Technische Universität Chemnitz
S. Dienelt

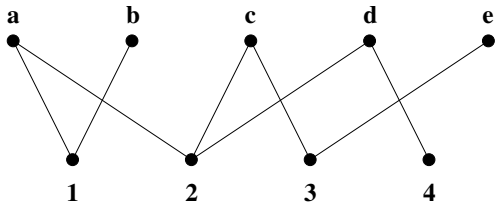
Chemnitz, 19. December 2007
Deadline: 8. January 2008

Disposal until 14:00, in room Rh. 39/715!!

Introduction to Discrete Mathematics
Task 9

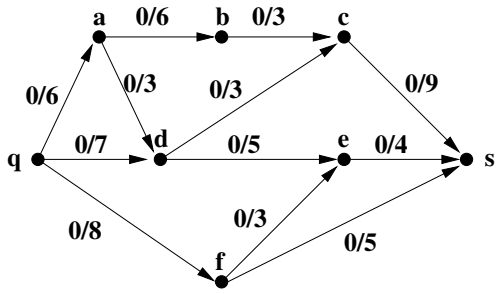
1. (3 scores)

   Find a maximal matching for the following bipartite graph by constructing a maximal flow.



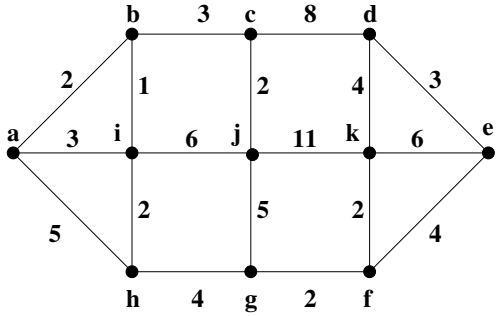
2. (3 scores)

   Calculate a maximum flow from q to s in the following network (the numbers on a edge are the capacities). Use the algorithm of Ford and Fulkerson. Which edges are contained in the minimal cut?



3. (3 scores)

   Solve the chinese postman problem for the following road map:



4. (2 scores) Has any eulerian bipartite graph an even number of edges?

5. (3 scores) Determine all simple and non-isomorphic graphs $G = (V, E)$, with $|V| = 11$, which consists of the three components $G1$, $G2$ and $G3$. It should be:

   G_1 eulerian and regular

G_2 contains exactly one bridge

G_3 can be decomposed in two edge-disjoint perfect matchings.

Hint: A matching $M \subseteq E'$ of a graph $G = (V', E')$ is called *perfect*, if $V(M) = V'$ holds.

*** Christmas-task**

See the german version, please.

Merry Christmas and a happy new year!