

Faculty of Engineering
Prince of Songkla University

Midterm Examination : Semester 2

Academic year 2011 (2554)

Date : 26 ธันวาคม 2554 (December 26, 2011)

Time 09:00 – 12:00

Subject : 225-515 Network Modeling

Room : หัวหุ่นยนต์

ทฤษฎีในการสอบ โทษขั้นต่ำ ปรับตกในวิชาที่ทฤษฎี
และพักการเรียน 1 ภาคการศึกษา

1. Total 6 topics, 27 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. **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	20	
2	18	
3	20	
4	14	
5	20	
6	8	
Total	100	

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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 (Minute). For Example, the distance between node ③ and node ④ is 5 minutes.

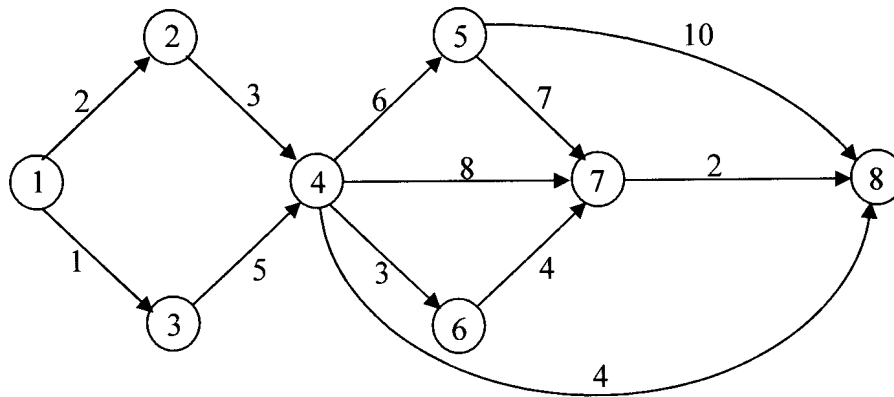


Figure 1.1

Use Network Method to find.

- 1.1 The shortest path level 1 and 2 from node ① to node ⑧ . What are the paths ? (9 scores)
- 1.2 The longest path level 1 and 2 from node ① to node ⑧ . What are the paths ? (11 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 ② and node ⑤ is 3 miles.

