



**UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

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**FACULTY OF COMPUTING**

**SEMESTER 1 2024/2025**

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**SECI 1013 DISCRETE STRUCTURE**

**SECTION 03**

**ASSIGNMENT 3**

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# Assignment 3 (Chapter 3 and 4)

$$1. P(M) = 3P(C)$$

$$P(C) = 2P(B)$$

$$P(B) = P(P)$$

$$P(M) + P(C) + P(B) + P(P) = 1$$

$$3P(C) + 2P(B) + P(B) + P(B) = 1$$

$$3(2P(B)) + 4P(B) = 1$$

$$6P(B) + 4P(B) = 1$$

$$10P(B) = 1$$

$$P(B) = \frac{1}{10}$$

$$P(P) = \frac{1}{10}$$

$$P(C) = 2\left(\frac{1}{10}\right) = \frac{2}{10} = \frac{1}{5}$$

$$P(M) = 3\left(\frac{1}{5}\right) = \frac{3}{5}$$

$$ii) P(M \cup B) = P(M) + P(B)$$

$$= \frac{3}{5} + \frac{1}{10}$$

$$= \frac{7}{10}$$

$$2. i) P(A \cup B) = P(A) + P(B)$$

$$= 0.4 + 0.5$$

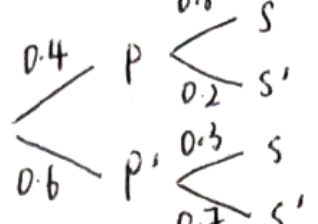
$$= 0.9$$

$$ii) P(A^c) = 1 - 0.4$$

$$= 0.6$$

$$iii) P(A^c \cap B) = P(B) = 0.5$$

$$3. \frac{1}{100} + \frac{1}{100} + \frac{1}{100} = \frac{3}{100} = 0.03$$

4.   $P(P') = (0.6 \times 0.3) + (0.6 \times 0.7)$   
 $= 0.6$

$$ii) P(P|S) = \frac{P(P \cap S)}{P(S)}$$

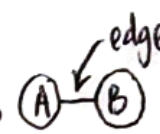
$$= \frac{0.4(0.8)}{0.4(0.8) + 0.6(0.3)}$$

$$= 0.64$$

$$5. \frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$$

## Chapter 4

i) a. points (A)

b. lines that connected 2 points (A) — (B) 

c. vertices that connected by an edge.

(A) — (B) means that A and B are adjacent vertices.

d. edge that connect 2 vertices.

(A) —<sup>e</sup> (B) means that e is incident to A and B.

e. vertices that doesn't connect with others

(A) — (B) (C) means that C is isolated vertex.

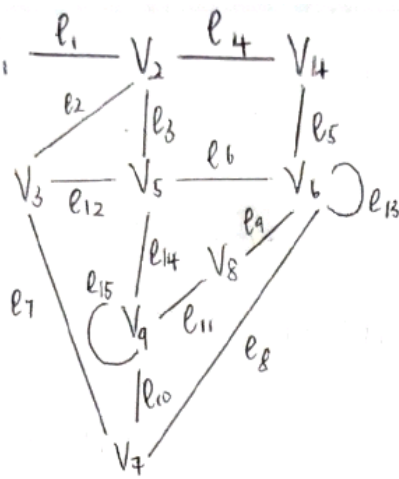
f. edge that start and end in one vertex.

(A) —<sup>e</sup> (A), means that edge e is a loop.

g. 2 edge connected with 2 same vertices.

(A) —<sup>e<sub>1</sub></sup> (B) —<sup>e<sub>2</sub></sup> (A), means that e<sub>1</sub> and e<sub>2</sub> are parallel edges.

