

Faculty of Engineering  
Prince of Songkla University

Midterm Examination : Semester 2/2010(2553)

Academic Year 2010 (2553)

Date : December 24, 2010 ( 24 ธันวาคม 2553 )

Time: 09:00 - 12:00

Subject: 225-515 Network Modeling

Room : S102

**ทฤษฎีในการสอบ โทษชั้นต่ำ ปรับตกในวิชาที่ทฤษฎีนั้น  
และพักการเรียน 1 ภาคการศึกษา**

1. Total 6 topics, 24 pages, and 100 scores.
2. Do your examination in these papers and return all them.
3. Write down your Name, Surname, and 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	21	
2	20	
3	22	
4	8	
5	9	
6	20	
Total	100	

Name.....

Surname.....

StudentCode.....

Year.....

Department.....

( Yodduang Pannara )



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

1. From figure 1.1 ,the number between each node is time (hours). For example , time travels between node ⑤ and node ⑦ is 11 hours.

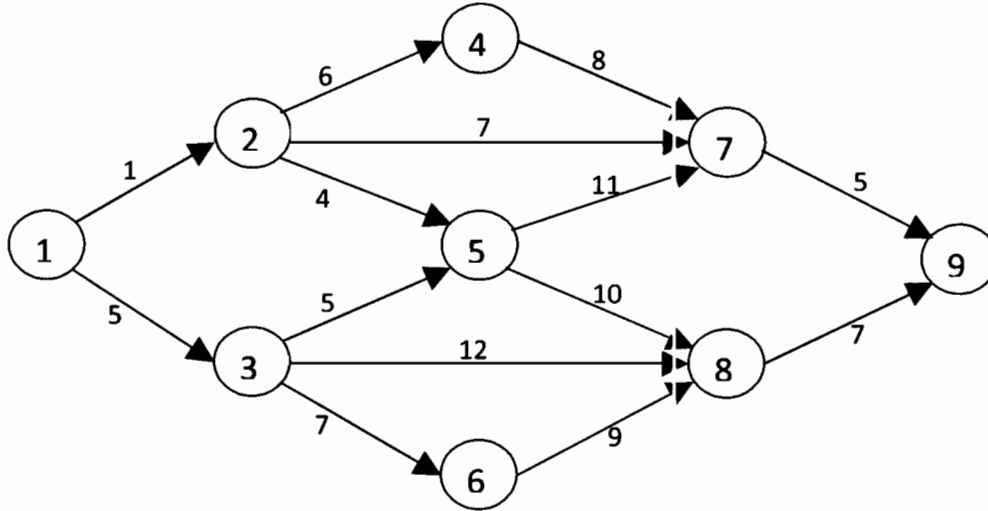


Figure 1.1

Use Network techniques to find

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

( Total 21 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 1 mile.