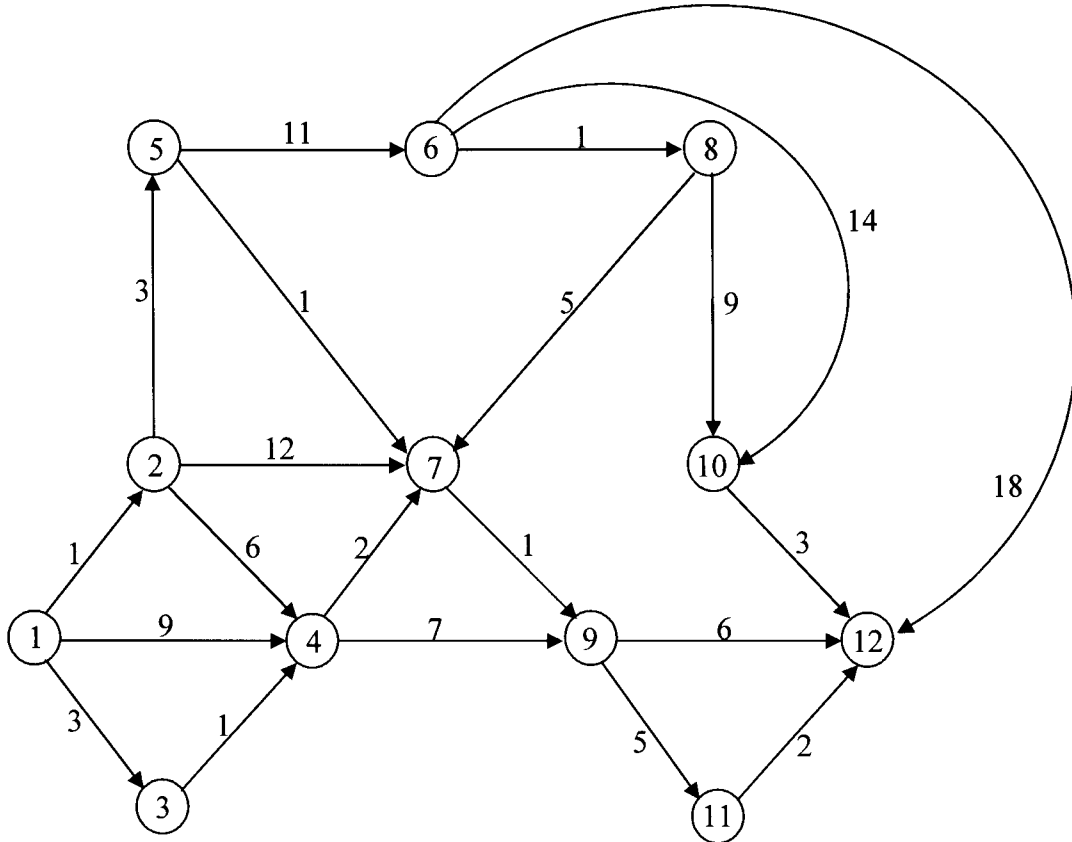


Figure 2.1

Use Dijkstra's Algorithm to find.

- 2.1 The shortest path from node ① to all nodes. What are the paths ? (7 scores)
2.2 The longest path from node ① to all nodes. What are the paths ? (11 scores)

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3. From figure 3.1, Find the number between each node is the reliability. For example, the reliability between node ① to node ② is 0.9

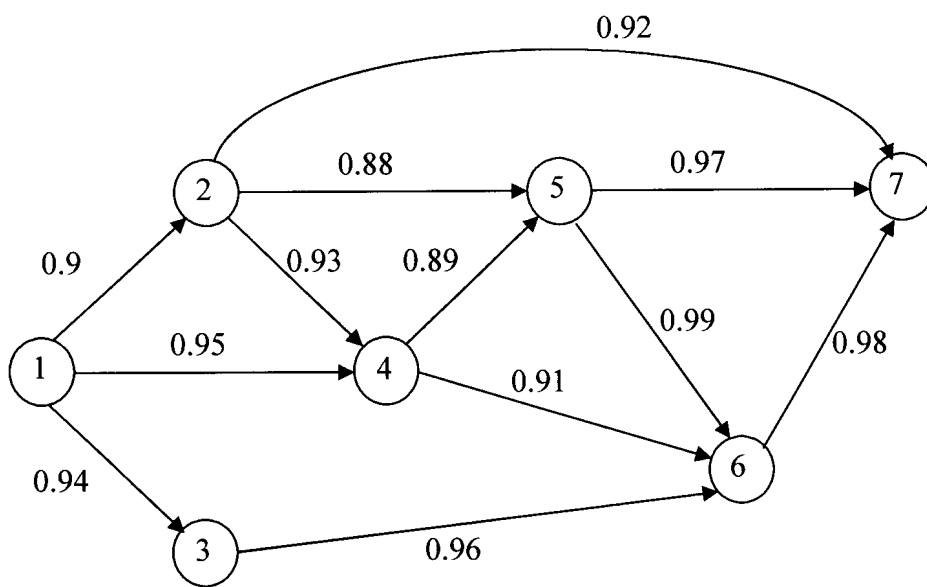


Figure 3.1

Use Dijkstra's Algorithm

- 3.1. Find the maximum reliability and path from node ① to node ⑦. (12 scores)
- 3.2. Find the minimum reliability and path from node ② to node ⑦. (8 scores)

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4. Use labeling procedure.

