

Faculty of Engineering
Prince of Songkla University

Midterm Examination : Semester 2/2007(2550)

Academic year 2007(2550)

Date : December 28, 2007

Time 13:30 – 16:30

Subject : 225 – 703 Network Modeling

Room A200

1. Total 6 topics, 27 pages, and 110 scores
2. Do your examination in these papers and return all them
3. Write down your name, surname, student code in every page.
4. Show all calculation, and assumption
5. All books, notes and calculators are allowed but you are not permitted to borrow anything from the others

	Scores	Your Scores
1	22	
2	20	
3	14	
4	10	
5	24	
6	20	
Total	110	

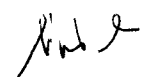
Name.....

Surname.....

Student code.....

Year/Department.....

(Assistant Professor Yodduang Pannara)



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1. From Figure 1.1 ,the number between each node is time (hours). For example, time travels between node ⑤ and node ⑥ is 8 hours.

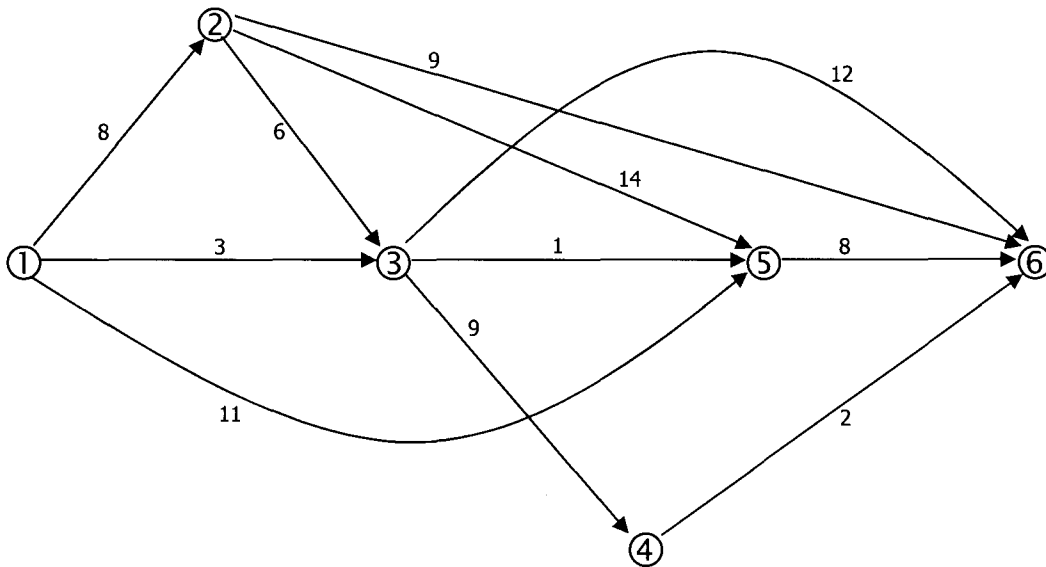


Figure 1.1

Using Network techniques to find

- 1.1 The shortest path level 1 and 2 between node ① and node ⑥. What are the paths?
(9 scores)
- 1.2 The longest path level 1 and 2 between node ① and node ⑥. What are the paths?
(13 scores)

(Total 22 scores)

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2. From Figure 2.1, the number between each node is the distance (miles) . For example, the distance between node ① and node ② is 3 miles.