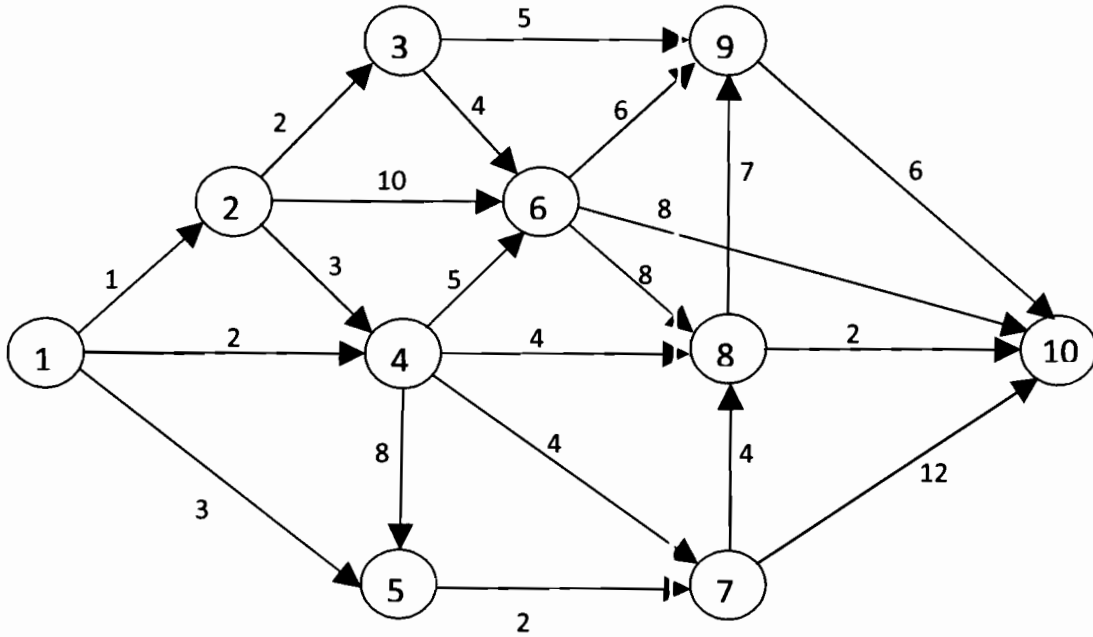


Figure 2.1

Use Dijkstra's Algorithm to find

- 2.1 The shortest path form node ① to all nodes. What are the paths for each pair? (7 scores)  
 2.2 The longest path form node ① to all nodes. What are the paths for each pair? (13 scores)

( Total 20 scores )

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3. From Figure 3.1, the number between each node is the reliability. For example, the reliability between node ② and node ④ is 0.97

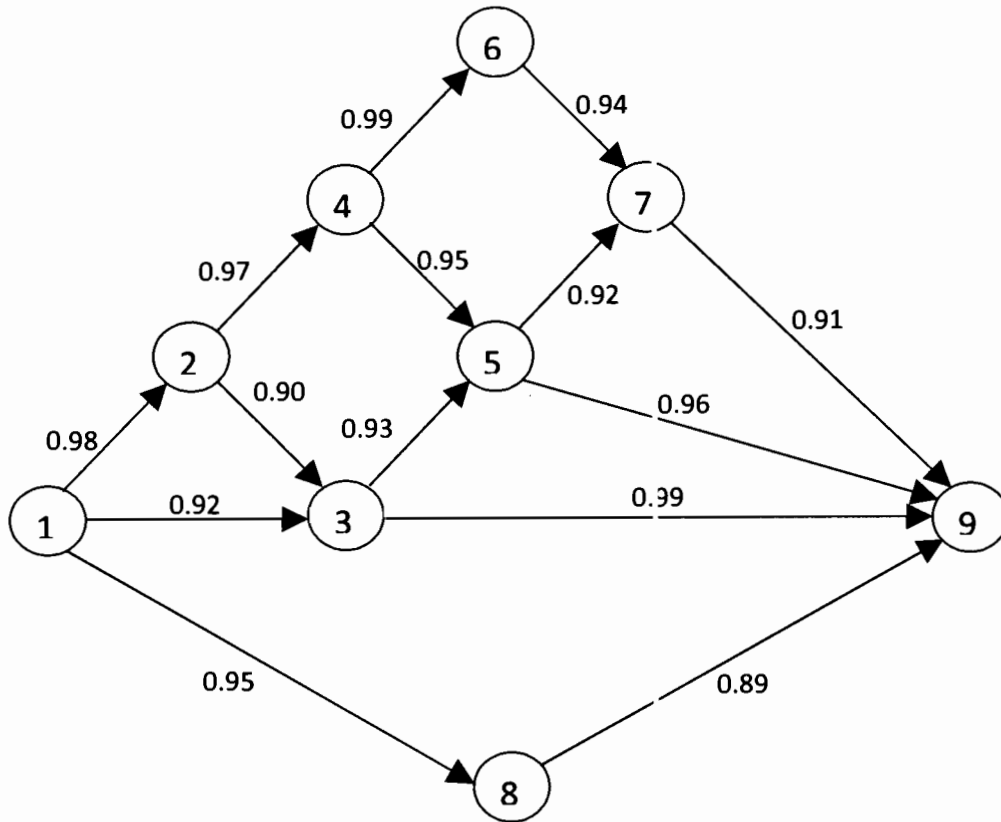


Figure 3.1

3.1 Use Dijkstra's Algorithm to find the maximum reliability and the paths.

3.1.1 Between node ① and ⑨ (9 scores)

3.1.2 Between node ④ and ⑨ (4 scores)

3.2 Use Shortest Path technique to find the total reliability and the paths.

3.2.1 Between node ① and node ⑤ (9 scores)

(Total 22 scores)

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4. Use labeling procedure.