4.1 From figure 4.1, Find the maximum flow from node ① to node ⑧ (7 scores)

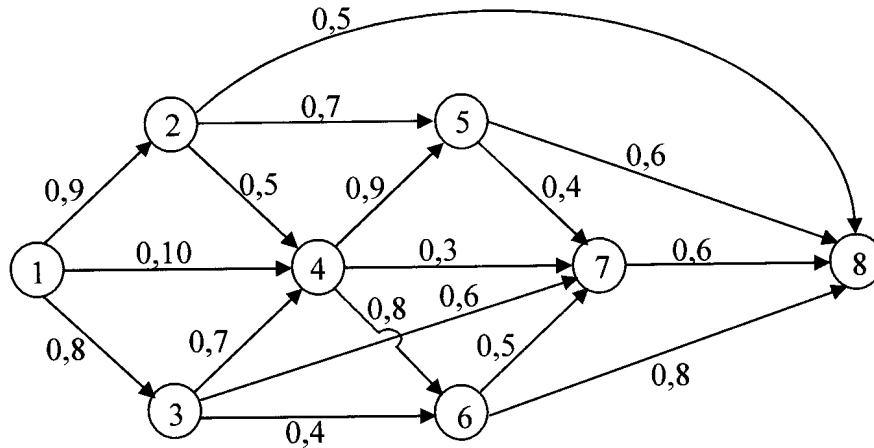


Figure 4.1

4.2 From Figure 4.2 , Find the maximum flow from node ① to node ⑨ (7 scores)

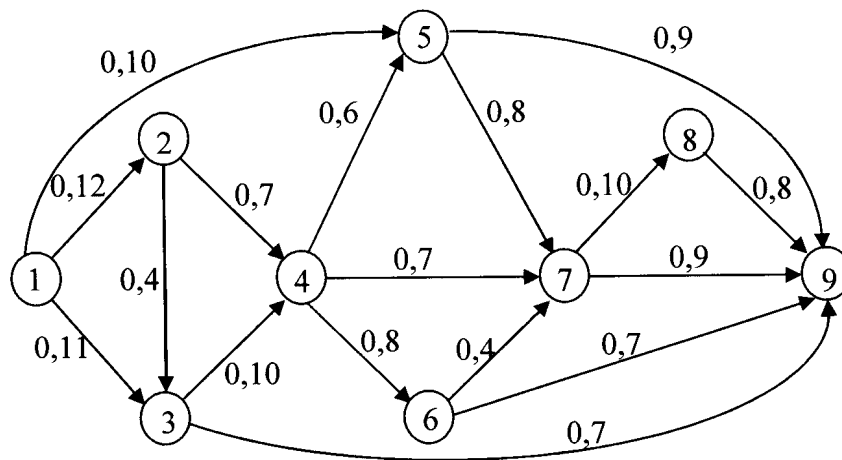


Figure 4.2

Remark

