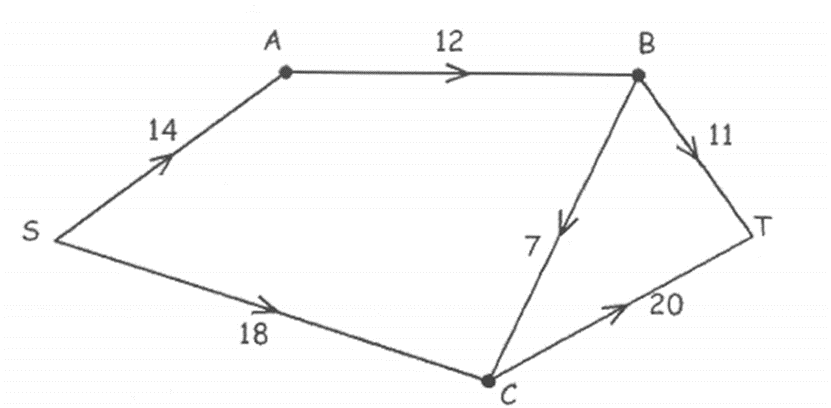
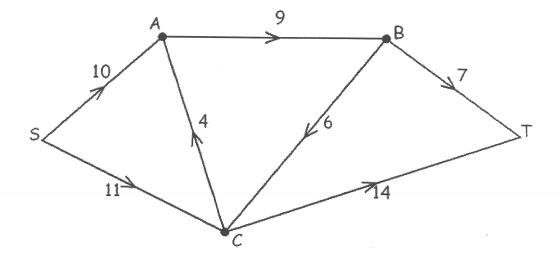
 Critical path analysis

Maximum flow minimum cut

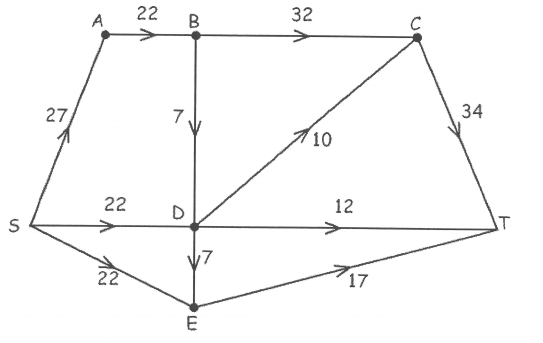
1. Find a minimum cut and the maximum flow in the following networks



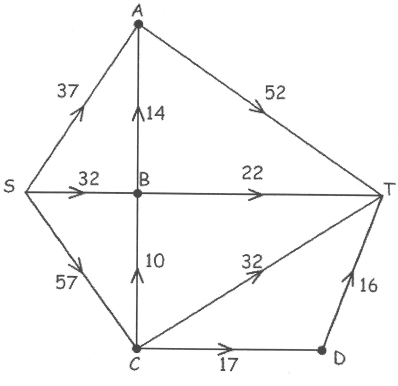




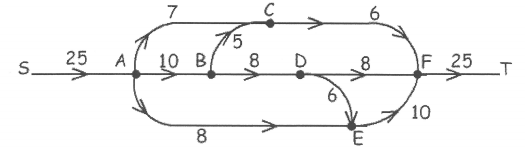
1. Find the maximum flow through the following networks and verify by finding the minimum cut.





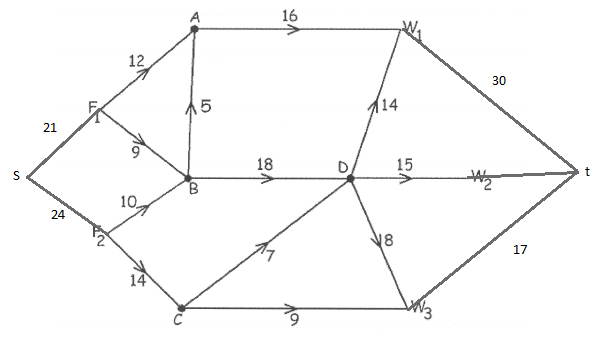


1. Find the maximum flow through the following network and a corresponding minimum cut.



Identify how you could increase the maximum flow by 1 if you can change the capacity of one edge.