From Figure 4.1 ,find the maximum flow between node ① and node ⑩ . (8 scores)

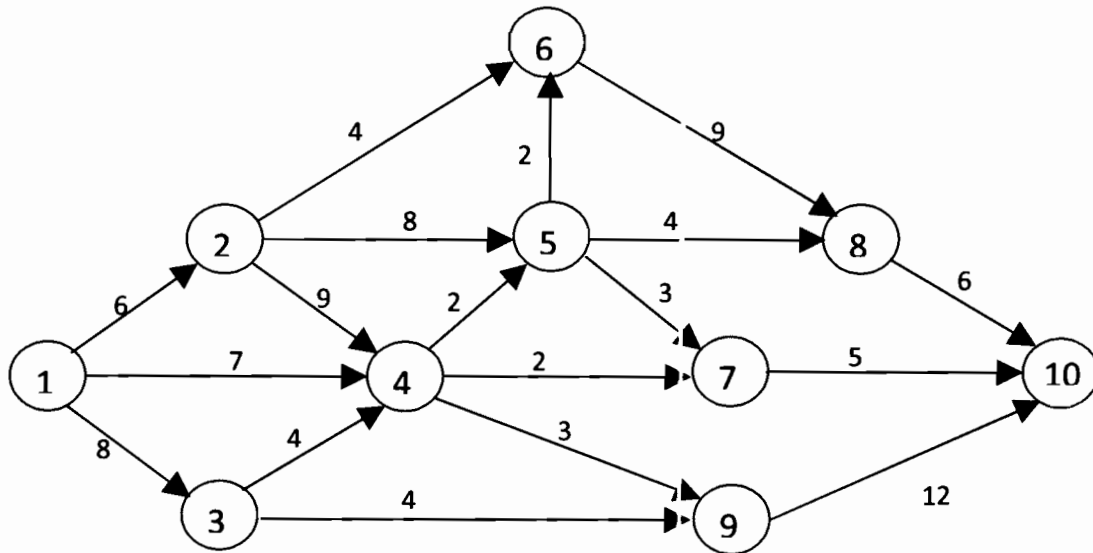
