PART OF THE UNIVERSITY
OF WOLLONGONG AUSTRALIA
GLOBAL NETWORK

**School of Computing & Creative Media**

**Department of Computing**

Bachelor of Software Engineering (Hons)
Bachelor of Computer Science (Hons)

# Discrete Mathematics
**XBCS1103N**
**July / September 2023 Semester**
**Group Assignment 2**

**15%**

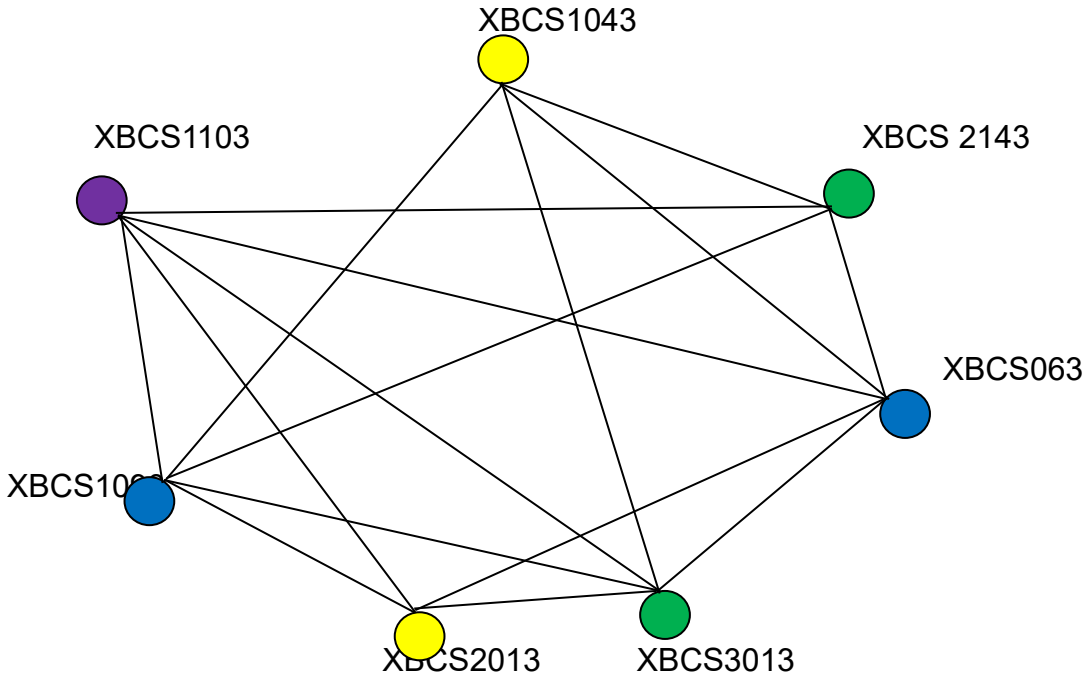
**INSTRUCTIONS:**

1. This is a group assignment, form a group of 2 members.
2. The assignment due date is 1st December 2023 (week 12), 4pm.

Name: Nicholas Teoh Jenn Zhen 0133311

Name: Lee Chong Yu 0136648

1)




| | 1043 | 1103 | 2143 | 1093 | 1063 | 2013 | 3013 |
|---|---|---|---|---|---|---|---|
| 1043 | ---------- | 0 | 1 | 1 | 1 | 0 | 1 |
| 1103 | 0 | ---------- | 1 | 1 | 1 | 1 | 1 |
| 2143 | 1 | 1 | ---------- | 1 | 1 | 0 | 0 |
| 1093 | 1 | 1 | 1 | ---------- | 0 | 1 | 1 |
| 1063 | 1 | 1 | 1 | 0 | ---------- | 1 | 1 |
| 2013 | 0 | 1 | 1 | 1 | 1 | ---------- | 1 |
| 3013 | 1 | 1 | 0 | 1 | 1 | 1 | ---------- |

| **SUBJECT** | **PAIR** |
|---|---|
| XBCS1043 | XBCS2143, XBCS1093, XBCS1063, XBCS3013 |
| XBCS1103 | XBCS2143, XBCS1093, XBCS1063, XBCS2013, XBCS3013 |
| XBCS2143 | XBCS1043, XBCS1103, XBCS1093, XBCS1063 |
| XBCS1093 | XBCS1043, XBCS1103, XBCS2143, XBCS2013, XBCS3013 |
| XBCS1063 | XBCS1043, XBCS1103, XBCS2143, XBCS2013, XBCS3013 |
| XBCS2013 | XBCS1103, XBCS1093, XBCS1063, XBCS3013 |
| XBCS3013 | XBCS1043, XBCS1103, XBCS1093, XBCS1063, XBCS2013 |