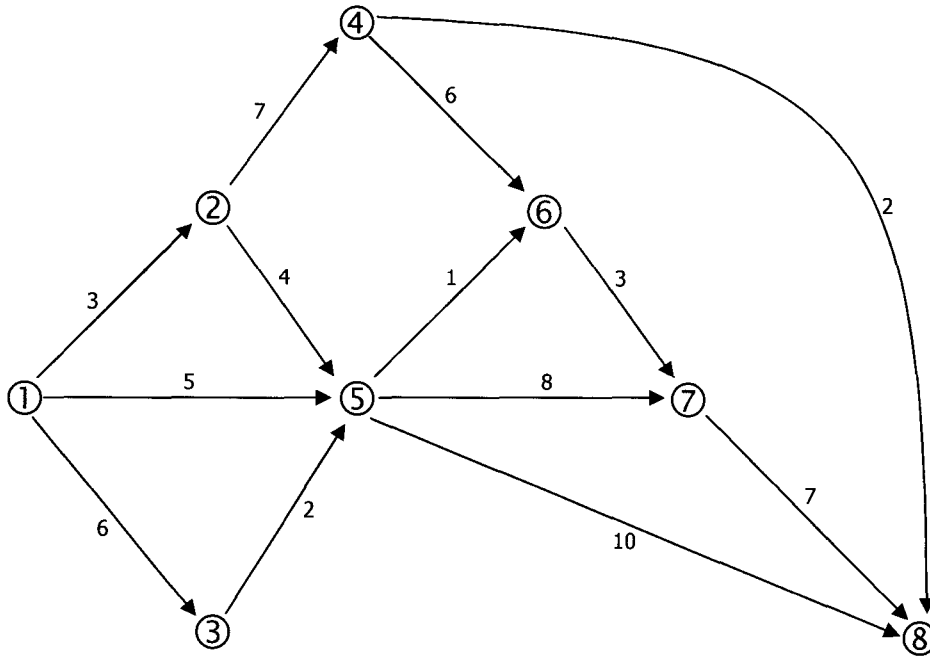


Figure 2.1

Using Dijkstra's Algorithm to find

2.1 The shortest path from node ① to all nodes. What are the paths for each pair? (8 scores)

2.2 The longest path from node ① to all nodes. What are the paths for each pair? (12 scores)

(Total 20 scores)

Ans 2

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3. Using labeling procedure.

