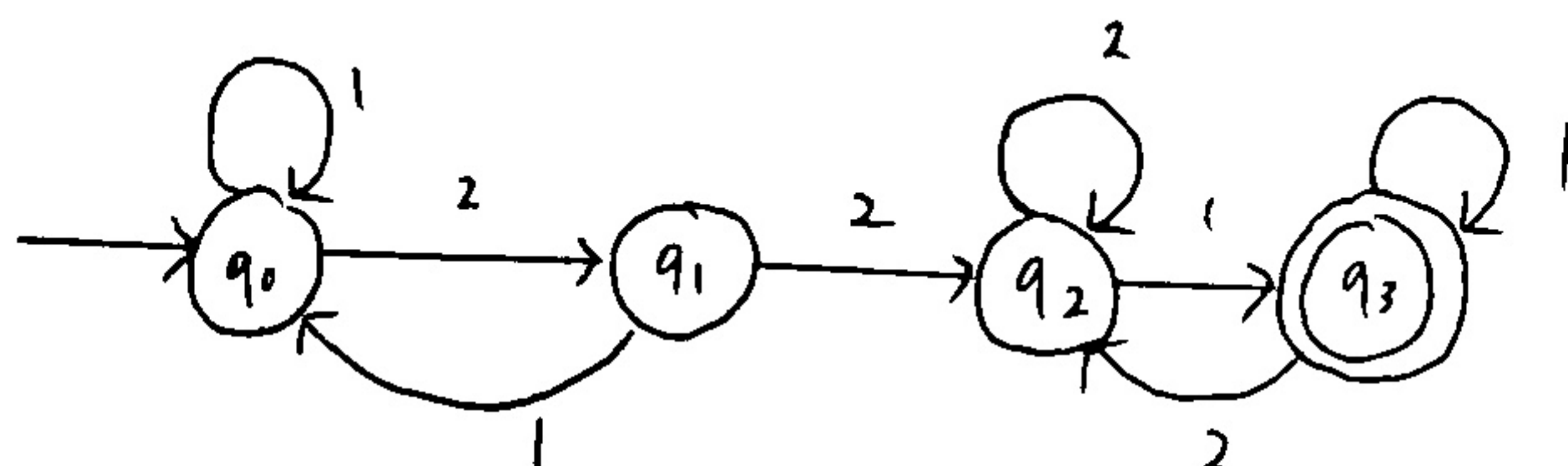
(iii) minimum string = y
sequence of configuration:

$$q_0 \xrightarrow{y} q_2$$

7. (i)



(ii)



8. (a)

$$S = \{q_0, q_1, q_2, q_3\}$$

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

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

$$q_0 = \{q_0\}$$

f_s = state transition function

f_o = output function

f_s	f_s		f_o	
	a	b	a	b
q_0	q_1	q_3	1	0
q_1	q_1	q_2	0	1
q_2	q_1	q_2	0	1
q_3	q_3	q_3	1	0

(b)

$$q_0 \xrightarrow[1]{a} q_1 \xrightarrow[0]{a} q_1 \xrightarrow[0]{a} q_1 \xrightarrow[1]{b} q_2 \xrightarrow[1]{b} q_2 \xrightarrow[1]{b} q_2$$

output string = 10011

output = 1

\therefore output = 1 , accepted

9 States

- S_1 Traffic light shows green light with barriers at the top position
- S_2 Traffic light shows yellow light and lowering down the barriers
- S_3 Traffic light shows red light with barriers at the bottom position
- S_4 Traffic light shows red light and raising up the barriers

Inputs

- A No signal from any sensors
- B Left first signal
- C The arm barriers are not at the bottom position
- D The arm barriers are at the bottom position
- E Left second signal
- F Right first signal
- G Right second signal
- H The arm barriers are not at the top position
- I The arm barriers are at the top position.

Outputs

- 0 Nothing happened
- 1 Lower the arm barriers
- 2 Raise the arm barriers

	f_s									f_o								
	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I
S_1	S_1	S_2	S_1	S_1	S_1	S_1	S_1	S_1	S_1	0	1	0	0	0	0	0	0	0
S_2	S_2	S_2	S_2	S_3	S_2	S_2	S_2	S_2	S_2	0	0	1	0	0	0	0	0	0
S_3	S_2	S_3	S_3	S_3	S_2	S_3	S_4	S_3	S_3	0	0	0	0	0	0	2	0	0
S_4	S_4	S_4	S_4	S_4	S_4	S_4	S_4	S_4	S_1	0	0	0	0	0	0	0	2	0

$A/0, C/0, D/0, E/0, F/0, G/0, H/0, I/0$
 $A/0, B/0, C/1, E/0, F/0, G/0, H/0, I/0$
 $A/0, B/0, C/0, D/0, E/0, F/0, H/0, I/0$

