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Algorithms

WS 2015/16

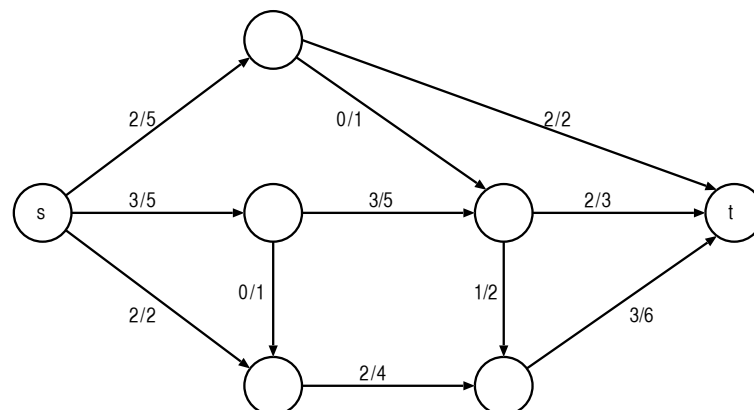
Exercise 3

(discussed on November 6th, 2015)

Prepare yourself to present your solutions to your fellow students.

1. Ford-Fulkerson (Niveau I)

(a) Use the Ford-Fulkerson algorithm to find a maximum flow in the network

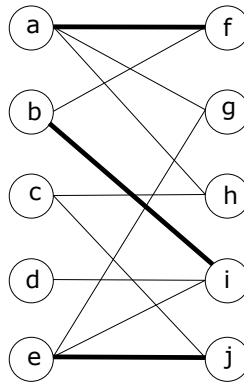


Start with the initial flow f . An edge label f/c means initial flow f and capacity c .

(b) Find a minimum cut proving the maximality of the flow.

2. Matching and Bipartite Graphs (Niveau I)

(a) Apply the matching augmenting algorithm for bipartite graphs to the graph below and compute a maximum cardinality matching from the initial matching.



3. Marriage Theorem (Niveau II)

Prove that a bipartite graph $G = (A \cup B, E)$, with $|A| = |B| = n$, has a perfect matching if and only if for all $B' \subseteq B$, $|B'| \leq |N(B')|$, where $N(B')$ is the set of all neighbors of nodes in B' .