2. a) i)  $d(V_1) = 1$   
 $d(V_2) = 4$   
 $d(V_3) = 3$   
 $d(V_4) = 2$   
 $d(V_5) = 4$   
 $d(V_6) = 6$   
 $d(V_7) = 3$   
 $d(V_8) = 2$   
 $d(V_9) = 5$



ii) adjacent matrix :

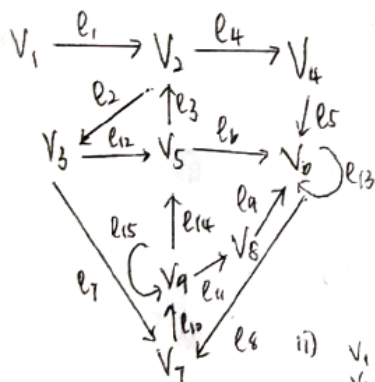
	$V_1$	$V_2$	$V_3$	$V_4$	$V_5$	$V_6$	$V_7$	$V_8$	$V_9$
$V_1$	0	1	0	0	0	0	0	0	0
$V_2$	1	0	1	1	1	0	0	0	0
$V_3$	0	1	0	0	1	0	1	0	0
$V_4$	0	1	0	0	0	1	0	0	0
$V_5$	0	1	1	0	0	1	0	0	1
$V_6$	0	0	0	1	1	1	1	1	0
$V_7$	0	0	1	0	0	1	0	0	1
$V_8$	0	0	0	0	0	1	0	0	1
$V_9$	0	0	0	0	1	0	1	1	1

ii) incident matrix :

	$e_1$	$e_2$	$e_3$	$e_4$	$e_5$	$e_6$	$e_7$	$e_8$	$e_9$	$e_{10}$	$e_{11}$	$e_{12}$	$e_{13}$	$e_{14}$	$e_{15}$
$V_1$	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
$V_2$	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
$V_3$	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0
$V_4$	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
$V_5$	0	0	1	0	0	1	0	0	0	0	0	1	0	1	0
$V_6$	0	0	0	0	1	1	0	1	1	0	0	0	2	0	0
$V_7$	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0
$V_8$	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
$V_9$	0	0	0	0	0	0	0	0	0	1	1	0	0	1	2

ii)

	$V_1$	$V_2$	$V_3$	$V_4$	$V_5$	$V_6$	$V_7$	$V_8$	$V_9$
In	0	2	1	1	2	4	2	1	2
Out	1	2	2	1	2	2	1	1	3



incident matrix :

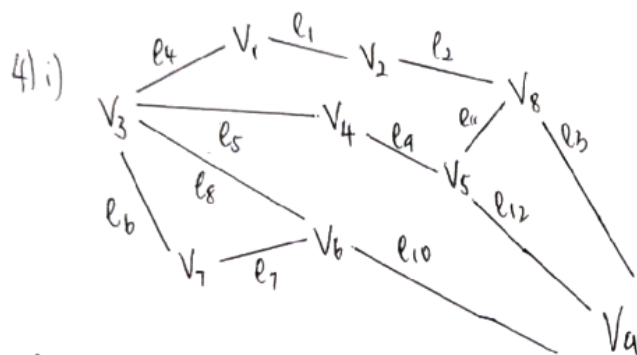
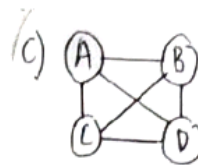
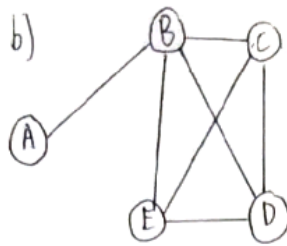
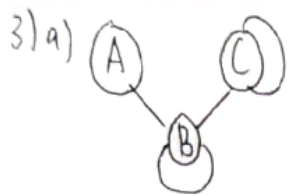
ii)

	$e_1$	$e_2$	$e_3$	$e_4$	$e_5$	$e_6$	$e_7$	$e_8$	$e_9$	$e_{10}$	$e_{11}$	$e_{12}$	$e_{13}$	$e_{14}$	$e_{15}$
$V_1$	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
$V_2$	-1	1	-1	1	0	0	0	0	0	0	0	0	0	0	0
$V_3$	0	-1	0	0	0	0	1	0	0	0	0	1	0	0	0
$V_4$	0	0	0	-1	1	0	0	0	0	0	0	0	0	0	0
$V_5$	0	0	1	0	0	1	0	0	0	0	-1	0	-1	0	0
$V_6$	0	0	0	0	-1	-1	0	1	-1	0	0	0	1	0	0
$V_7$	0	0	0	0	0	0	-1	-1	0	1	0	0	0	0	0
$V_8$	0	0	0	0	0	0	0	0	1	0	-1	0	0	0	0
$V_9$	0	0	0	0	0	0	0	0	0	-1	1	0	0	1	1

adjacent matrix :

ii)

