Faculty of Engineering

Prince of Songkla University

Midterm Examination : Semester 2

Date : 24 กุมภาพันธ์ 2552 (February 24, 2009)

Subject : 225-703 Network Modeling

Academic year 2008 (2551)

Time 13:30 - 16:30

Room : R300

1.   Total 6 topics, 24 pages, and 100 scores.

2.   Do your examination in these papers and return all of them.

3.   Write down your name, surname, student code in every page.

4.   <u>Show all calculation, and assumption.</u>

5.   All books, notes and calculators are allowed but you are not permitted to borrow anything from
        the others.

6.   Use only Network techniques.

	Scores	Your Scores
1	14	
2	20	
3	12	
4	18	
5	20	
6	16	
Total	100	

Name...

Surname...

Student code....................................

Year/Department................................

Assistant Professor Yodduang Pannara

Name .... Surname ....Student Code ....

1. From replacement model in figure 1.1.

    C_{ij} = Total cost of buying equipment in year i and selling in year j.

    C_{01} = 680 Baht C_{02} = 1,400 Baht C_{03} = 1,860 Baht

    C_{12} = 900 Baht C_{13} = 1,300 Baht C_{14} = 1,720 Baht

    C_{23} = 1,000 Baht C_{24} = 1,250 Baht C_{25} = 2,000 Baht

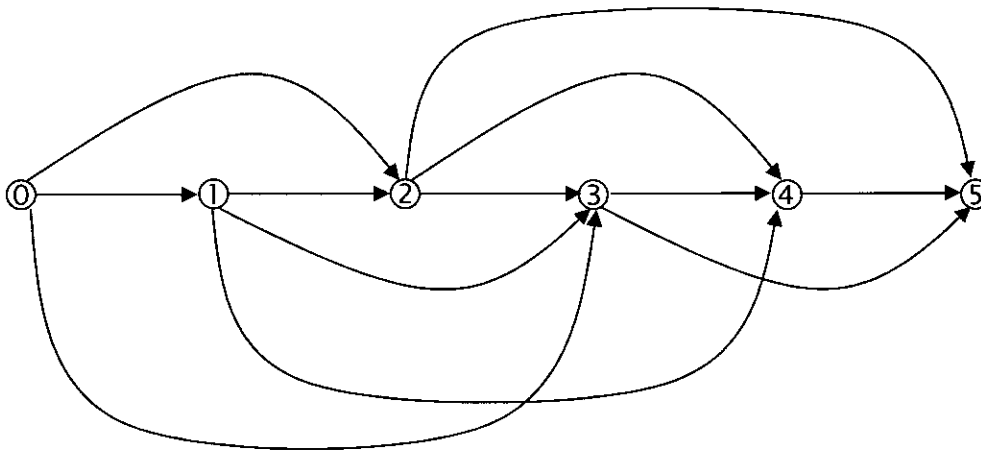 C_{34} = 800 Baht C_{35} = 1,200 Baht C_{45} = 670 Baht

Figure 1.1

Use only Network technique to find the minimum cost of replacement level 1 and 2 from year 0 to year 5. You must specify the year that you replace equipment clearly.

(14 scores)

Name .... Surname .... Student Code ....

2. Find the transmittance between node $\textcircled{x}$ and node $\textcircled{y}$ in Figure 2.1 and Figure 2.2.

    2.1.
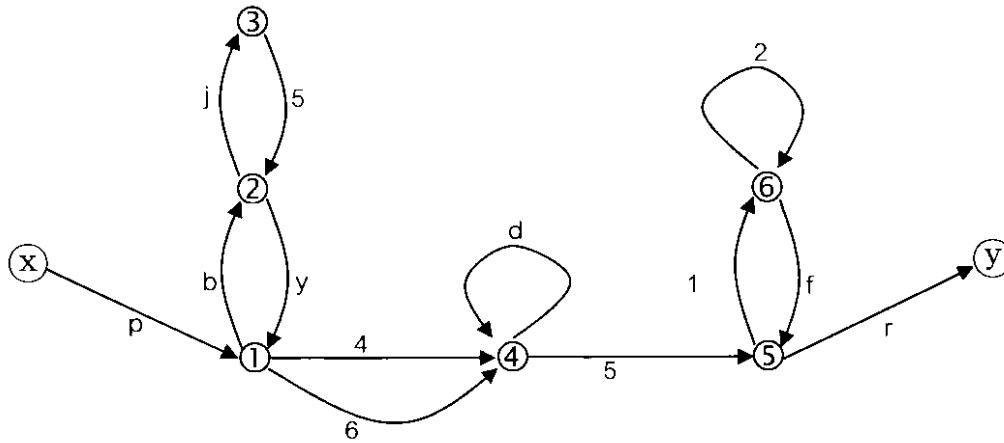
Figure 2.1

(8 scores)

    2.2.
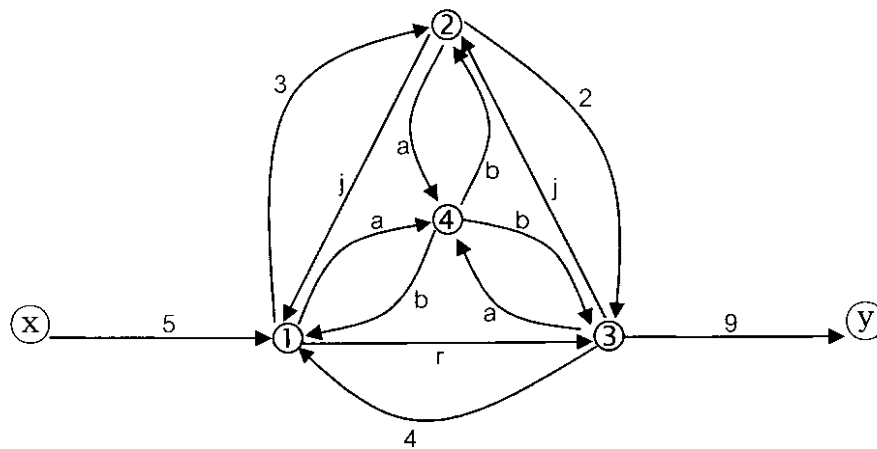
Figure 2.2.