1) Time slots:

Time slot 1: XBCS1043, XBCS2013

Time slot 2: XBCS1103

Time slot 3: XBCS2143, XBCS3013

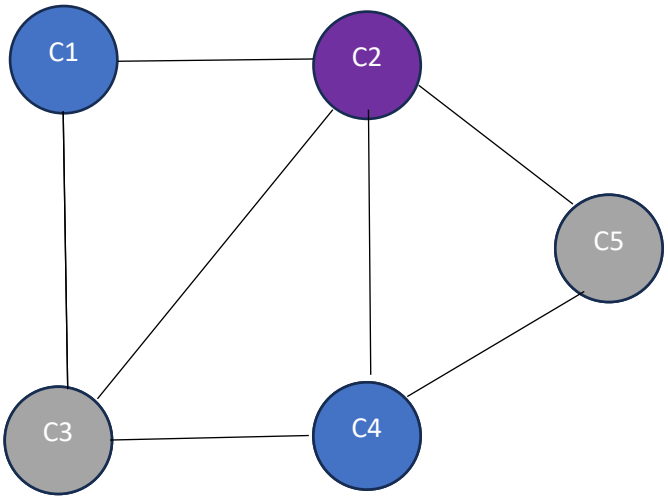
Time slot 4: XBCS1093, XBCS1063

2)