3.1 From Figure 3.1 ,find the maximum flow between node ① and node ⑧. (7 scores)

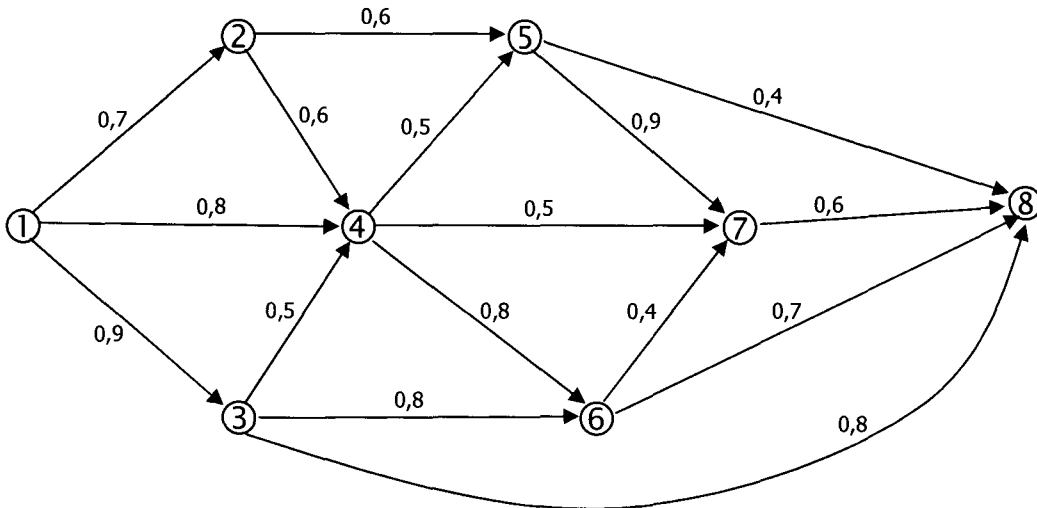


Figure 3.1

3.2 From Figure 3.2 ,find the maximum flow between node ① and node ⑪. (7 scores)

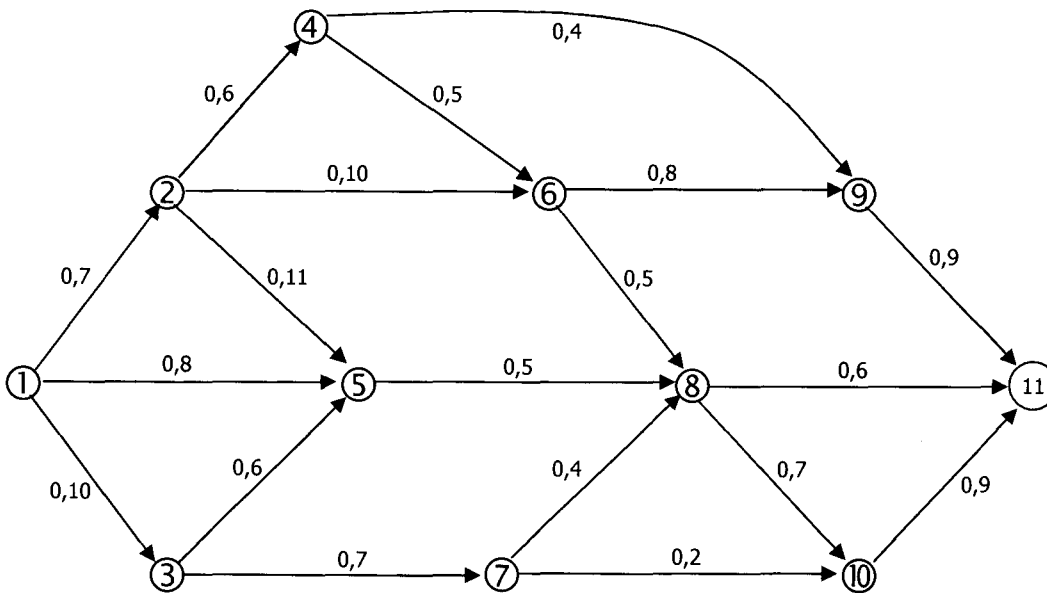
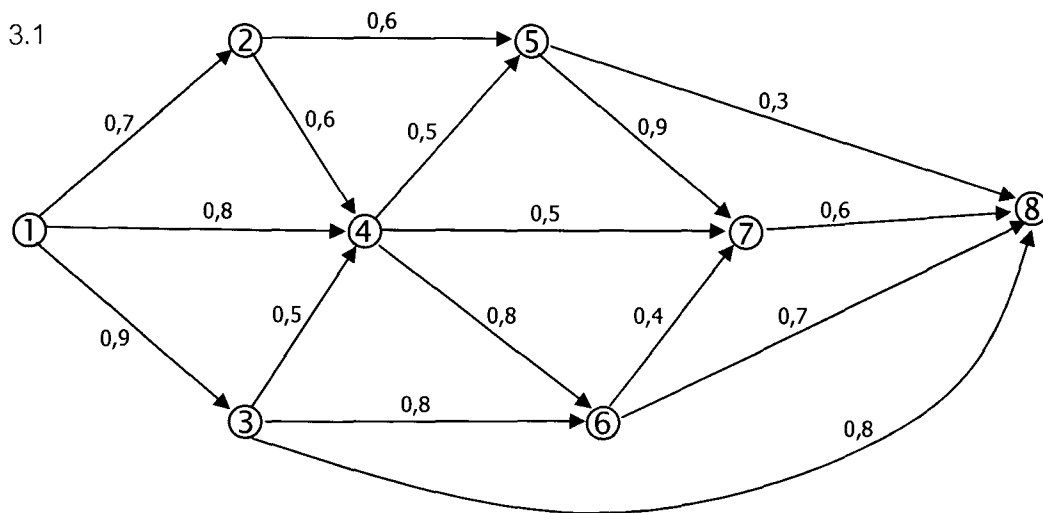
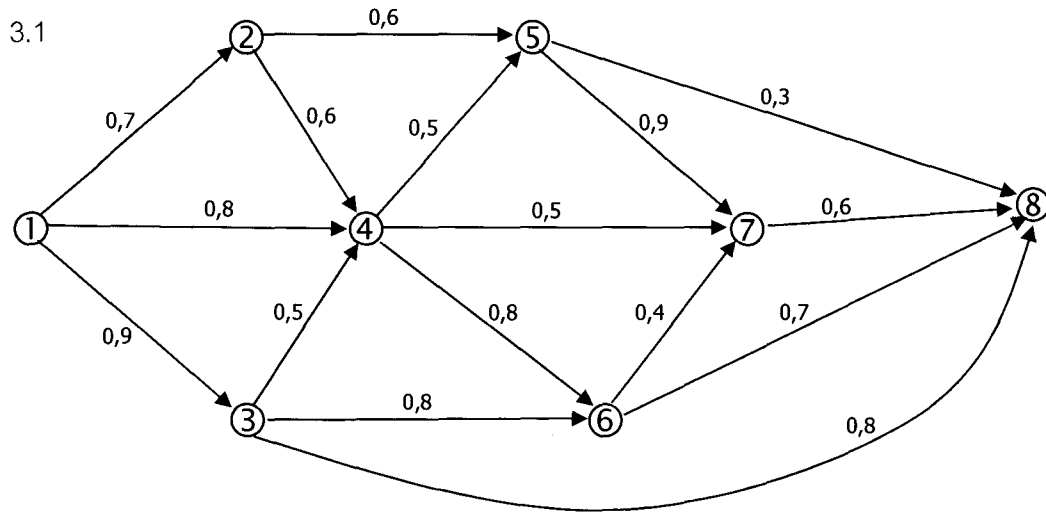