(12 scores)

(Total 20 scores)

Name ....…............ Surname ....…Student Code ....

3. From Flowgraph in figure 3.1 and data from table 3.1

P_{ij} = Probability from node (i) to node (j)
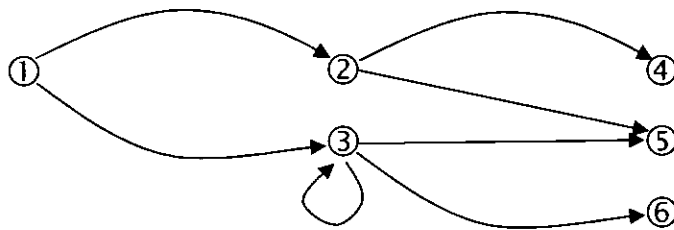
Figure 3.1.

Node (i) to node (j)	Probability (P_{ij})
1 – 2	0.7
1 – 3	0.3
2 – 4	0.8
2 – 5	0.2
3 – 3	0.1
3 – 5	0.5
3 – 6	0.4

Table 3.1

Use Flowgraph to :

1. Find the probability from node (1) to node (2) (1 scores)

2. Find the probability from node (1) to node (3) (2 scores)

3. Find the probability from node (1) to node (4) (3 scores)

4. Find the probability from node (1) to node (5) (3 scores)

5. Find the probability from node (1) to node (6) (3 scores)

(Total 12 scores)

Name .... Surname ....Student Code ....

4. Mr. Eddy deposits money in the bank the first time 200,000 Baht. At the end of the third year, he

deposits 250,000 Baht. At the end of the fifth year, he withdraws 320,000 Baht. The interest rate is

in table 4.1. He withdraws all the money at the end of the seventh year.

Year	Interest (%)
1	4
2	5
3	4.5
4	6
5	5
6	7
7	5.5

Table 4.1

How much money does he receive ? Use only Flowgraph techniques.

(18 scores)

Name .... Surname .... Student Code ....

5. From GERT Network in figure 5.1 and table 5.1.

P_{ij} = Probability from node i to node j
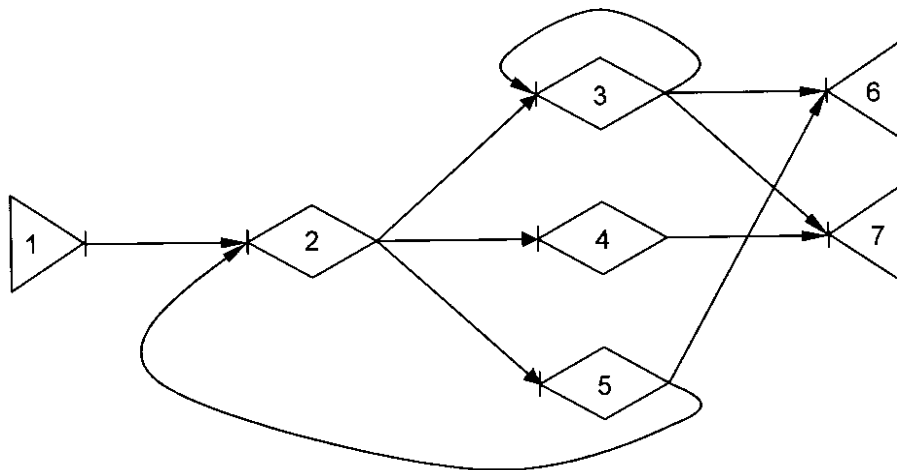
T_{ij} = Time move from node i to node j

Figure 5.1

Node		P_{ij}	T_{ij} (minutes)	Distribution
i	j			
1	2	1.0	5	Constant
2	3	0.3	3	Constant
2	4	0.45	2	Constant
2	5	0.25	4	Constant
3	3	0.1	2	Constant
3	6	0.7	7	Constant
3	7	0.2	10	Constant
4	7	1.0	6	Constant
5	2	0.1	9	Constant
5	6	0.9	8	Constant

Table 5.1

Name .... Surname ....Student Code ....

Use GERT to :

5.1. Find probability from node ① to node ②. (1 score)

5.2. Find probability from node ① to node ③. (1 score)

5.3. Find probability from node ① to node ④. (1 score)

5.4. Find probability from node ① to node ⑤. (1 score)

5.5. Find probability from node ① to node ⑥. (1 score)

5.6. Find probability from node ① to node ⑦. (1 score)

5.7. Find the average time from node ① to node ⑥. (7 scores)

5.8. Find the average time from node ① to node ⑦. (7 scores)

(Total 20 scores)

Name .... Surname ....Student Code ....

6. There is a game. Each time the probability to win the game is 0.45 and the probability to lose the game is 0.55. The time use to play each game is 2 minutes.

    Draw only GERT network to find the average time to play the game to. You must specify all the values in each transmittance. (Do not calculate this problem)

    6.1. Win the game 3 times (Don't need to be consecutive).