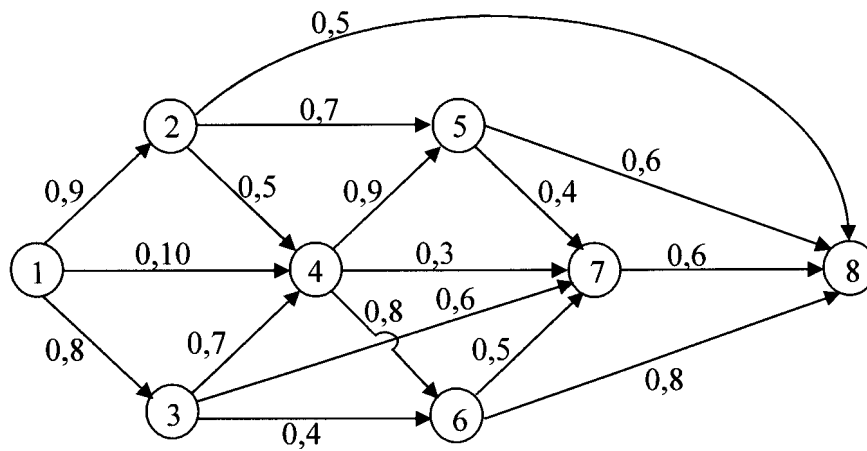
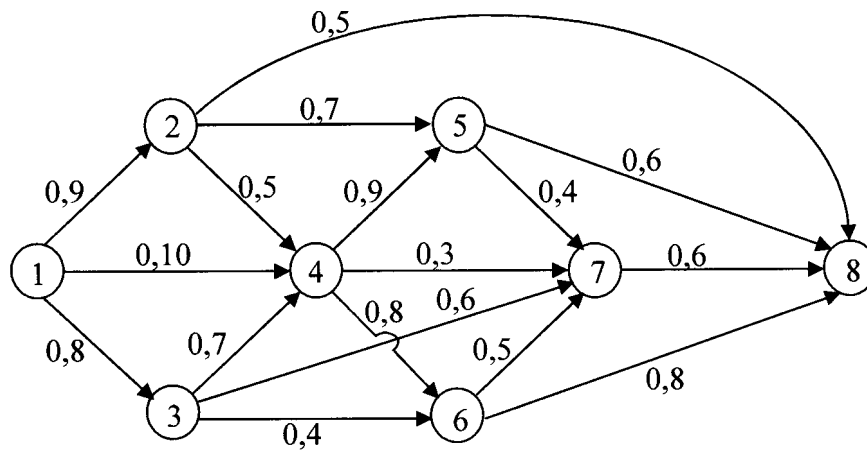
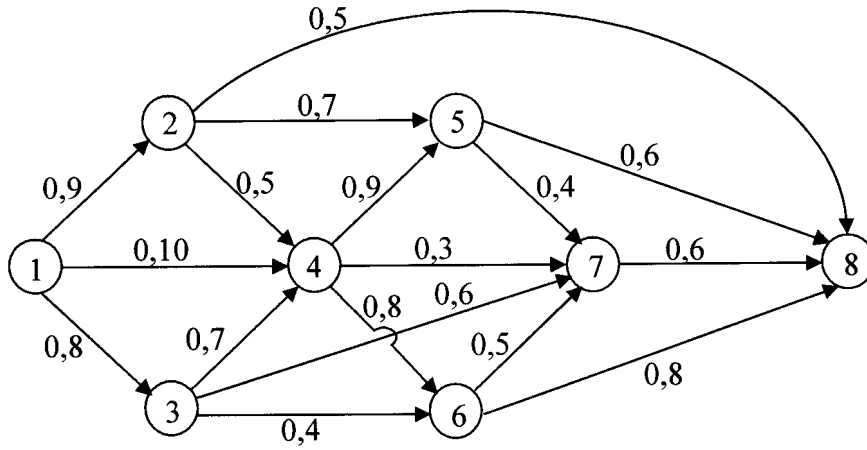
The meaning of each number in each node is

- The first number is original flow. (Unit is gallon / minute)
- The second number is capacity flow. (Unit is gallon / minute)