Figure 3.2

Remark for 3.1 and 3.2, The meaning of numbers in each node are:-

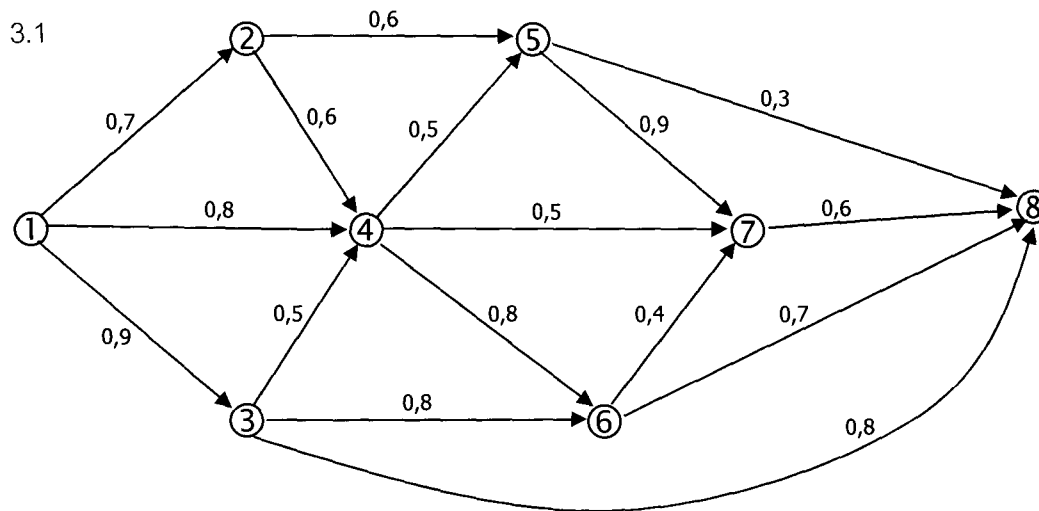
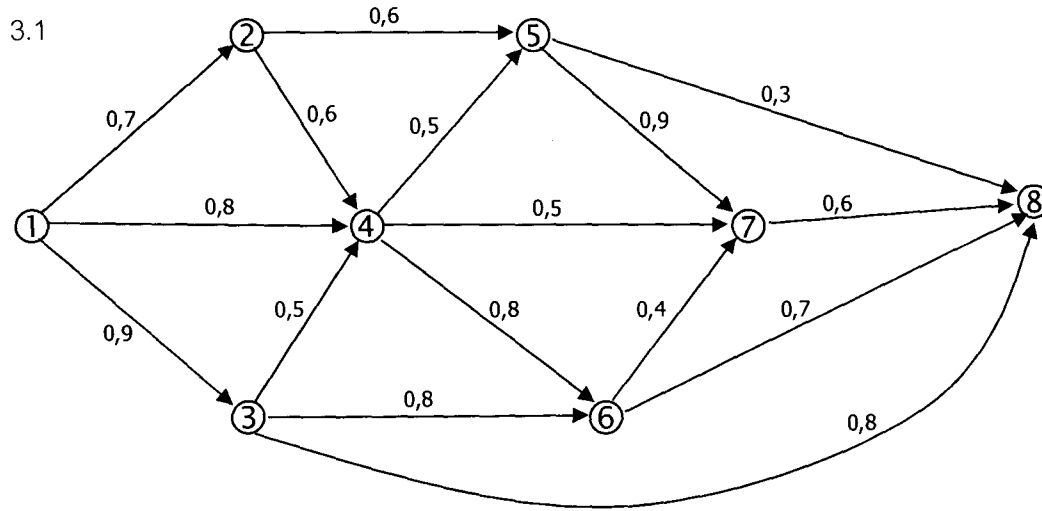
- a. The first number is original flow. (Unit is gallon/hour.)
- b. The second number is capacity flow. (Unit is gallon/hour.)

