UTM

UNIVERSITI TEKNOLOGI MALAYSIA

DISCRETE STRUCTURE

SECI 1013 (SECTION 9)

ASSIGNMENT 4

GROUP 14

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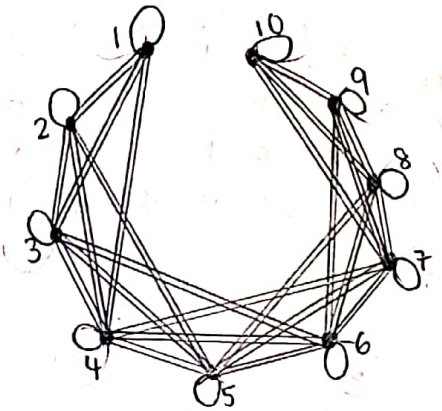
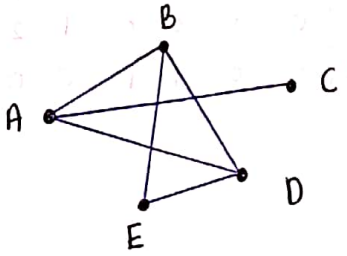
Tutorial 4

1)



no of edges = 58

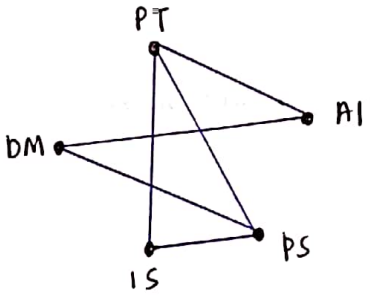
2) a)



Adjancecy Matrix =

	A	B	C	D	E
A	0	1	1	1	0
B	1	0	0	1	1
C	1	0	0	0	0
D	1	1	0	0	1
E	0	1	0	1	0

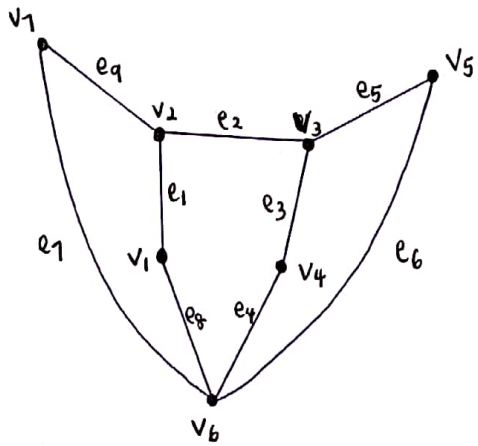
b)



Adjancy Matrix =

	DM	PT	AI	PS	IS
DM	0	0	1	1	0
PT	0	0	1	1	1
AI	1	1	0	0	0
PS	1	1	0	0	1
IS	0	1	0	1	0

3)



4) Graph G

Adjancy Matrix =

	V_1	V_2	V_3	V_4
V_1	1	0	2	0
V_2	0	0	1	0
V_3	2	1	0	2
V_4	0	0	2	0

Incidence Matrix =

	e_1	e_2	e_3	e_4	e_5	e_6
V_1	2	1	1	0	0	0
V_2	0	0	0	1	0	0
V_3	0	1	1	1	1	1
V_4	0	0	0	0	1	1

Graph H

Adjancy Matrix =

	V_1	V_2	V_3	V_4
V_1	1	0	0	0
V_2	0	1	1	2
V_3	0	1	1	0
V_4	0	2	0	0

Incidence Matrix =

	e_1	e_2	e_3	e_4	e_5	e_6
V_1	2	0	0	0	0	0
V_2	0	2	1	1	1	0
V_3	0	0	0	0	1	2
V_4	0	0	1	1	0	0

5) a) G_1 and G_2 are isomorphic
- both have same numbers of vertices and edges

b) H_1 and H_2 are not isomorphic
- H_1 have 1 vertex of degree 5 but H_2 does not have

6) a) trail
b) walk
c) trivial walk
d) circuit / cycle
e) closed walk
f) path

7) a) 3
b) 9
c) infinity

8) Graph (a) has Euler circuit :

$v_1, e_1, v_2, e_2, v_5, e_3, v_2, e_4, v_3, e_5, v_4, e_7, v_5, e_6, v_4, e_8, v_1$

Graph (b) does not have Euler circuit :

- because not all vertex has even degree

9) Graph (a) has Euler path :

$u, v_1, v_0, v_7, u, v_2, v_3, v_4, v_2, v_6, v_4, w, v_6, v_5, w$

Graph (b) does not have Euler path

- because there are other vertex beside u and w that have odd degree

10) Graph (a) has Hamiltonian circuit :

$v_0, v_7, v_1, v_2, v_3, v_4, v_5, v_6, v_0$

Graph (b) does not have Hamiltonian

- because there is no way of not repeating other vertex when we want to go back to the start vertex to end.

11) $\ell = 100 - \frac{100-1}{3}$

$= 67$

12) a) a

b) b, e, g, n, d, h, j

c) c, f, k, l, m, r, s, o, i, p, q

d) r, s

e) b

f) l, m

g) a, d, j

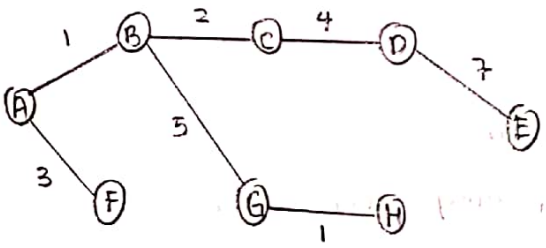
h) e, k, l, m, f, g, n, r, s

13) Preorder : a, b, e, k, l, m, f, g, n, r, s, c, d, h, o, i, j, p, q

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

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

14)



Total weight = 1 + 1 + 2 + 3 + 4 + 5 + 7

= 23

15)

No.	S	N	L(M)	L(N)	L(O)	L(P)	L(Q)	L(R)	L(S)	L(T)
0	{}	{M, N, O, P, Q, R, S, T}	0	∞	∞	∞	∞	∞	∞	∞
1	{M}	{N, O, P, Q, R, S, T}	0	4	∞	2	∞	5	∞	∞
2	{M, P}	{N, O, Q, R, S, T}	0	4	∞	2	6	5	5	∞
3	{M, P, N}	{O, Q, R, S, T}	0	4	10	2	6	5	5	∞
4	{M, P, N, R}	{O, Q, S, T}	0	4	7	2	6	5	5	6
5	{M, P, N, R, S}	{O, Q, T}	0	4	7	2	6	5	5	6
6	{M, P, N, P, S, T}	{O, Q}	0	4	7	2	6	5	5	6

Shortest path from M to T is M → R → T

Total length is 6