Time slot 1: C1 and C4

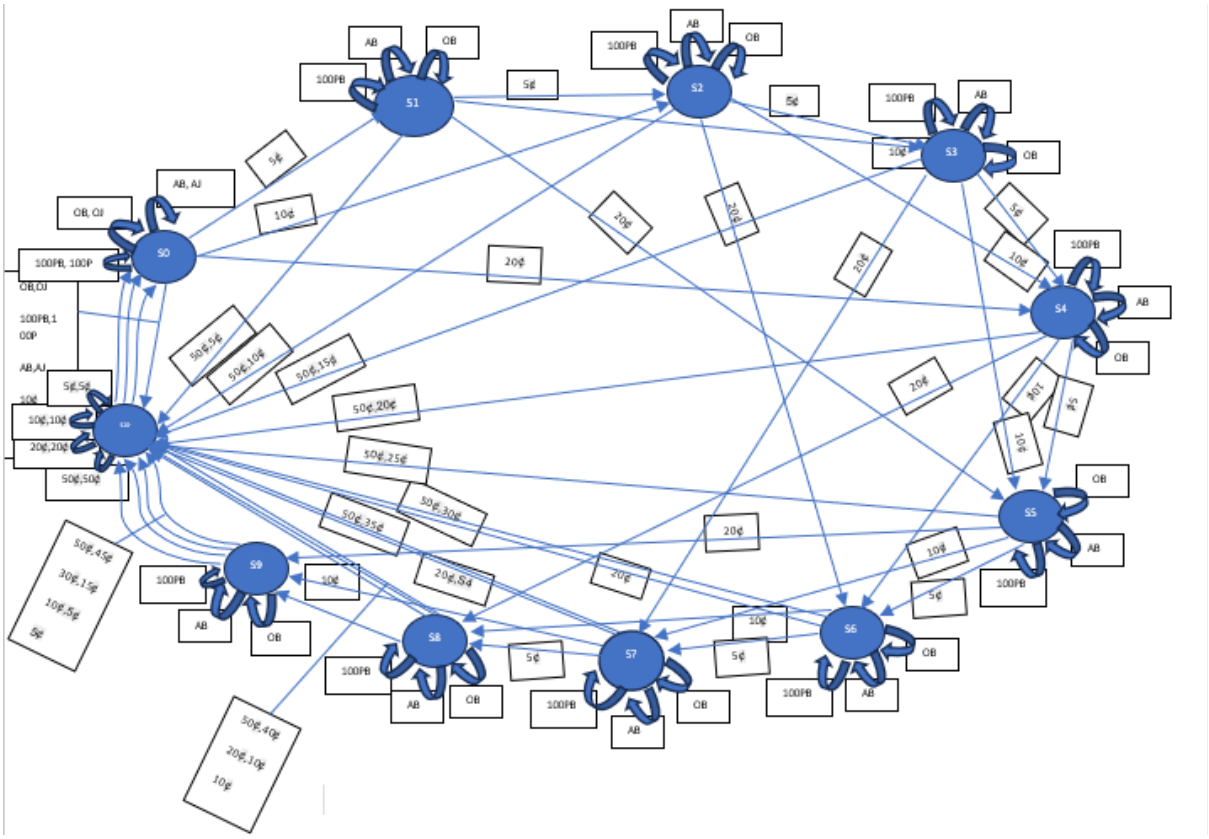
Time slot 2: C3 and C5

Time slot 3: C2



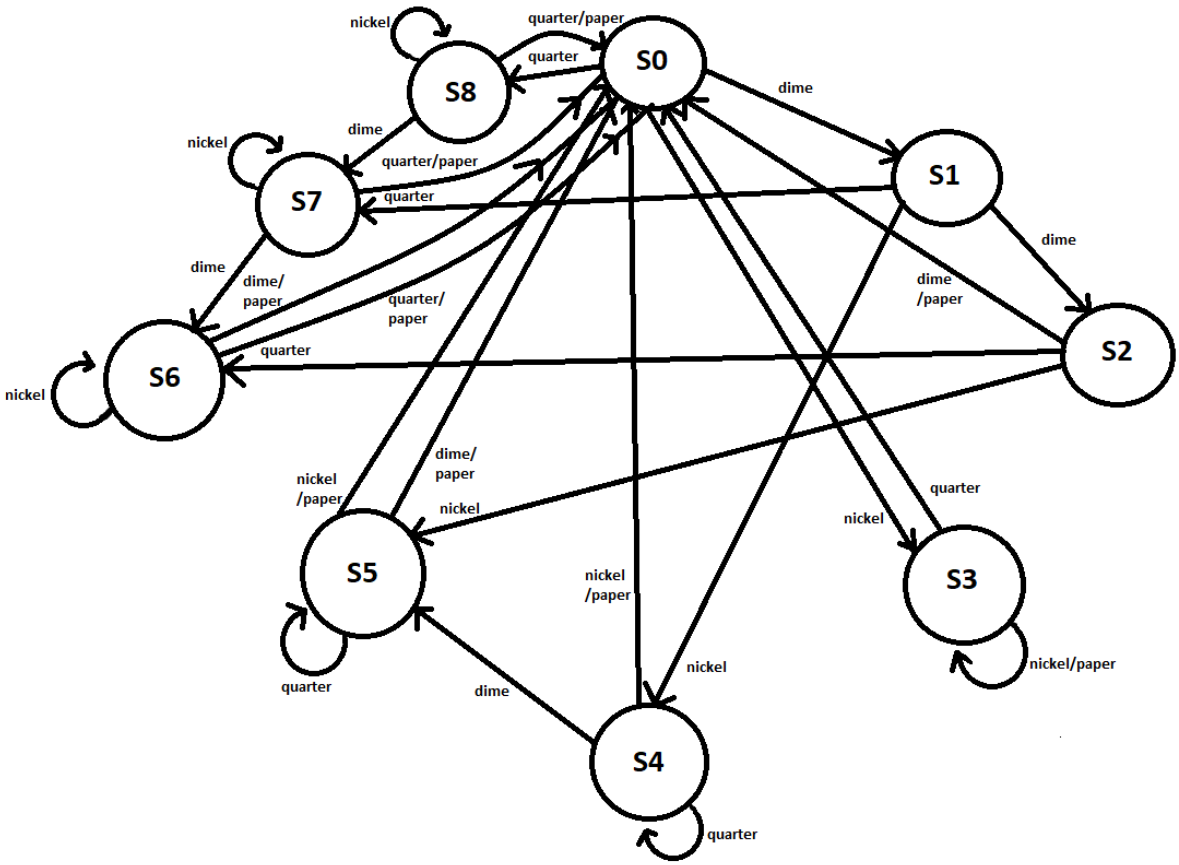
3 )