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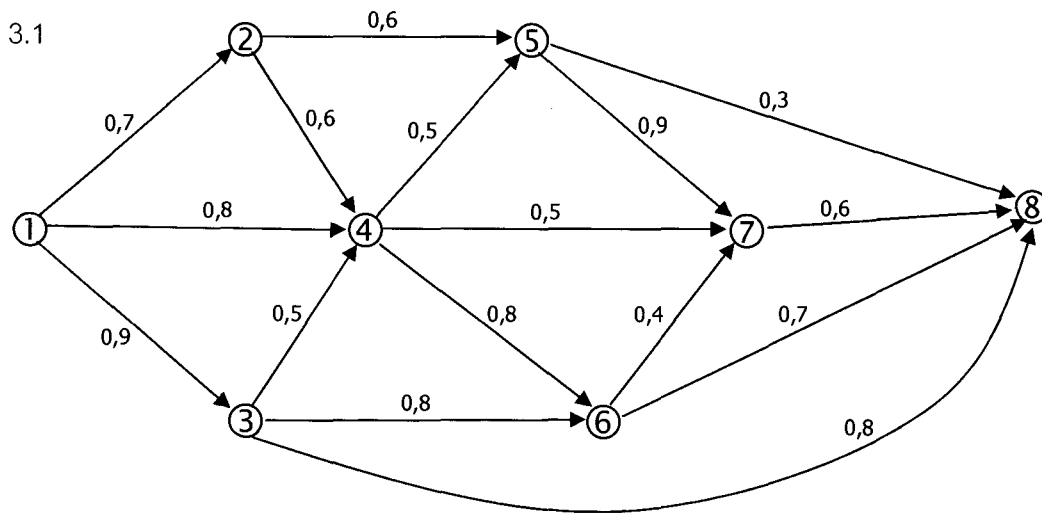
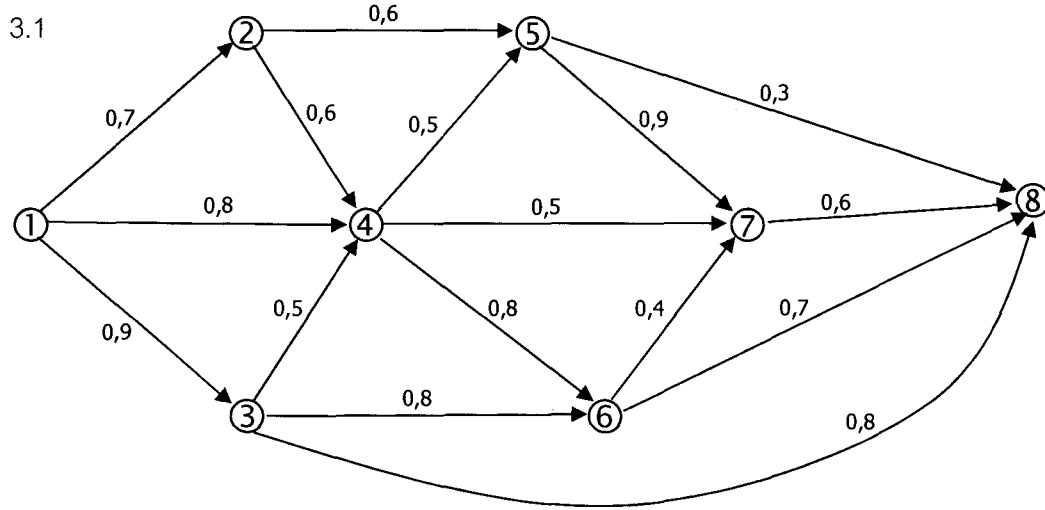
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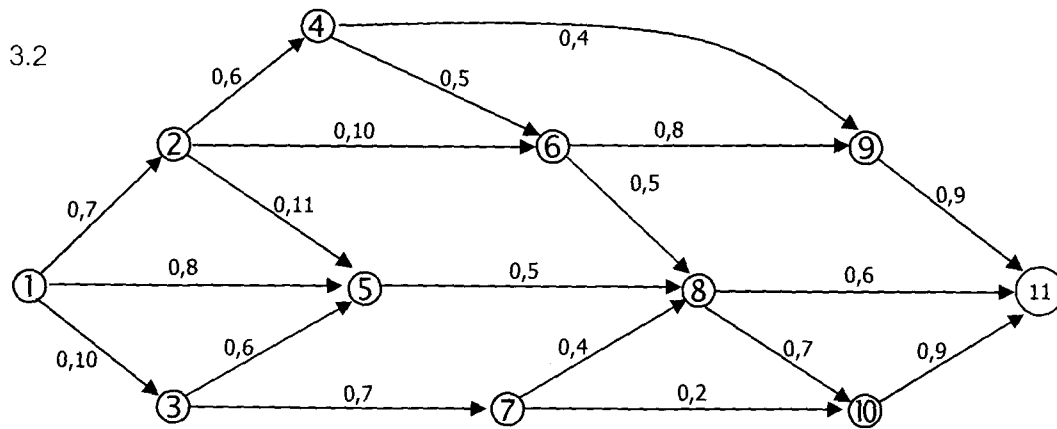
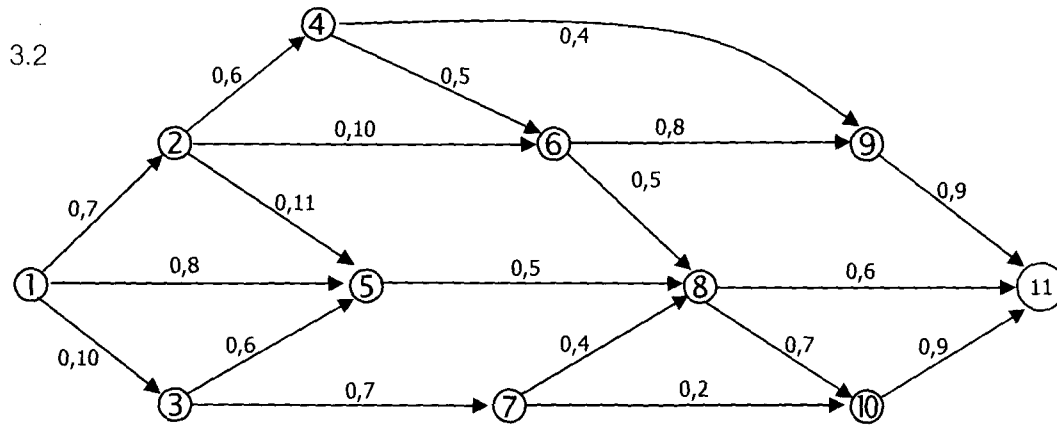