1. An oil company has a underground tank and wishes to transport its product to a tanker truck. The capacities of the various routes through pipes are shown in the diagram below.

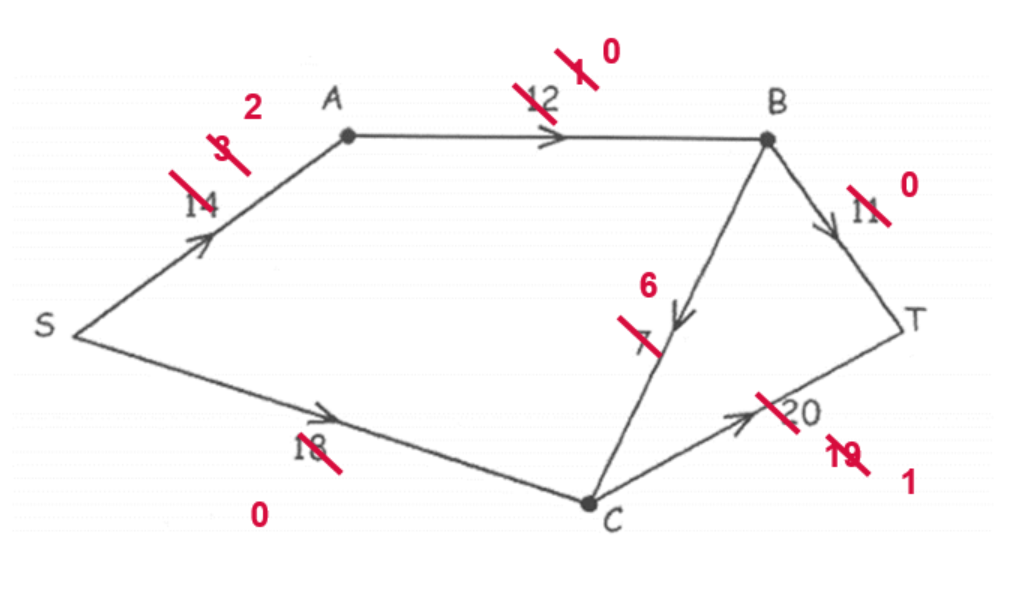


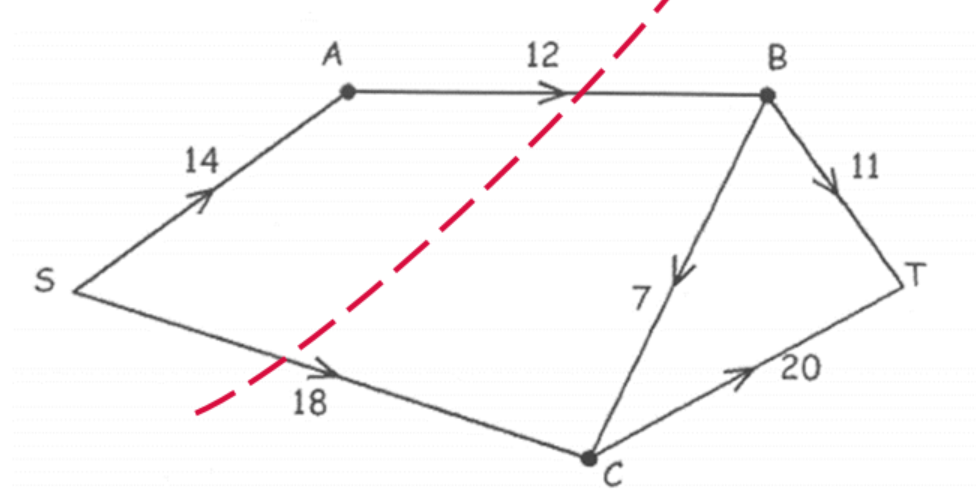
1. Find the maximum number of units of oil that can be transported through the network and determine if the demand of 40 units can be met.
   1. Verify by finding the minimum cut
   2. What is the outflow of the source?