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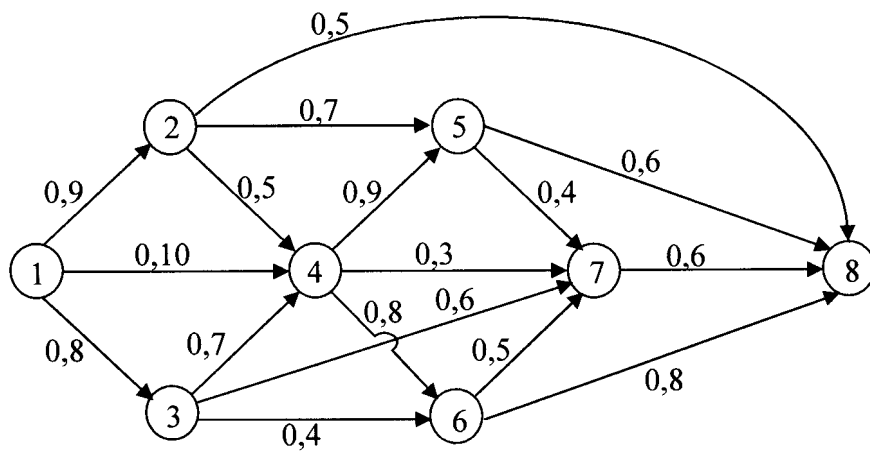
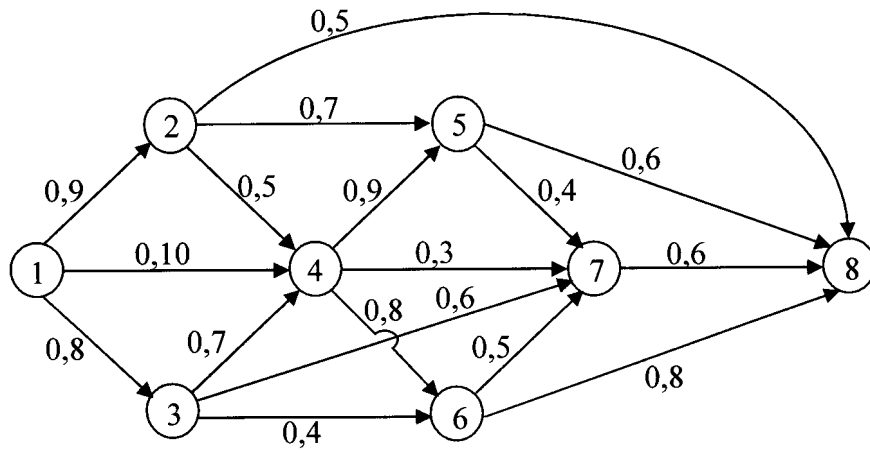
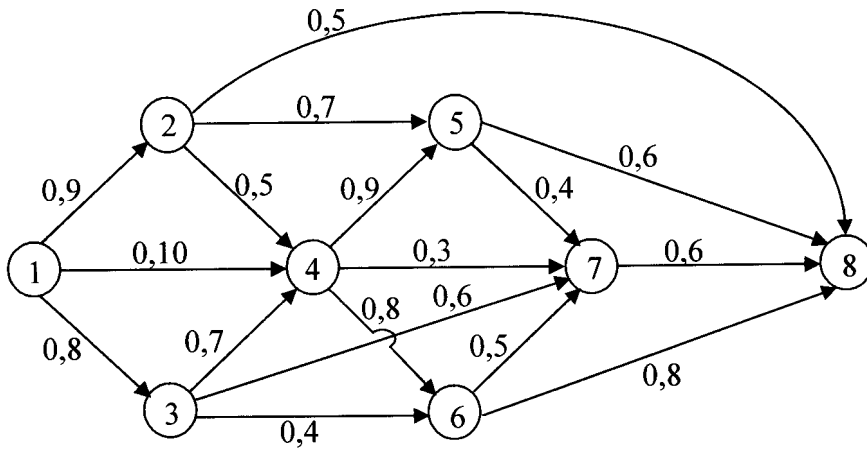
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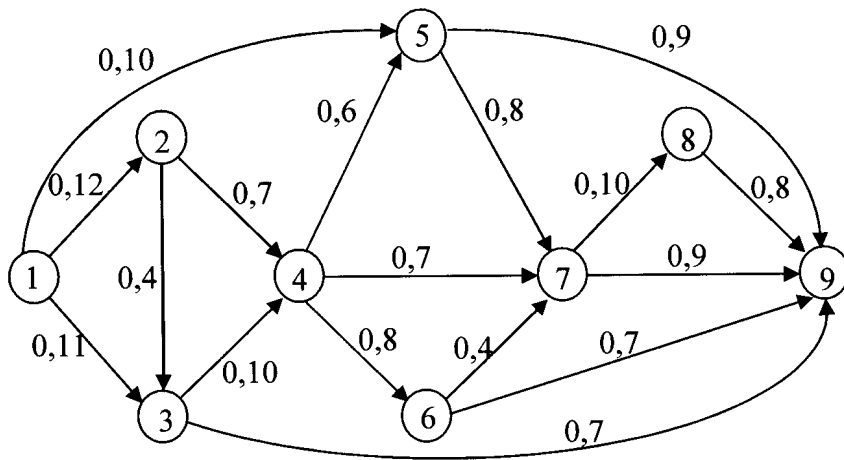