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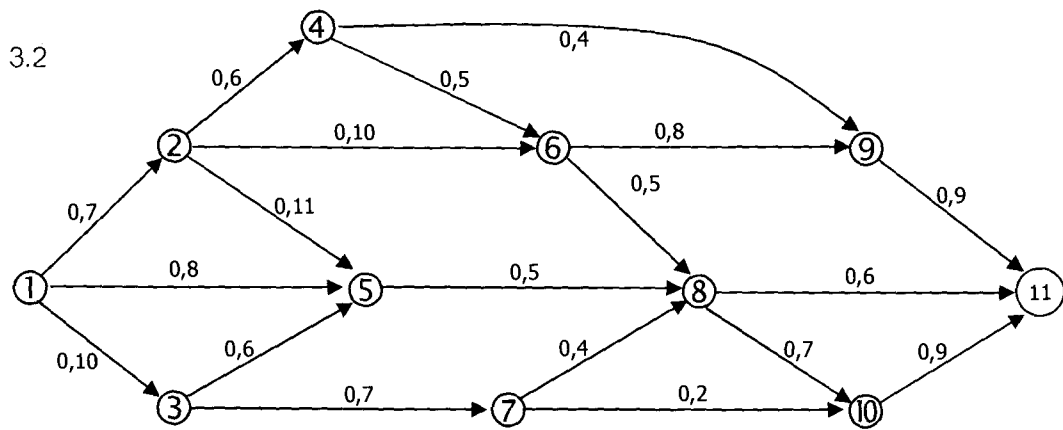
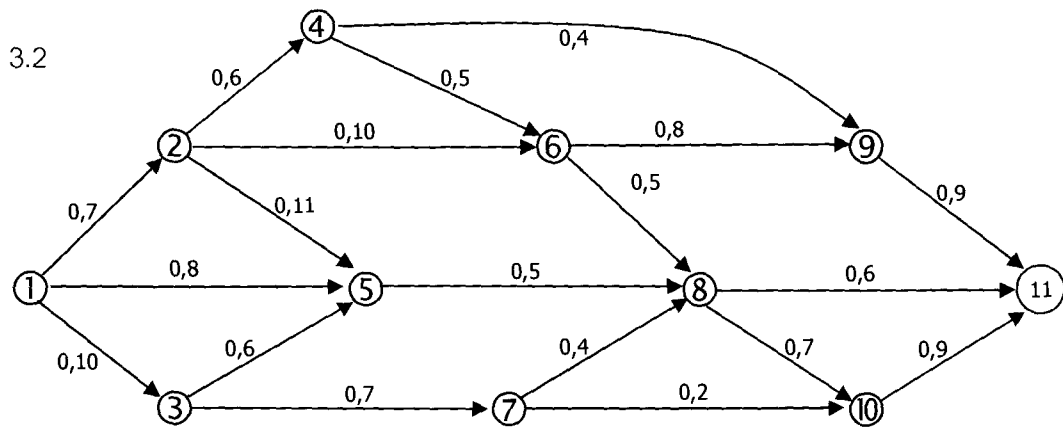