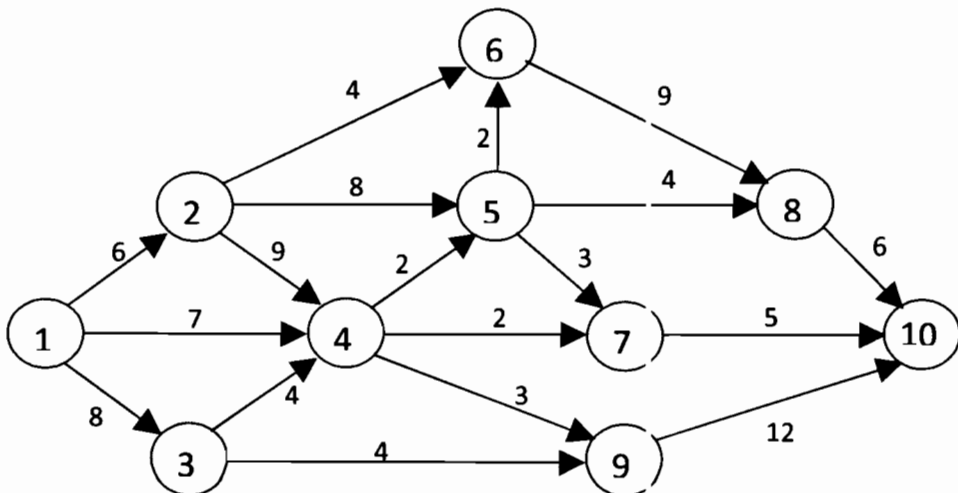
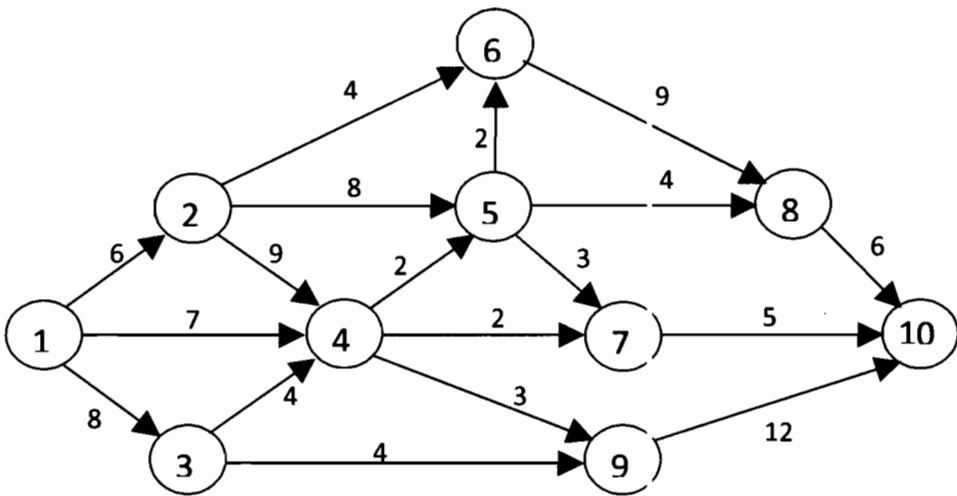
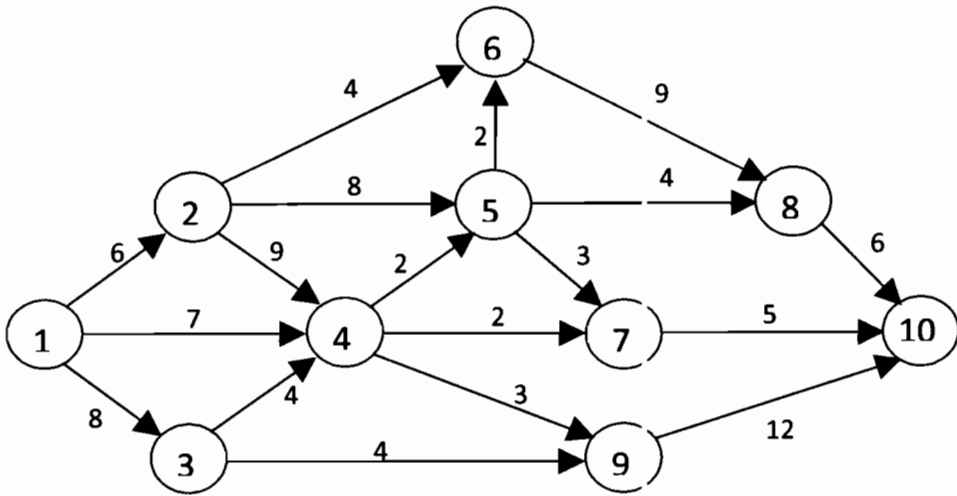