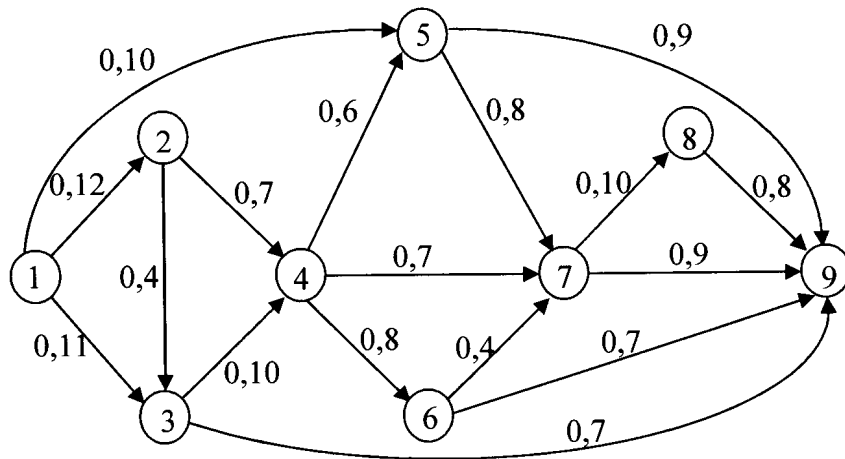
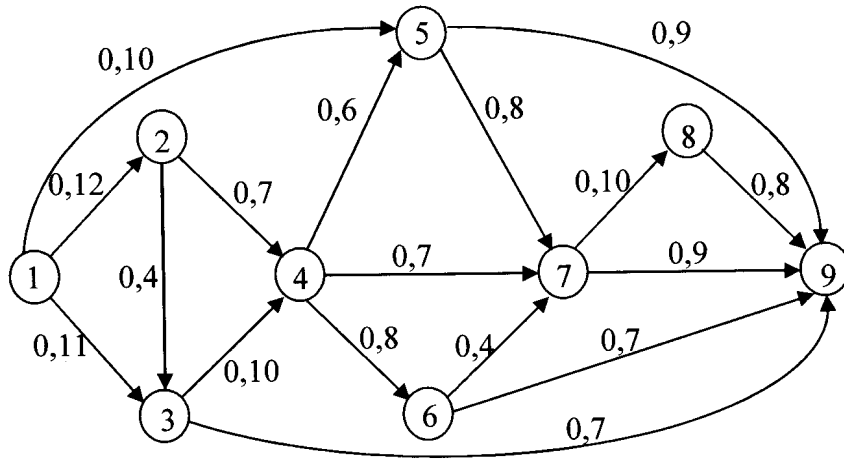
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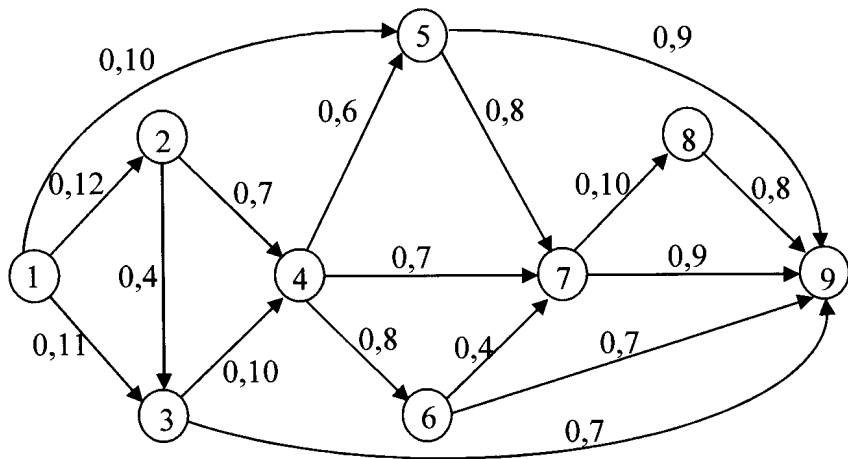
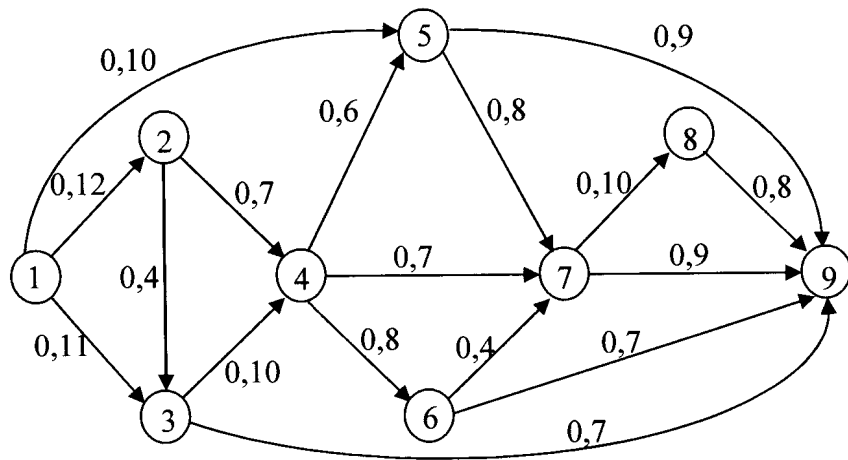