Maximum flow minimum cut solutions

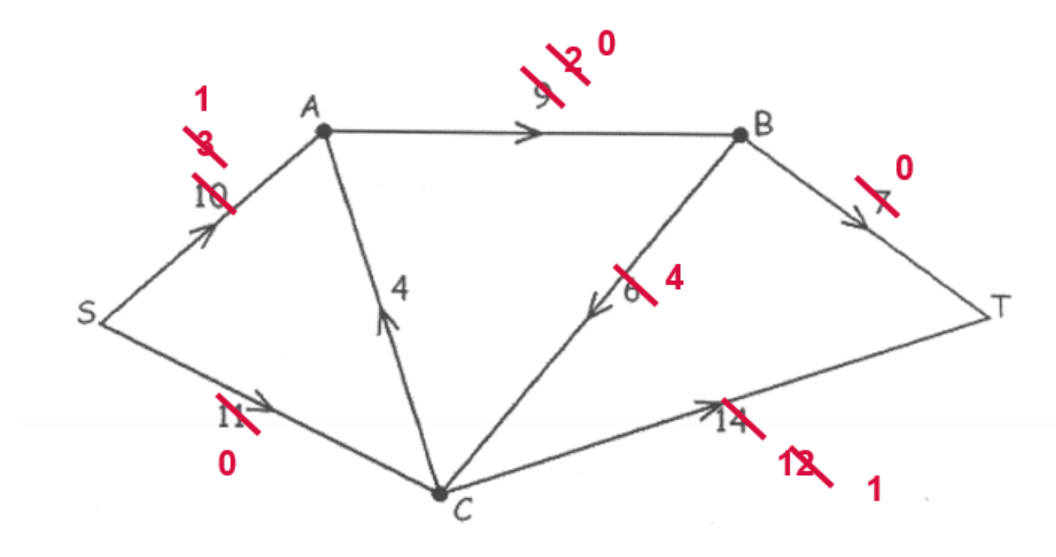
Note: The maximum flow in the solutions may be able to be achieved in other ways. There may be additional cuts equal to the minimum cut shown

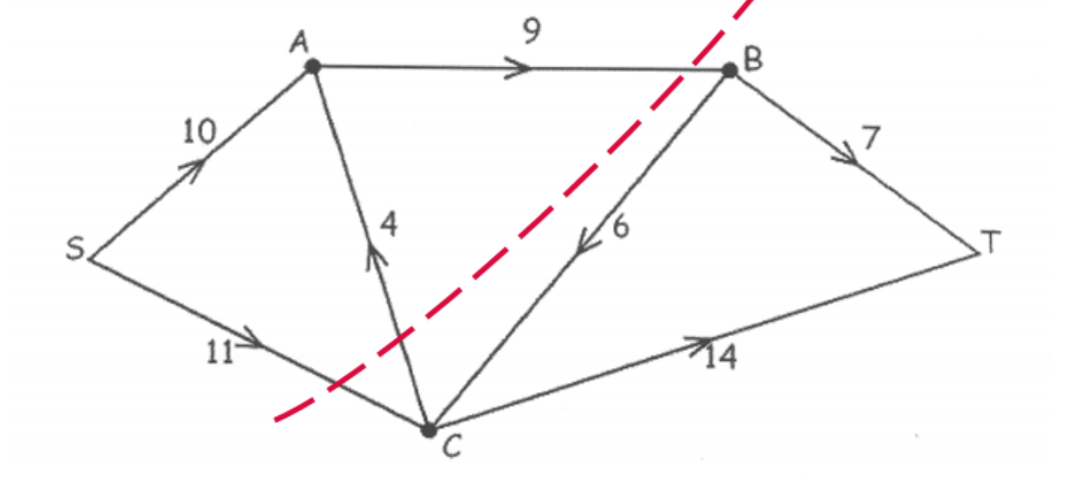
1. Find a minimum cut and the maximum flow in the following networks





This is the minimum cut as the maximum flow is equal to the minimum cut.