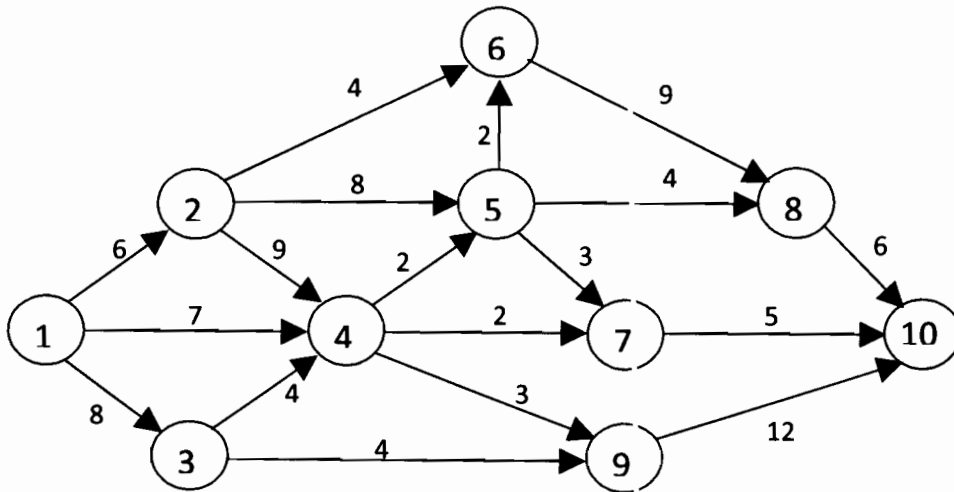
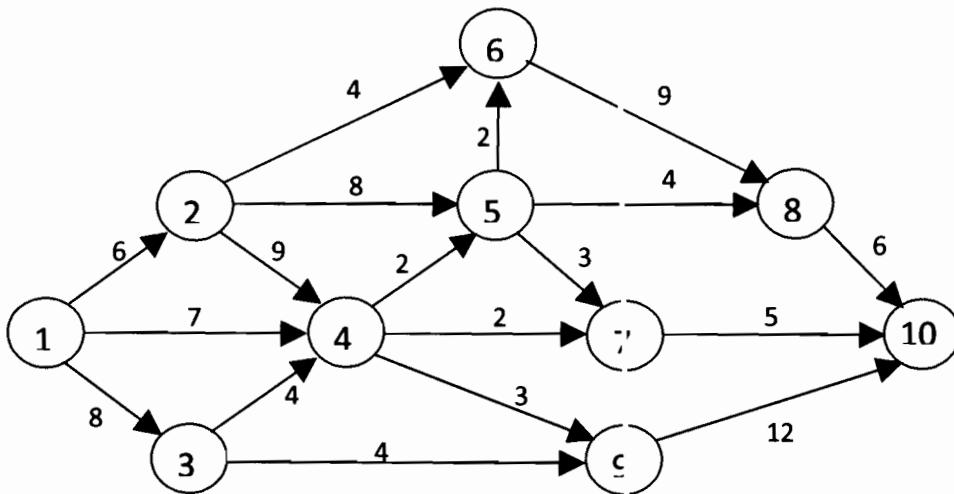
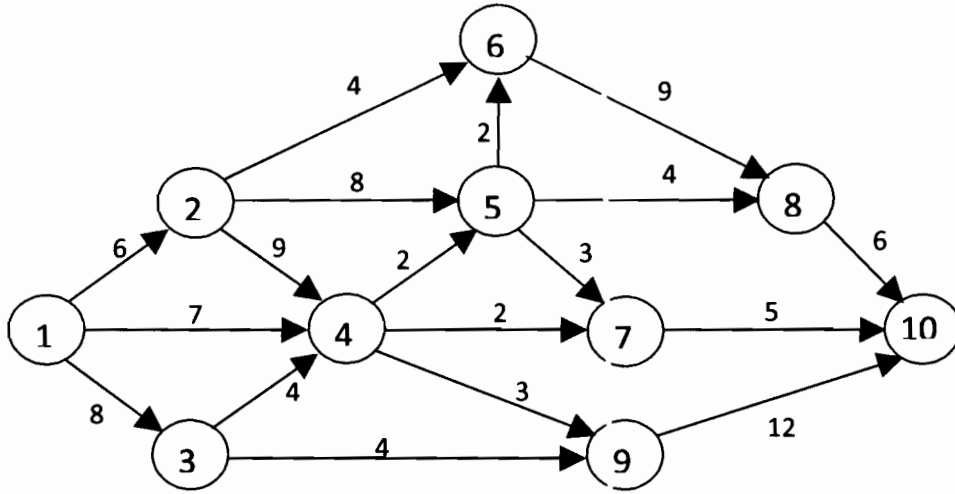
Figure 4.1