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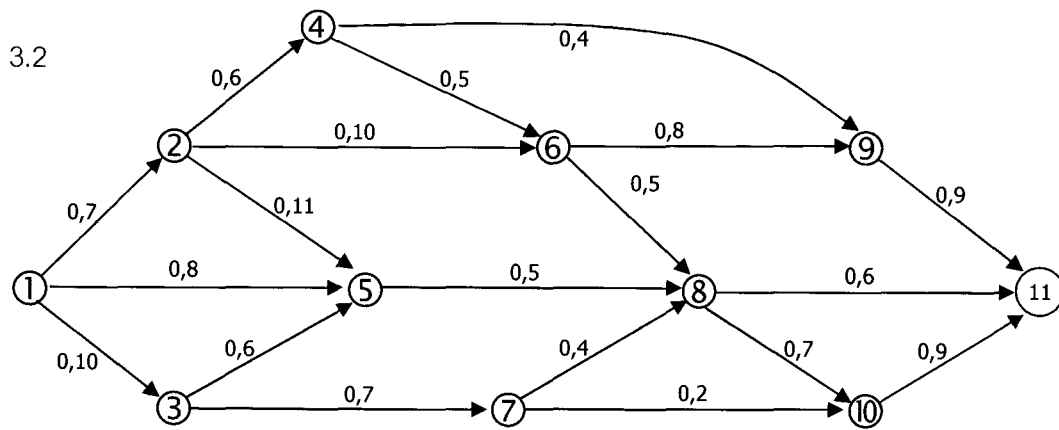
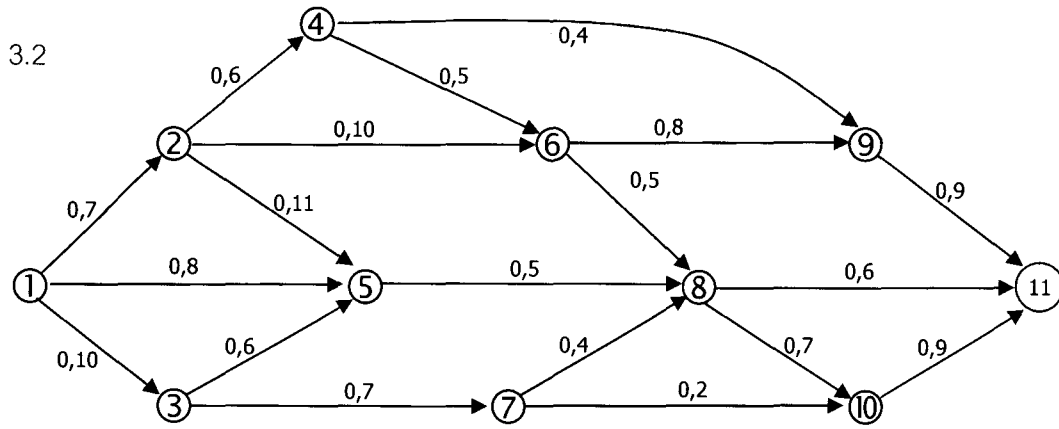
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4. Using linear programming formulates the objective function and constraints to find the maximum flow between node ① and node ⑩ in figure 4.1.

(Do not calculate to solve the problem)

(10 scores)

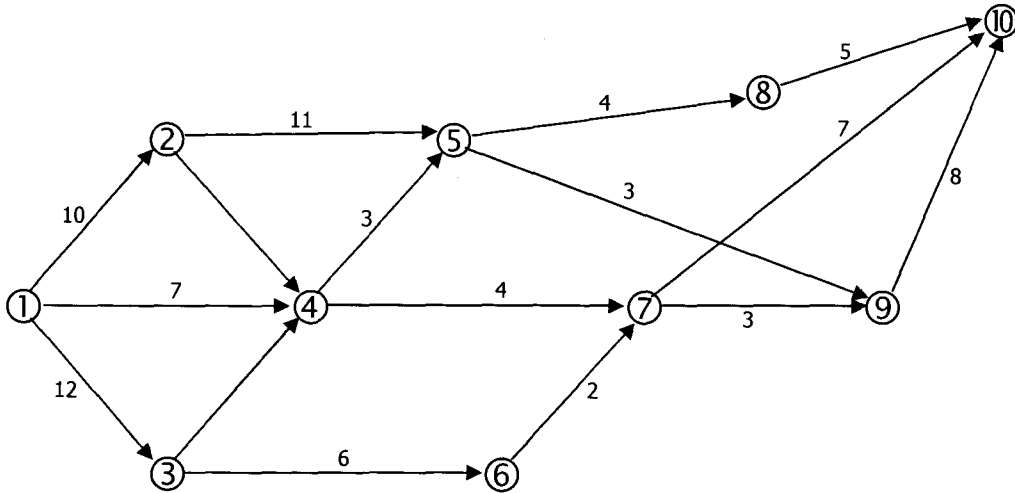


Figure 4.1

Remark : The meaning of numbers in each node is capacity flow

Ans 9

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5. From Figure 5.1 , the number between each node is the reliability . For example , the reliability between node ② and node ④ is 0.91