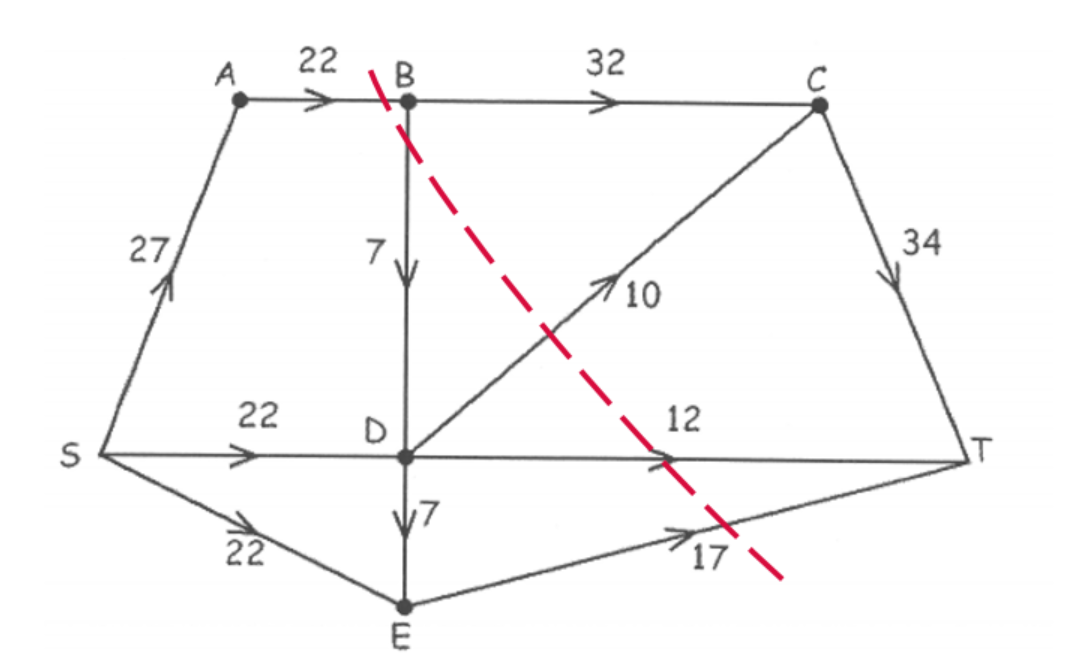


This is the minimum cut as the maximum flow is equal to the minimum cut.

CA is disregarded as it is flowing from the sink side of the cut to the source side of the cut.

1. Find the maximum flow through the following networks and verify by finding the minimum cut.

Directed network with 7 vertices. D goes to A, D and E with weights 27, 22 and 22 respectively. A goes to B with weight 22. B goes to D and C with weights 7 and 32 respectively. C goes to T with weight 34. D goes to C, T and E with weights 10, 12 and 7 respectively. E goes to T with weight 17. Flow is 22 from S to A to B to C to T, 17 from S to E to T, 10 from S to D to C to T and 12 from S to D to T.

