

him to make payments of \$50,000 at the end of each year for the next six years. The first payment of \$200,000 at the end of year 0 is completed. Joe has identified three investment opportunities. The cost of the fund, these investments, and the interest rate are summarized in the following table:

Investment	Months	Interest Rate
A	1, 2, 3	5%
B	4, 5, 6	5%
C	1, 4	8%

The table indicates that investment A will be available at the end of each of the next six months. Investment B will be available at the end of each of the next six months. Investment C will be available at the end of each of the next six months.

Joe wants to invest his money in a way that will maximize the amount of money he has at the end of month 6. He wants to know how much money he should invest in each investment and when he should invest it. He wants to know the optimal solution.

- Draw a network flow model for this problem.
- Create a spreadsheet model for this problem and solve it.
- What is the optimal solution?

26. Telephone companies use a variety of switching devices that interconnect various network hubs in different cities. The maximum number of calls that can be made between each segment of their network is shown in the following table:

Network Segment	Maximum Number of Calls
Washington, DC to Chicago	1,000
Washington, DC to Kansas City	800
Washington, DC to Dallas	700
Chicago to Dallas	900
Kansas City to Dallas	625
Denver to San Francisco	900
Dallas to San Francisco	900

operations hub in Washington, DC, and another hub in San Francisco.

- Draw a network flow model for this problem.
- Create a spreadsheet model for this problem and solve it.
- What is the optimal solution?

27. Union Express has 60 tons of cargo that need to be shipped from Boston to Dallas. The shipping capacity on each of the routes Union Express planes fly each night is shown in the following table:

Nightly Flight Segments	Capacity (in tons)
Boston to Baltimore	30
Boston to Pittsburgh	25
Boston to Cincinnati	35
Baltimore to Atlanta	10
Baltimore to Cincinnati	5

Question

Pittsburgh to Atlanta	15
Pittsburgh to Chicago	20
Cincinnati to Chicago	15
Cincinnati to Memphis	5
Atlanta to Memphis	25
Atlanta to Dallas	10
Chicago to Memphis	20
Chicago to Dallas	15
Memphis to Dallas	30
Memphis to Chicago	15

Will Union Express be able to move all 60 tons from Boston to Dallas in one night?

- Draw a network flow model for this problem.
- Create a spreadsheet model for the problem and solve it.
- What is the maximum flow for this network?

take a variety of different paths to reach the destination through the original message
assembled. Suppose the network shown in Figure 5.41 represents a
series of computer hubs and the arcs represent the connections between
suppose the values on the arcs represent the number of packets per minute
(in 1,000,000s) that can be transmitted over each arc.

- Implement a network flow model to determine the maximum number of packets that can flow from node 1 to node 12 in one minute.
- What is the maximum flow?

FIGURE 5.41

Network hubs and
interconnections
for the mail
problem