Remark the meaning of numbers in each node is capacity flow

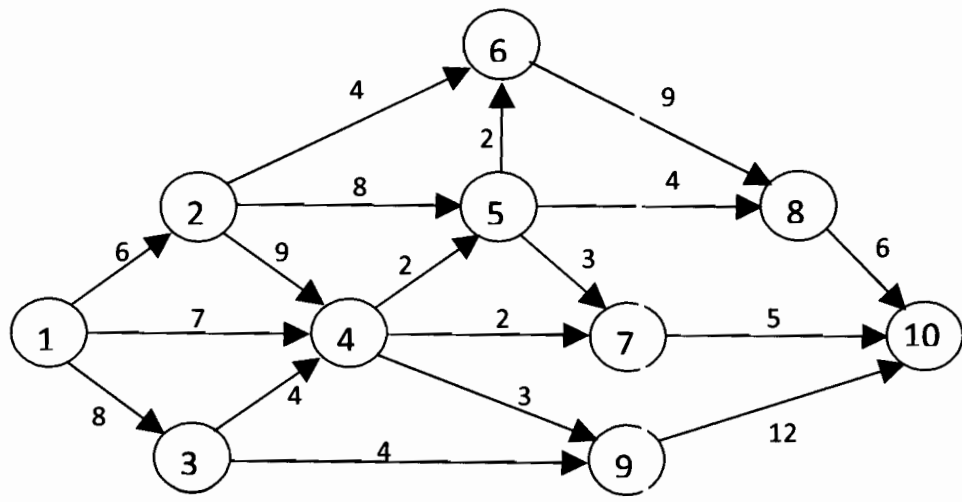
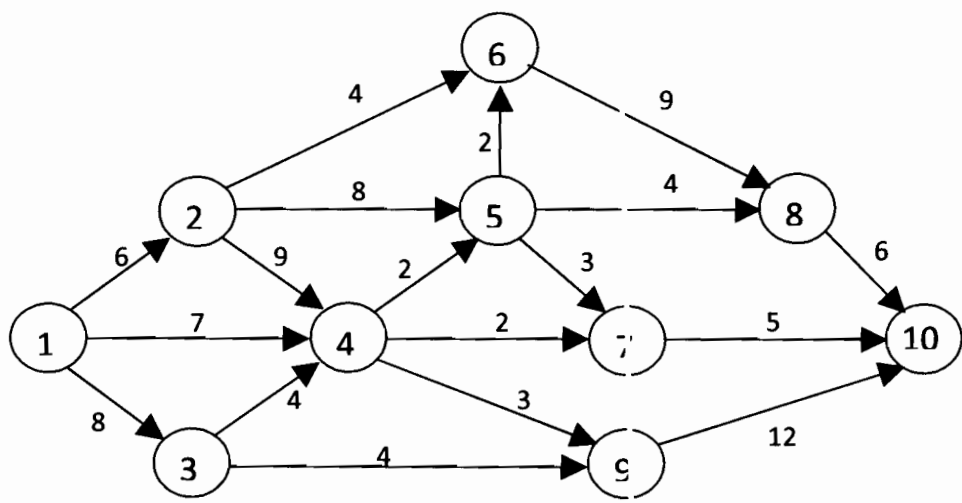
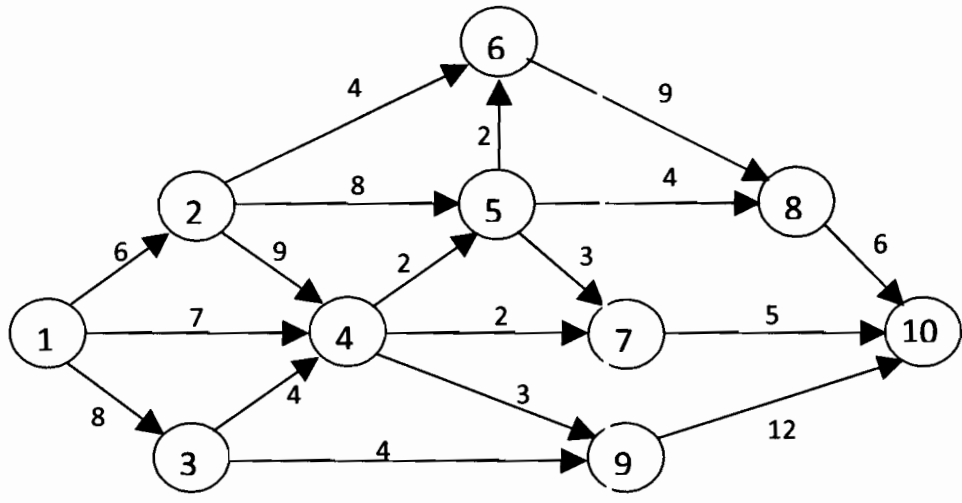
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5. Use linear programming formulates the objective function and constraints to find the maximum flow between node ① and node ⑨ in figure 5.1

