

# ASSIGNMENT 4 DISCRETE STRUCTURE

LUBNA AL HANNI BINTI (A23CS0107)

LAM YOKO YU (A23CS0233)

LIM YU HAN (A23CS0241)

## Question 1

1. a)  $\{A, 1, B, 5, C, 6, D, 9, F, 11, G, 10, D, 7, E, 8, G, 12, H, 14, I, 13, H, A, A, 2, K, 3, J, 15, I\}$

- The guard will not back at guard house at the end.

because Euler circuit cannot be formed since vertex A and I have odd degrees. Only Euler Trail can be formed with start with A and end with I without repeating edges.

- b) Circuit of the neighborhood <sup>that</sup> start and end with A:

$\{A, 1, B, 5, C, 6, D, 9, F, 11, G, 10, D, 7, E, 8, G, 12, H, 13, I, 15, J, 3, K, 2, A\}$

Based on the ~~the~~ circuit, Hamiltonian circuit is not possible since ~~the~~ vertex G and D are repeated, because Hamiltonian circuit cannot have repeated vertex.

## Assignment 4 : DISCRETE STRUCTURE

## Question 2

a)	S	N	L(A)	L(B)	L(C)	L(D)	L(E)	L(F)
	{ }	{A, B, C, D, E, F}	$\infty$	$\infty$	$\infty$	$\infty$	$\infty$	$\infty$
	{B}	{A, C, D, E, F}	3		$\infty$	6	$\infty$	$\infty$
	{B, C}	{A, D, E, F}	$\infty$			5	5	$\infty$
	{B, C, A}	{D, E, F}				$\infty$	5	8
	{B, C, A, D}	{E, F}					$\infty$	8
	{B, C, A, D, E}	{F}						$\infty$
	{B, C, A, D, E, F}	{ }						

b) Shortest path :  $B \rightarrow C \rightarrow E \rightarrow F$ 

Minimum Hours : 7 hours

## Question 3

a) Ancestors of p : p, n, i, d, a

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



## Assignment 4: DISCRETE STRUCTURE.

## Question 4

a) ~~Beam~~ Because:

- A, B and I are not connected with others.
- C, E, F, H, D form a circuit.

b)	edge	weight	form a circuit?	can select?
	CD	1	X	✓
	DH	2	X	✓
	EF	2	X	✓
	FH	4	X	✓
	AB	4	X	✓
	DE	6	✓	X
	FJ	7	X	✓
	CE	7	✓	X
	AC	8	X	✓
	BF	8	✓	X
	JI	9	X	✓
	IH	10	✓	X
	BC	11	✓	X
	JH	14	✓	X

Total length #

$$= 1 + 2 + 2 + 4 + 4 + 7 + 8 + 9$$

$$= 37 \text{ m}$$

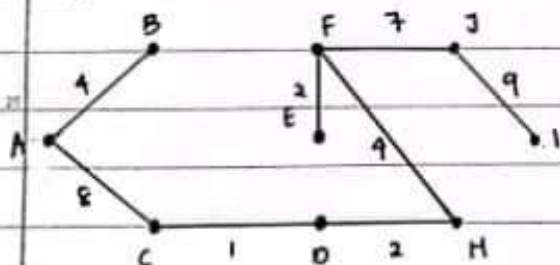
Total cost :

$$= 37 \text{ m} \times \text{RM}100$$

$$= \text{RM } 37,000$$

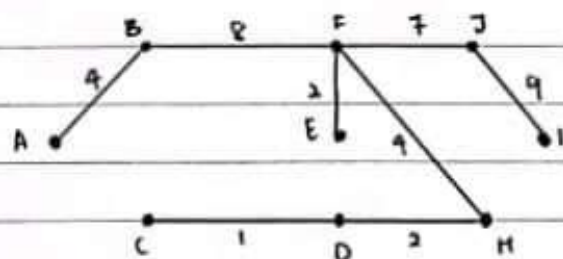
c) Yes, ~~bea~~ because total ~~tea~~-minimum length are same but <sup>has</sup> different paths.

Network 1:



Total length: 37 m

Network 2:



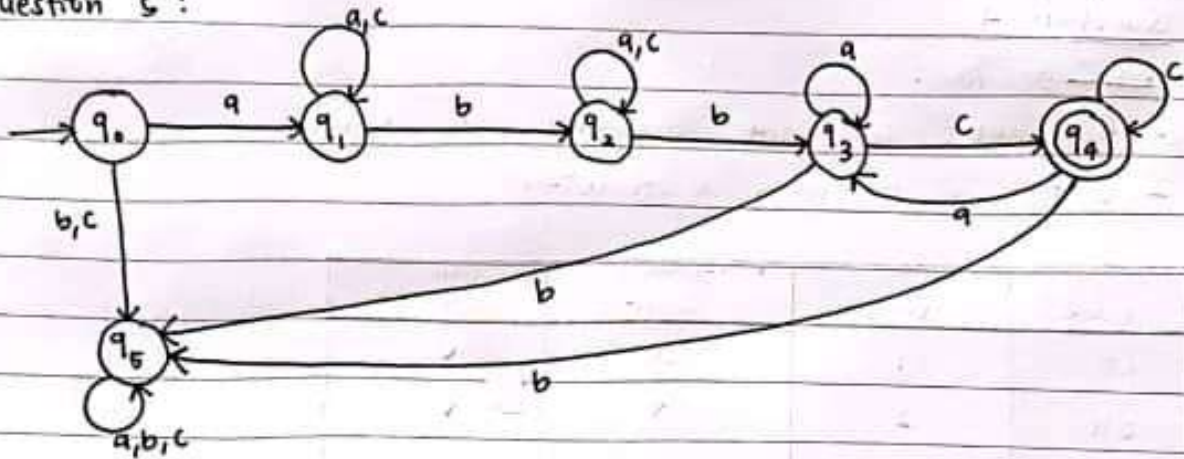
Total length: 37 m

Ref:

Date:

## Assignment 4 : DISCRETE STRUCTURE

Question 5 :

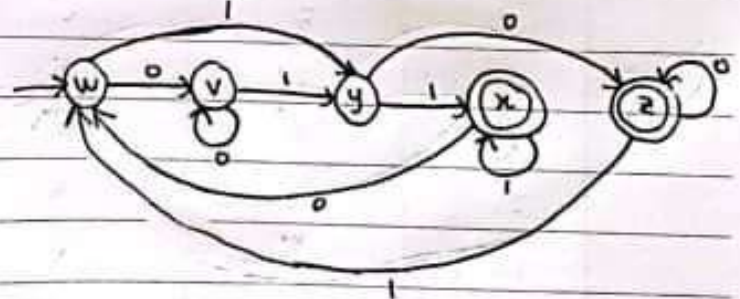


Question 6

state diagram :

a)  $S = \{v, w, x, y, z\}$

Initial state = w



b) Input string : 0111

 $w \xrightarrow{0} v \xrightarrow{1} y \xrightarrow{1} x \xrightarrow{1} x$

## Assignment 4 : Discrete Structure

## Question 7.

state : GF = Ground Floor

F1 = Floor 1

F2 = Floor 2

Input : 0 = ground floor

1 = First floor

2 = Second floor

output: U : goes up

D : goes down

N : nothing happen.

Transition Table :

state	$f_s$			$f_o$		
	0	1	2	0	1	2
GF	GF	F1	F2	N	U	U
F1	GF	F1	F2	D	N	U
F2	GF	F1	F2	D	D	N