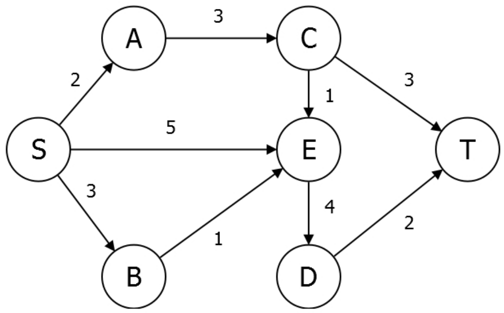
Flow Algorithms

LATEST SUBMISSION GRADE
64.76%

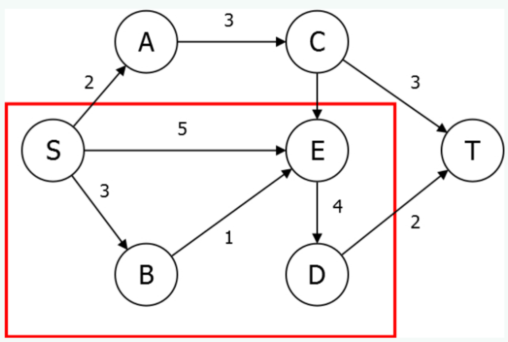
1. Which vertices are in the minimum S-T cut in the network below?

0.571 / 1 point



- [ ] A
- [x] B

Correct
The mincut below has size 4 and contains B.

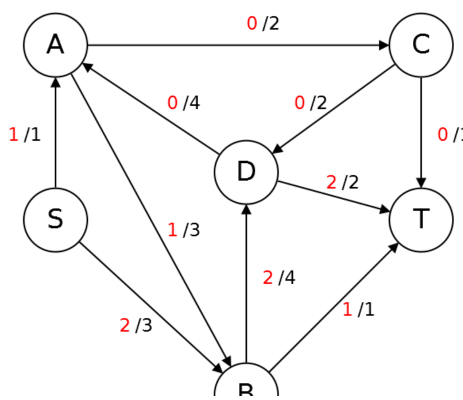


- [ ] C
- [ ] D
- [ ] E
- [ ] S
- [ ] T

You didn't select all the correct answers

2. What is the augmenting path that will be used by the Edmonds-Karp algorithm to increase the flow given below?

0 / 1 point



- ( ) S-B-A-C-D-T
- ( ) S-A-C-T
- ( ) S-B-T
- ( ) S-B-A-C-T
- (•) S-B-D-C-T

! **Incorrect**
Incorrect. This is a valid augmenting path, but there is a shorter one using the edge B->A in the residual graph.

3. Which of the statements below is true?

0.667 / 1 point

- [x] The sum of the capacities of the edges of a network equals the sum of the capacities of the edges of any residual network.

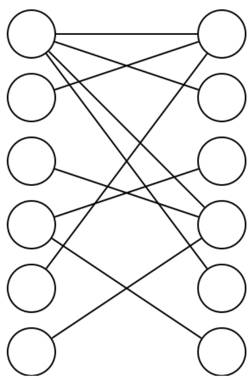
✓ **Correct**
True. The reduced capacity of any edge of the network is exactly compensated for the by the capacity of the reverse edge.

- [ ] The Ford-Fulkerson algorithms runs in polynomial time on graphs with unit edge capacities.
- [ ] The Edmonds-Karp algorithm is always faster than the Ford-Fulkerson algorithm.

You didn't select all the correct answers

4. What is the size of the maximum matching of the following graph?

1 / 1 point



4

✓ **Correct**

5. Consider the image segmentation problem on a picture that is given by an n by n grid of pixels. Suppose that separation penalties are imposed only for adjacent pairs of pixels. If we use the Edmonds-Karp algorithm to solve this problem as described in class, the final runtime is O(n^a) for some a. What is the best such a?

1 / 1 point

6

✓ **Correct**
Correct. We need to compute maximum flow on a graph with V=O(n^2) and E=O(n^2). The runtime of Edmonds-Karp is at worst O(E^2 V) = O(n^6).