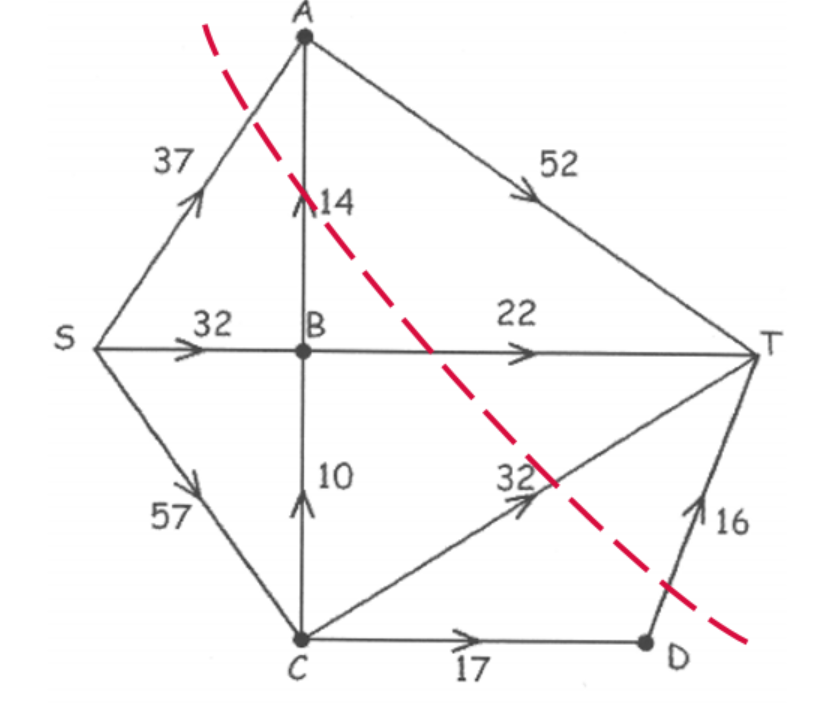



This is the minimum cut as the maximum flow is equal to the minimum cut.

BD is disregarded as it is flowing from the sink side of the cut to the source side of the cut.



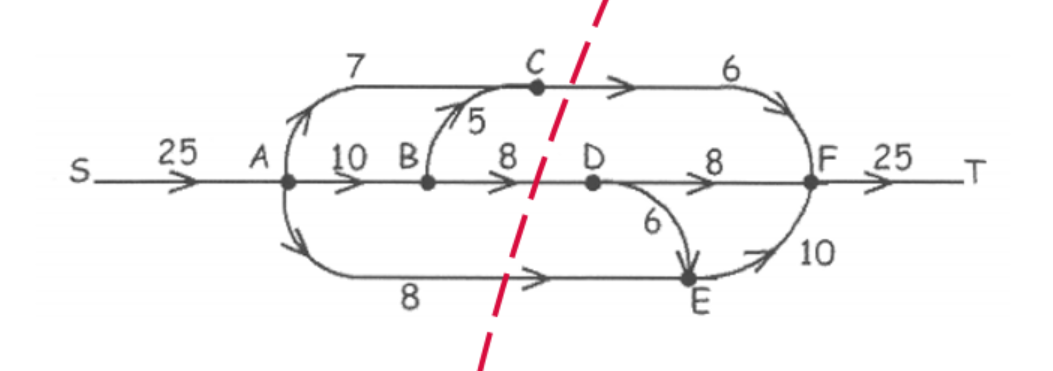
Directed network with 6 vertices. S goes to A, B and C with weights 37, 32 and 57 respectively. A goes to T with weight 52. C goes to B, T and D with weights 10, 32 and 17 respectively. B goes to A and T with weights 14 and 22 respectively. D goes to T with weight 16. Flow of 37 from S to A to T, 14 from S to B to A to T, 18 from S to B to T, 4 from S to C to B to T, 32 from S to C to T and 16 from S to C to D to T.

This is the minimum cut as the maximum flow is equal to the minimum cut.

1. Find the maximum flow through the following network and a corresponding minimum cut.

Directed network with 8 vertices. S goes to A with weight 25. A goes to C, B and E with weights 7, 10 and 8 respectively. B goes to C and D with weights 5 and 8 respectively. C goes to F with weight 6. D goes to F and E with weights 8 and 6 respectively. E goes to F with weight 10. F goes to T with weight 25. Flow of 6 from S to A to C to F to T, 8 from S to A to B to D to F to T and 8 from S to A to E to F to T.

