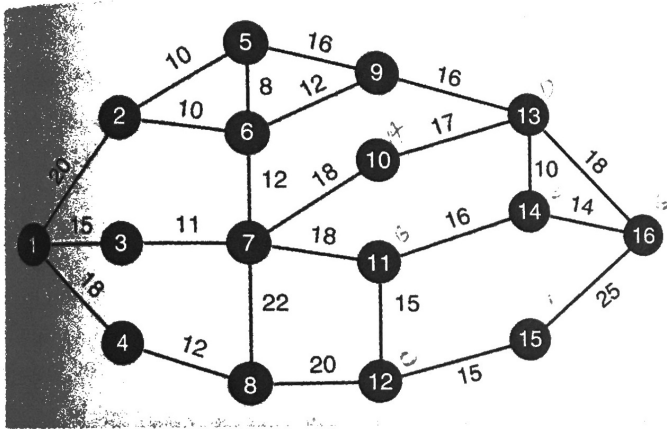


and 7, have had problems recently, and repairs on these are being considered. However, these repairs would require that these terminals (nodes) be shut down for a significant amount of time, and no material could flow into or out of these nodes until the repairs are finished. What impact would closing these nodes have on the capacity of the network?

- 9-38 The German towns around the Black Forest are represented by nodes in the network below. The distances between towns is shown in kilometers. Find the shortest route from city 1 to city 16. If flooding in cities 7 and 8 force closure of all roads leading into or coming out of those cities, how would that impact the shortest route?

Network for Problem 9-38



- 9-39 Grey Construction would like to determine the least expensive way of connecting houses it is building with cable TV. It has identified 11 possible branches or routes that could be used to connect the houses. The cost in hundreds of dollars and the branches are summarized in the following table.

- (a) What is the least expensive way to run cable to the houses?

BRANCH	START NODE	END NODE	COST (\$100s)
Branch 1	1	2	5
Branch 2	1	3	6
Branch 3	1	4	6
Branch 4	1	5	5
Branch 5	2	6	7
Branch 6	2	7	5
Branch 7	3	7	7
Branch 8	4	7	4
Branch 9	5	8	1
Branch 10	6	7	6
Branch 11	7	9	2

- (b) After reviewing cable and installation costs, Grey Construction would like to alter the costs for installing cable TV between its houses. The first branches need to be changed. The changes are summarized in the following table. What is the impact on total costs?

BRANCH	START NODE	END NODE	COST (\$100s)
Branch 1	1	2	5
Branch 2	1	3	1
Branch 3	1	4	1
Branch 4	1	5	1
Branch 5	2	6	7
Branch 6	3	7	5
Branch 7	4	7	7
Branch 8	5	8	4
Branch 9	6	7	1
Branch 10	7	9	6
Branch 11	8	9	2

- 9-40 In going from Quincy to Old Bainbridge, there are 10 possible roads that George Olin can take. Each road can be considered a branch in the shortest-route problem.

- (a) Determine the best way to get from Quincy (node 1) to Old Bainbridge (node 8) that will minimize total distance traveled. All distances are in hundreds of miles.

BRANCH	START NODE	END NODE	DISTANCE (IN HUNDREDS OF MILES)
Branch 1	1	2	3
Branch 2	1	3	2
Branch 3	2	4	3
Branch 4	3	5	3
Branch 5	4	5	1
Branch 6	4	6	4
Branch 7	5	7	2
Branch 8	6	7	2
Branch 9	6	8	3
Branch 10	7	8	6

- (b) George Olin made a mistake in estimating the distances from Quincy to Old Bainbridge. The new distances are in the following table. What impact does this have on the shortest route from Quincy to Old Bainbridge?