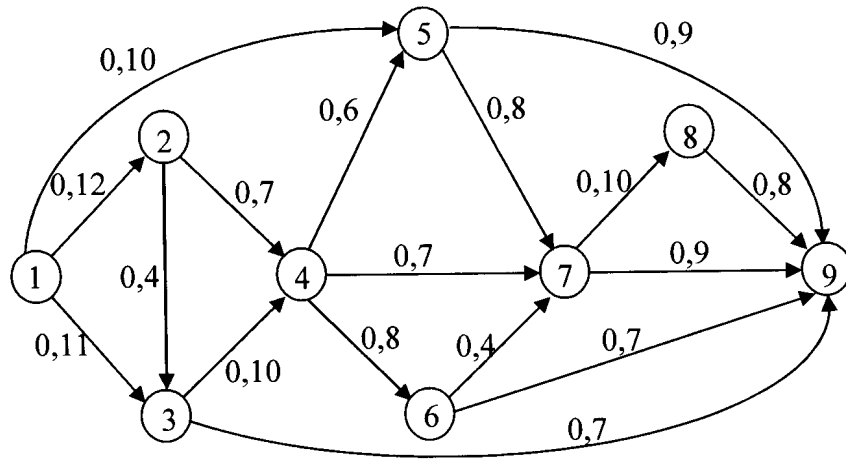
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5 From Figure 5.1, value at each path is Baht per times that pass that path. Value at each node is Baht per times that pass that node.