Do not calculate to solve the problem

(9 scores)

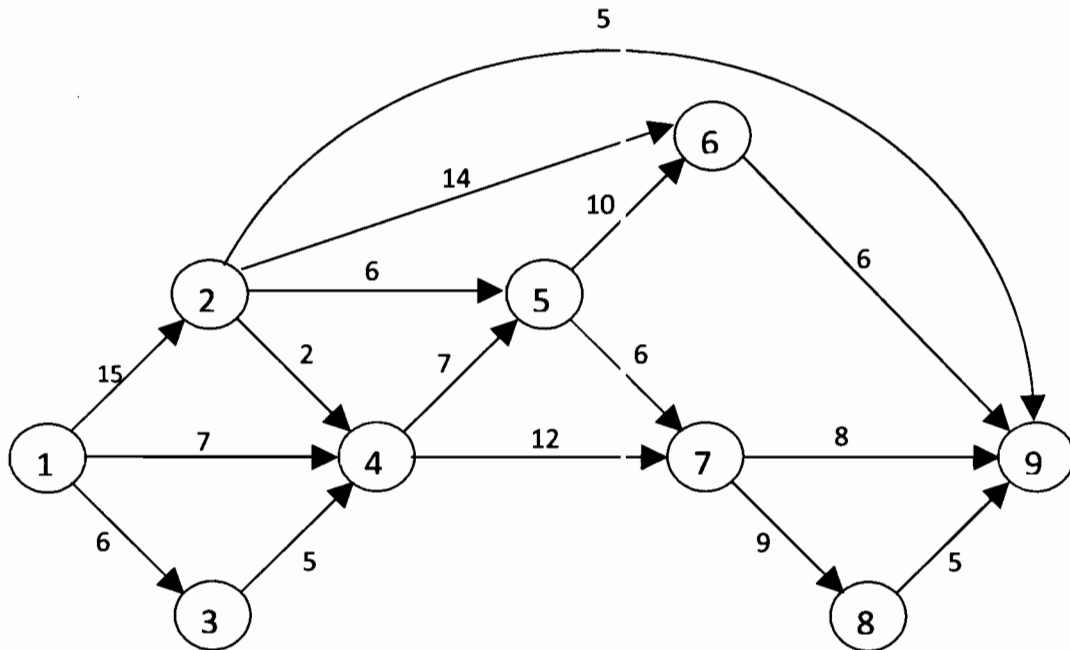


Figure 5.1

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

*Signature*

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

6. Mr. Taksin plans to deposit 60,000 million baht in the British Virgin bank for 1 year. The British Virgin bank pays the interests by there methods.

1. Deposits every three months , the interest is 2.15 % per three months.
2. Deposits every six months for , the interest is 4.30% per six months.
3. Deposits every twelve months , the interest is 8.6% per twelve months

If Mr.Taksin does not follow the rule from methods 1 to 3, he cannot get the interest.

Form method 1 to 3 or you combine all the methods. Use Shortest Path to find the maximum interest. How much will he get at the end of the year?

Suggestion : You use the decimal at least 6 digits

( 20 scores )