	$V_1$	$V_2$	$V_3$	$V_4$	$V_5$	$V_6$	$V_7$	$V_8$	$V_9$
$V_1$	0	1	0	0	0	0	0	0	0
$V_2$	0	0	1	1	0	0	0	0	0
$V_3$	0	0	0	0	1	0	1	0	0
$V_4$	0	0	0	0	0	1	0	0	0
$V_5$	0	1	0	0	0	1	0	0	0
$V_6$	0	0	0	0	0	1	1	0	0
$V_7$	0	0	0	0	0	0	0	0	1
$V_8$	0	0	0	0	0	1	0	0	0
$V_9$	0	0	0	0	1	0	0	1	1



ii)  $\{V_1, e_1, V_2, e_2, V_6, e_3, V_9\}$

$\{V_1, e_1, V_2, e_3, V_8, V_{11}, V_5, e_{12}, V_9\}$

$\{V_1, e_1, V_2, e_3, V_8, V_{11}, V_5, e_9, V_4, e_5, V_3, e_6, V_7, e_7, V_6, e_{10}, V_9\}$

$\{V_1, e_4, V_3, e_8, V_6, e_{10}, V_9\}$

$\{V_1, e_1, V_2, e_2, V_6, e_{11}, V_5, e_9, V_4, e_5, V_3, e_8, V_6, e_{10}, V_9\}$

$\{V_1, e_4, V_3, e_5, V_4, e_9, V_5, e_{11}, V_6, e_3, V_9\}$

$\{V_1, e_{11}, V_3, e_5, V_4, e_9, V_5, e_{12}, V_9\}$

$\{V_1, e_4, V_3, e_6, V_7, e_7, V_6, e_8, V_3, e_5, V_4, e_9, V_5, e_{12}, V_9\}$

$\{V_1, e_4, V_3, e_8, V_6, e_7, V_7, e_6, V_3, e_5, V_4, e_9, V_5, e_{12}, V_9\}$

5 a)  $d(A) = 4$  No. Since all the degrees

$d(B) = 2$  are even.

$d(C) = 4$

$d(D) = 2$

$d(E) = 2$

$d(F) = 4$

b) Euler circuit  $= \{A, B, C, D, F, C, A, F, E, A\}$

c) Hamilton circuit  $= \{A, B, C, D, F, E, A\}$

d) Euler circuit passes through edge exactly one but Hamilton doesn't need to connect all the edges.

i)  $\{V_1, e_1, V_2, e_2, V_6, e_3, V_9\}$

$\{V_1, e_1, V_2, e_3, V_8, V_{11}, V_5, e_{12}, V_9\}$

$\{V_1, e_1, V_2, e_3, V_8, V_{11}, V_5, e_9, V_4, e_5, V_3, e_6, V_7, e_7, V_6, e_{10}, V_9\}$

$\{V_1, e_4, V_3, e_8, V_6, e_{10}, V_9\}$

$\{V_1, e_1, V_2, e_2, V_6, e_{11}, V_5, e_9, V_4, e_5, V_3, e_8, V_6, e_{10}, V_9\}$

$\{V_1, e_4, V_3, e_5, V_4, e_9, V_5, e_{11}, V_6, e_3, V_9\}$

$\{V_1, e_{11}, V_3, e_5, V_4, e_9, V_5, e_{12}, V_9\}$

iii) and iv)

shortest:  $\{V_1, e_1, V_2, e_2, V_6, e_3, V_9\}$

$\{V_1, e_4, V_3, e_8, V_6, e_{10}, V_9\}$

longest:  $\{V_1, e_1, V_2, e_2, V_6, e_{11}, V_5, e_9, V_4, e_5, V_3, e_6, V_7, e_7, V_6, e_{10}, V_9\}$