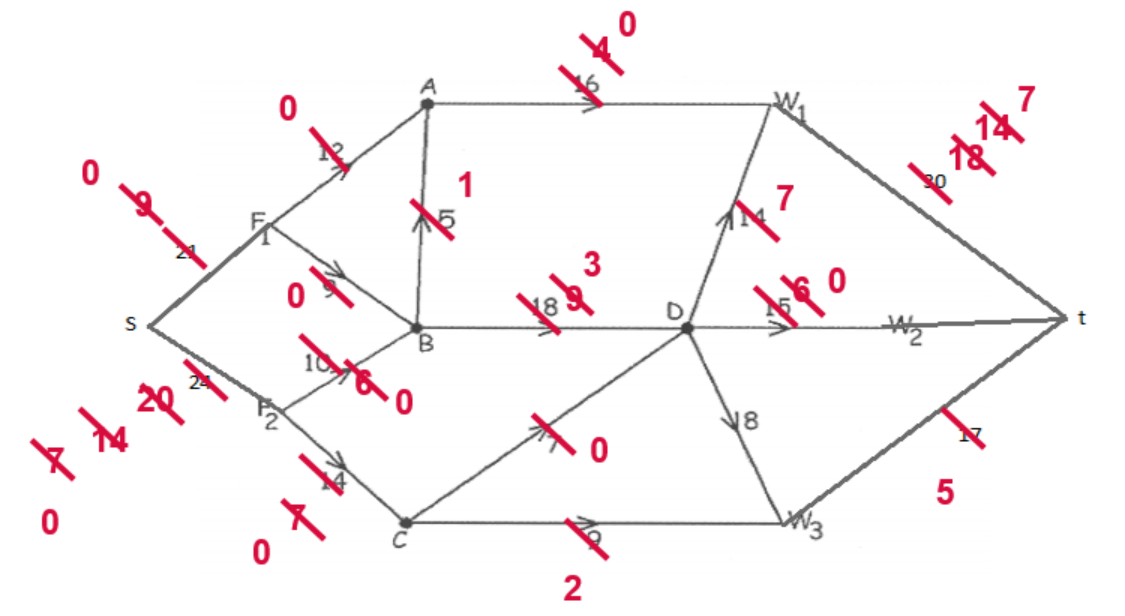



This is the minimum cut as the maximum flow is equal to the minimum cut.

Identify how you could increase the maximum flow by 1 if you can change the capacity of one edge.

Increase the capacity of CF by 1. This would increase the maximum flow to 23.

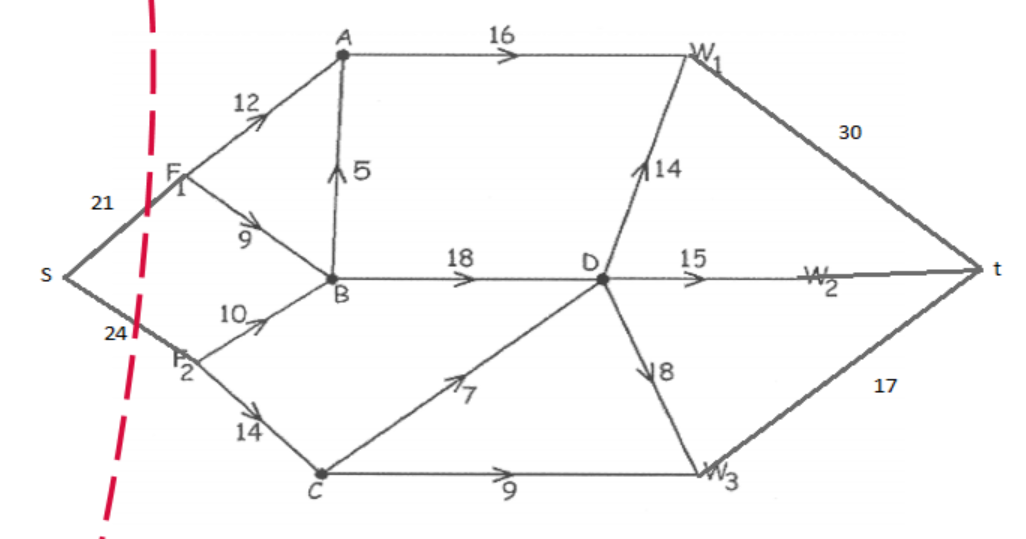
1. An oil company has a underground tank and wishes to transport its product to a tanker truck. The capacities of the various routes through pipes are shown in the diagram below.



1. Find the maximum number of units of oil that can be transported through the network and determine if the demand of 40 units can be met.

The demand of 40 units is met.

* 1. Verify by finding the minimum cut



This is the minimum cut as the maximum flow is equal to the minimum cut.

* 1. What is the outflow of the source?