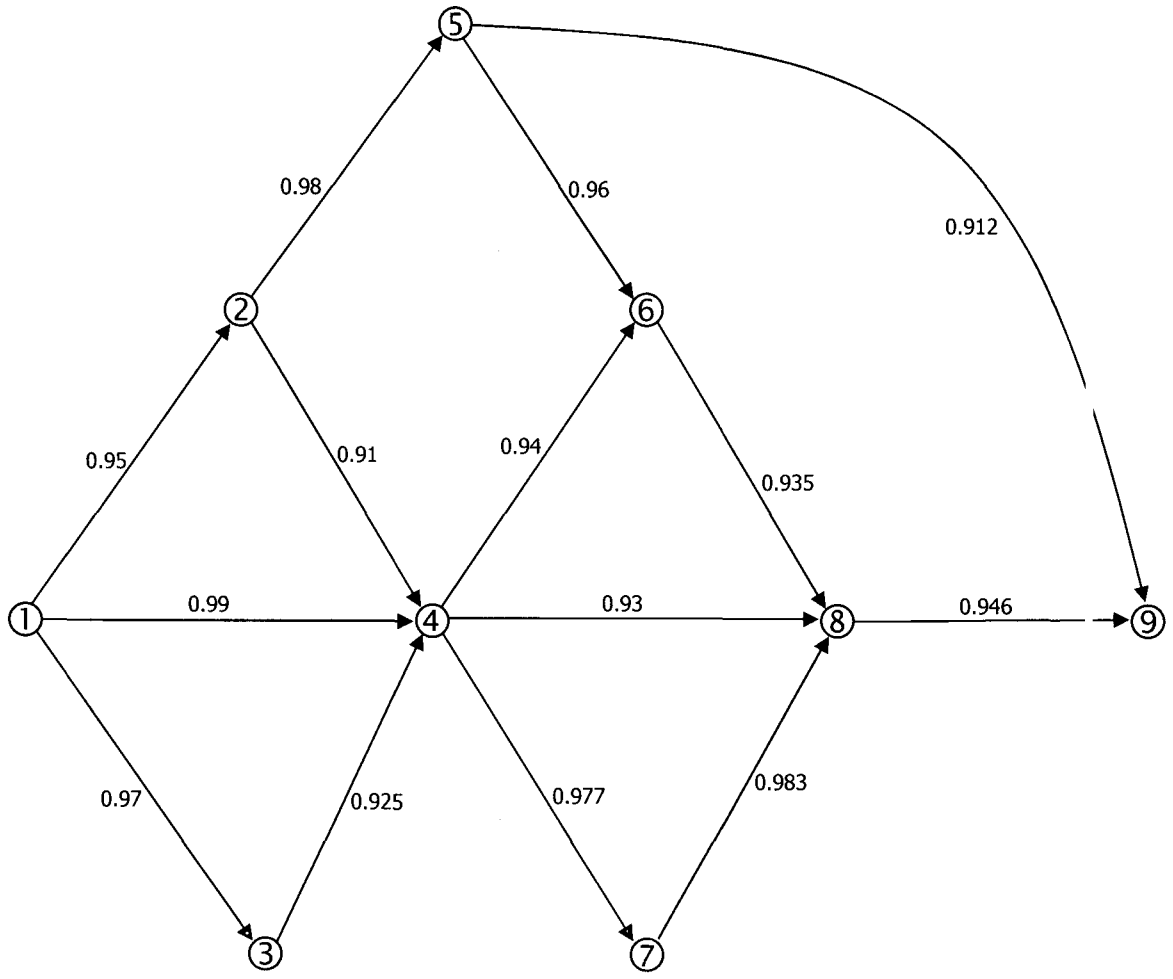


Figure 5.1

- 5.1 Using Dijkstra's Algorithm to find the maximum reliability and the paths.
 - 5.1.1 Between node ① and node ⑨ (10 scores)
 - 5.1.2 Between node ④ and node ⑨ (4 scores)
- 5.2. Using Dijkstra's Algorithm to find the **total** reliability and all paths
 - 5.2.1 Between node ① and node ⑥ (10 scores)

(Total 24 scores)

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6. Mr. Thawee plans to deposit money in the Thai Bank for **4 years**.

The interests are as follow:

Deposits 1 year, the interests are 3.00% per year.

Deposits 2 years, the interests are 6.10% per 2 years.

Deposits 3 years, the interests are 9.20% per 3 years.

Deposits 4 years, the interests are 12.48% per 4 years.

Using only Network Techniques to find

6.1 The method to get maximum interests. (16 scores)

6.2 From 6.1, if Mr. Thawee deposits 200,000 baht, how much money can he get in 4 years ?
(4 scores)

(Total 20 scores)

Suggestion : You use the decimal at least 7 digits.

