



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING

SECI1013

DISCRETE STRUCTURE

ASSIGNMENT 3

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1) a) $k=2$

$$n = m(k-1) + 1$$

$$n = 101(2-1) + 1$$

$$= 102 \text{ people}$$

b) $m=5, k=6$

$$n = m(k-1) + 1$$

$$= 5(6-1) + 1$$

$$= 26 \text{ people}$$

2) a) $P(B_1) = \frac{70}{100}$

$$= 0.7$$

b) $P(B_2) = \frac{30}{100}$

$$= 0.3$$

c) $P(A|B_1) = \frac{20}{100}$

$$= 0.2$$

d) $P(A|B_1) = \frac{P(A \cap B_1)}{P(B_1)}$

e) $P(A|B_2) = \frac{P(A \cap B_2)}{P(B_2)}$

$$\begin{aligned} P(A \cap B_1) &= P(B_1) \times P(A|B_1) \\ &= 0.7 \times 0.2 \\ &= 0.14 \end{aligned}$$

$$\begin{aligned} P(A \cap B_2) &= P(B_2) \times P(A|B_2) \\ &= 0.3 \times 0.4 \\ &= 0.12 \end{aligned}$$

f) $P(A) = P(A \cap B_1) + P(A \cap B_2)$

$$= 0.14 + 0.12$$

$$= 0.26$$

g) $P(B_1|A) = \frac{P(A|B_1)P(B_1)}{P(A|B_1)P(B_1) + P(A|B_2)P(B_2)}$

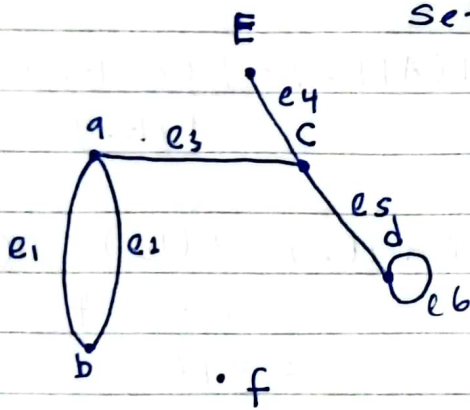
$$= \frac{0.20(0.7)}{0.20(0.7) + 0.4(0.3)}$$

$$= \frac{0.14}{0.14 + 0.12}$$

$$= \frac{0.14}{0.26}$$

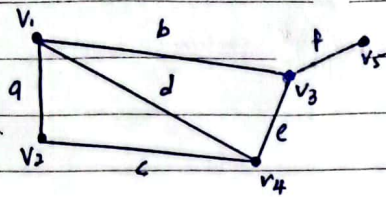
$$= 0.5385$$

3. a) Vertices = dot of graph (c)
 b) Edges = The connection and lines between vertices (e_1)
 c) Adjacent vertices = Two vertices are adjacent if they are connected directly by an edge ((c, E))
 d) Incident edge: Have vertices on each of its endpoints (a, c, E)
 Isolated points
 e) Incident vertex: Vertices which does not connected by any edge. (f)
 f) Loop: edge with the endpoint (e_6)
 g) parallel edges: two or more edges with same set of points. (e_1, e_2)



Question 4

$$G = \{V, E\} \quad V = \{V_1, V_2, V_3, V_4, V_5\} \quad E = \{a, b, c, d, e, f\}$$



$$d(V_1) = 3$$

$$d(V_4) = 3$$

$$d(V_2) = 2$$

$$d(V_5) = 1$$

$$d(V_3) = 3$$

Question 5

i) Incidence Matrix

	a	b	c	d	e	f	g	h	i	k
1	1	2	1	1	0	0	0	0	0	0
2	0	0	0	0	1	0	0	0	0	0
3	1	0	1	0	0	1	1	1	0	0
4	0	0	0	1	1	1	0	0	1	0
5	0	0	0	0	0	0	0	1	0	1
6	0	0	0	0	0	0	1	0	1	1

ii) adjacency Matrix

	1	2	3	4	5	6
1	1	0	2	1	0	0
2	0	0	0	1	0	0
3	2	0	0	1	1	1
4	1	1	1	0	0	1
5	0	0	1	0	0	1
6	0	0	1	1	1	0

Question 6.

1) Count the Vertices

• Graph Y = 6 vertices

• Graph Z = 6 vertices \therefore same number of vertices.

2) Count the edges

• Graph Y = 9 edges

• Graph Z = 9 edges \therefore same number of edges.

3) Find the degree of each vertex.

• Graph Y: 2 vertex has 4 degrees, 2 vertex has 3 degrees and 2 vertex has 2 degrees.

• Graph Z: 2 vertex has 4 degrees, 2 vertex has 3 degrees and 2 vertex has 2 degrees.

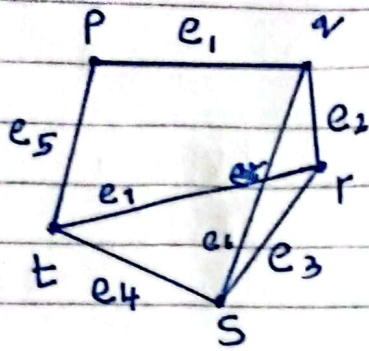
 \therefore corresponding number of degrees for each vertex.

4) Define function

 $f: Y \rightarrow Z$, where $Y = \{A, B, C, D, E, F\}$, $Z = \{1, 2, 3, 4, 5, 6\}$ $f(A) = 6$ $f(B) = 5$ $f(C) = 4$ $f(D) = 3$ $f(E) = 2$ $f(F) = 1$

	A	B	C	D	E	F		6	5	4	3	2	1		
Yadj =	A	0	1	0	1	0	0	Zadj =	6	0	1	0	1	0	0
	B	1	0	0	1	1	1		5	1	0	0	1	1	1
	C	0	0	0	1	1	1		4	0	0	0	1	1	1
	D	1	1	1	0	0	1		3	1	1	1	0	0	1
	E	0	1	1	0	0	0		2	0	1	1	0	0	0
	F	0	1	1	1	0	0		1	0	1	1	1	0	0

7.



a) Path 1 = $\{p, t\}$

Path 2 = $\{p, q, s, t\}$

Path 3 = $\{p, q, r, t\}$

Path 4 = $\{p, q, r, s, t\}$

Path 5 = $\{p, q, s, r, t\}$

b) Trail 1 = $\{p, t\}$

Trail 2 = $\{p, t, s, q, r, t\}$

Trail 3 = $\{p, t, s, r, t\}$

Trail 4 = $\{p, q, r, s, t\}$

Trail 5 = $\{p, q, r, t\}$

c) Shortest = $\{p, t\}$

Longest = $\{p, q, r, s, t\}$

d) Shortest = $\{p, t\}$

Longest = $\{p, t, s, q, r, t\}$