| **STATE** | 5¢ | 10 ¢ | 20 ¢ | 50 ¢ | **100 PLUSB** | **AB** | **OB** | 5 ¢ | 10 ¢ | 20 ¢ | 50 ¢ | **100 PLUSB** | **AB** | **OB** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S0 | S1 | S2 | S4 | S10 | S0 | S0 | S0 | - | - | - | | - | - | - |
| S1 | S2 | S3 | S5 | S10 | S1 | S1 | S1 | - | - | - | 5¢ | - | - | - |
| S2 | S3 | S4 | S6 | S10 | S2 | S2 | S2 | - | - | - | 10 ¢ | - | - | - |
| S3 | S4 | S5 | S4 | S10 | S3 | S3 | S3 | - | - | - | 15 ¢ | - | - | - |
| S4 | S5 | S6 | S7 | S10 | S4 | S4 | S4 | - | - | - | 20 ¢ | - | - | - |
| S5 | S6 | S7 | S8 | S10 | S5 | S5 | S5 | - | - | - | 25 ¢ | - | - | - |
| S6 | S7 | S8 | S9 | S10 | S6 | S6 | S6 | - | - | - | 30 ¢ | - | - | - |
| S7 | S8 | S9 | S10 | S10 | S7 | S7 | S7 | - | - | 5¢ | 35 ¢ | - | - | - |
| S8 | S9 | S10 | S10 | S10 | S8 | S8 | S8 | - | - | 10 ¢ | 40 ¢ | - | - | - |
| S9 | S10 | S10 | S10 | S10 | S9 | S9 | S9 | - | 5¢ | 15 ¢ | 45 ¢ | - | - | - |
| S10 | S10 | S10 | S10 | S10 | S0 | S0 | S0 | 5 ¢ | 10 ¢ | 20 ¢ | 50 ¢ | 100 plus | Apple juice | Orange juice |

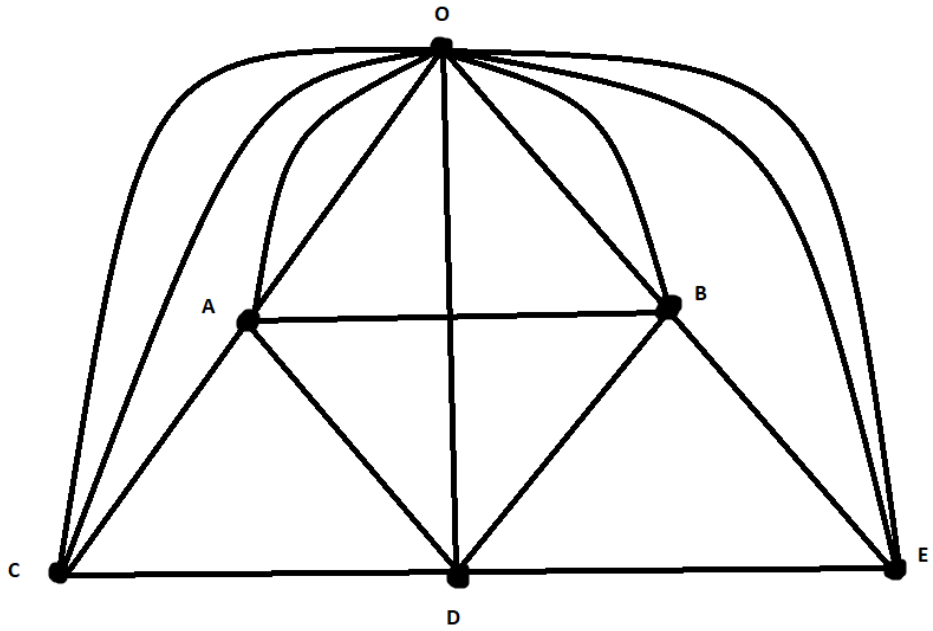

S0
S1
S2
S3
S4
S5
S6
S7
S8
S9
AB
OB
100PB
5¢
10¢
20¢
50¢,5¢
50¢,10¢
50¢,15¢
50¢,20¢
50¢,25¢
50¢,30¢
50¢,35¢
20¢,S4
50¢,40¢
20¢,10¢
50¢,45¢
30¢,15¢
10¢,5¢

4)

| State | nickel | dime | quarter | nickel | dime | quarter |
|---|---|---|---|---|---|---|
| **S0** | S3 | S1 | S8 | - | - | - |
| **S1** | S4 | S2 | S7 | - | - | - |
| **S2** | S5 | S0 | S6 | - | Newspaper | - |
| **S3** | S3 | S4 | S0 | Newspaper | - | - |
| **S4** | S0 | S5 | S4 | Newspaper | - | - |
| **S5** | S0 | S0 | S5 | Newspaper | Newspaper | - |
| **S6** | S6 | S0 | S0 | - | Newspaper | Newspaper |
| **S7** | S7 | S6 | S0 | - | - | Newspaper |
| **S8** | S8 | S7 | S0 | - | - | Newspaper |

