

Exercises of lecture  
**Mobile Ad Hoc Networks**  
 Summer 2007  
 Sheet 3

**SECTION 1:**  
 Max-Flow problem

1. Consider network of figure-1 with the capacities written over the edges as follows:

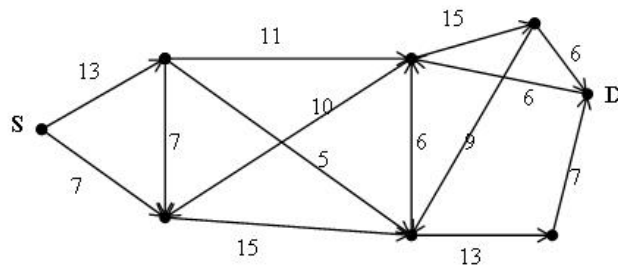


Figure 1:

- Apply Edmonds-Karp algorithm to find the max flow from source S to destination D. Show the path found during each step from S to D in separate figure.
- Find min-cut in the network given above.

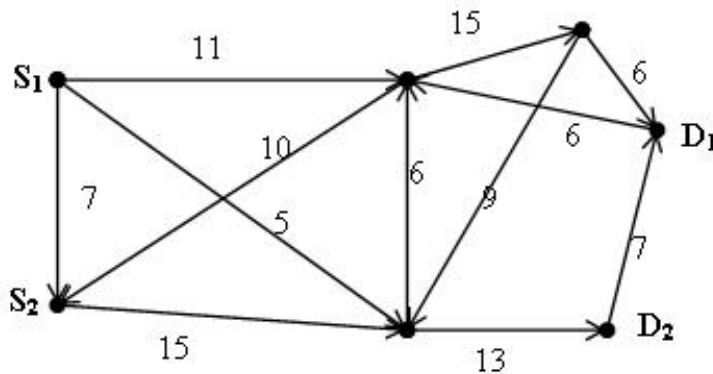


Figure 2:

2. Consider the network of figure-2 with capacities written over the edges as follows:

- Apply Edmonds-Karp algorithm to find max aggregated flow from sources S1, S2 to destination D1, D2.

## SECTION 2:

### Random Placement Model

1. According to Figure 3, consider a quadratic area that consists of 16 squares and the size of each square is 5m x 5m. We want to place each sensor randomly and uniformly in each square of the area so that they are connected to each other.

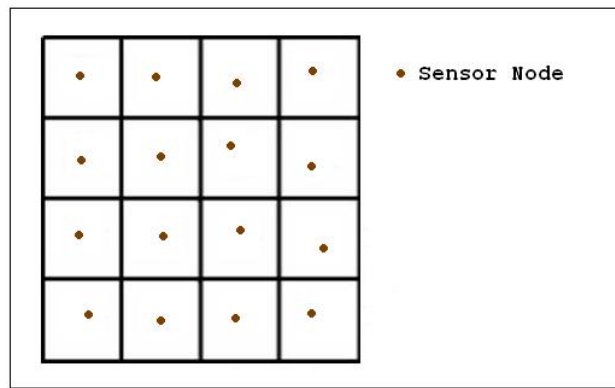


Figure 3:

- Based on the random placement model, if we have 16 sensor nodes, what is the probability that exactly 1 sensor node is placed in one square?
- However, to ensure the desired connectivity of all sensor nodes in the area, how many sensor nodes should be prepared?