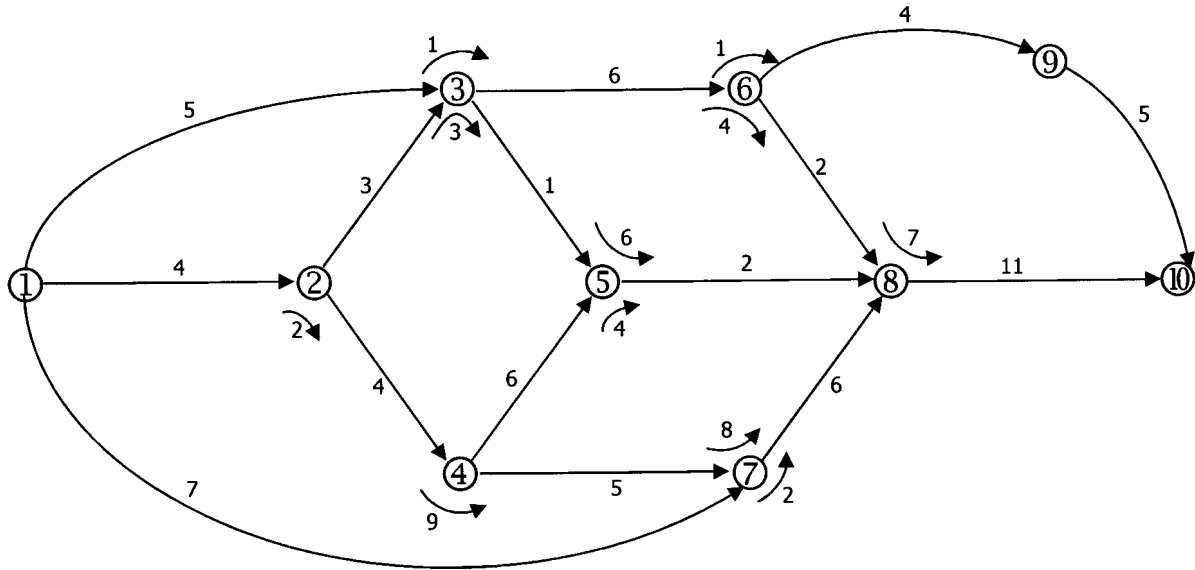


Figure 5.1

Use Network Method and Dijkstra's Algorithm to find

- 5.1 The minimum cost and path from node ① to node ⑩. (10 scores)
- 5.2 The maximum cost and path from node ① to node ⑩. (10 scores)

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6. From figure 6.1, number between each node is maximum transportation. Unit is gallon per minute.

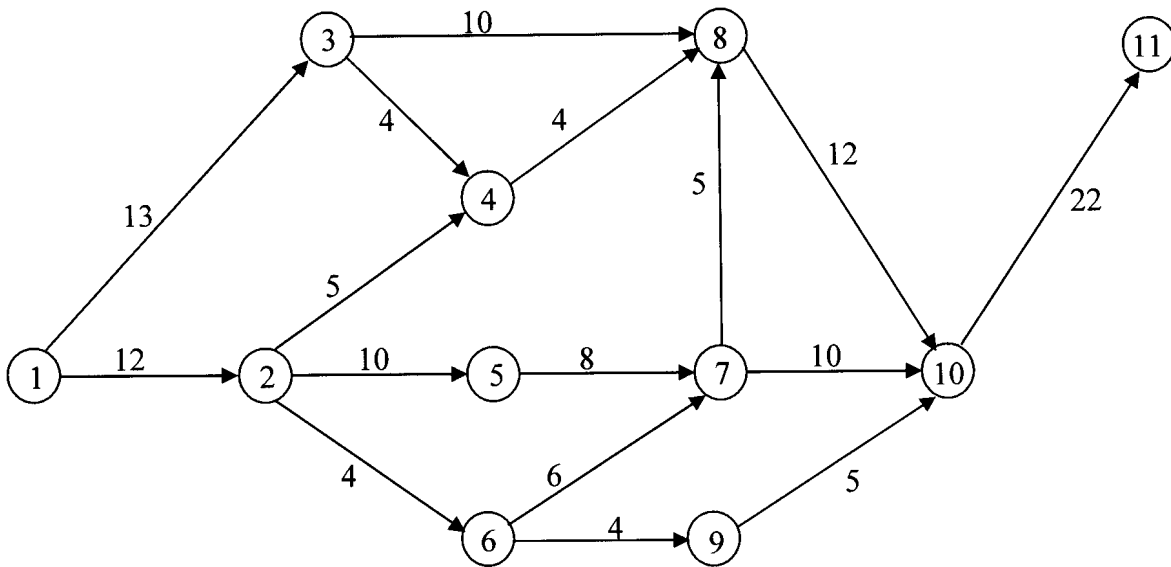


Figure 6.1

Use Linear Programming formulates the objective function to find the maximum flow and all constraints (**Do not** calculate to solve the problem) (8 scores)

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