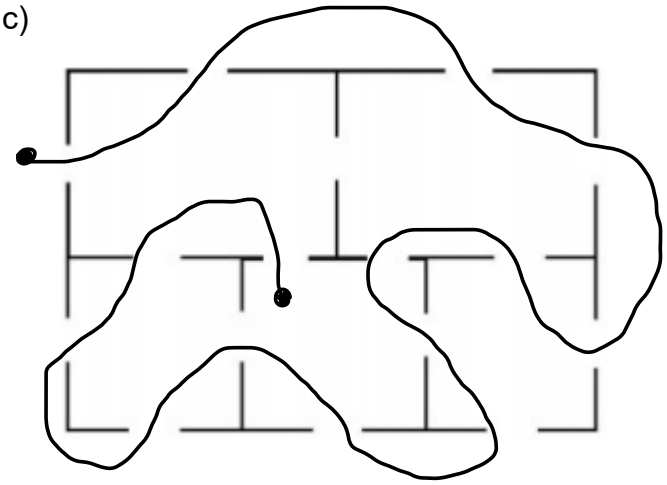


Q5) a)



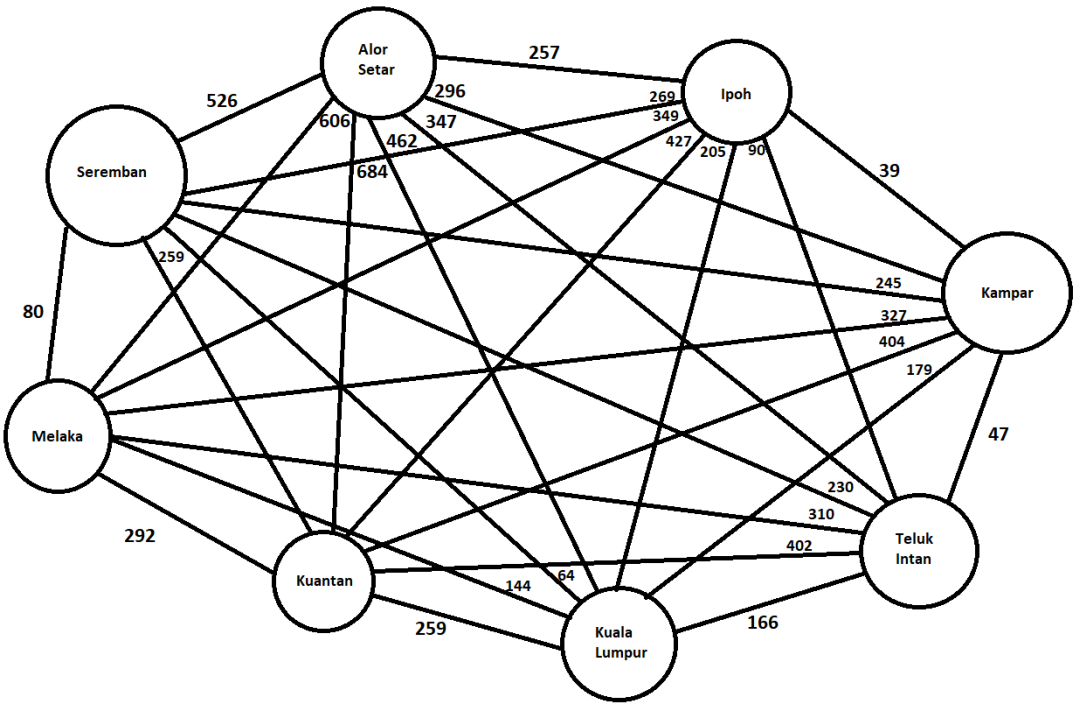

b) There would be no continuous line as rooms A, B, and D has an odd number of doors. Therefore, there would be no Euler Circuit.

c)



Q6)

a)




b) **Kruskal's Algorithm**

(Ipoh, Kampar): 39

(Kampar, Teluk Intan): 47

(Kuala Lumpur, Seremban): 64

(Melaka, Seremban): 80

(Kuala Lumpur, Teluk Intan): 166

(Ipoh, Alor Setar): 257

(Kuantan, Kuala Lumpur) : 259 39 + 47 + 64 + 80 + 166 + 257 + 259 = 912 (total distance)

c) **Prim's Algorithm**

1. Melaka (starting vertex)

2. (Melaka, Seremban) : 80

3. (Seremban, Kuala Lumpur) : 64

4. (Kuala Lumpur, Teluk Intan) : 166

5. (Teluk Intan, Kampar) : 47

6. (Kampar, Ipoh) : 39

7. (Ipoh, Alor Setar) : 257

8. (Kuantan, Kuala Lumpur) : 259 80 + 64 + 166 + 47 + 39 + 257 + 259 = 912 (total distance)