



Bergische Universität Wuppertal

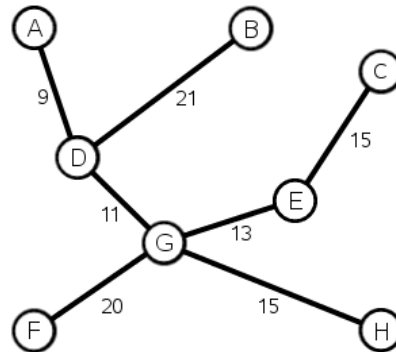
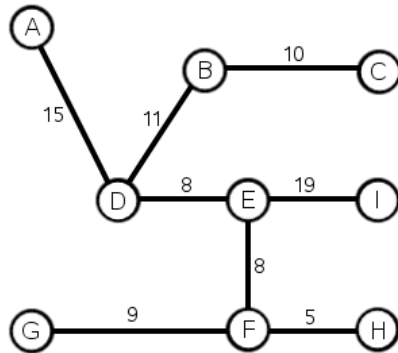
Fachbereich C – Angewandte Mathematik / Optimierung und Approximation

Prof. Dr. K. Klamroth, Dipl. Math. M. Kaiser

Besprechung der Aufgaben: Dienstag 06. Juli 2010

Aufgabe 33:

Consider the following two trees:



- Find the absolute 1-center of the trees.
- Find the vertex 1-center of the trees.
- Find the absolute 2-centers of the trees.

Aufgabe 34:

Show that the solution to the absolute 1-center problem on an unweighted tree is unique.

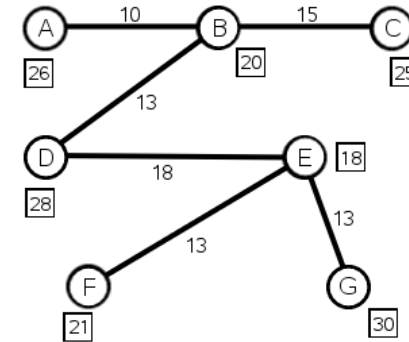
Aufgabe 35:

Considering a 1-center problem on a tree, it is possible to obtain a solution of a weighed problem (e.g. the weights can be demand units) by evaluating

$$\beta_{ij} = \frac{h_i h_j d(i, j)}{h_i + h_j}$$

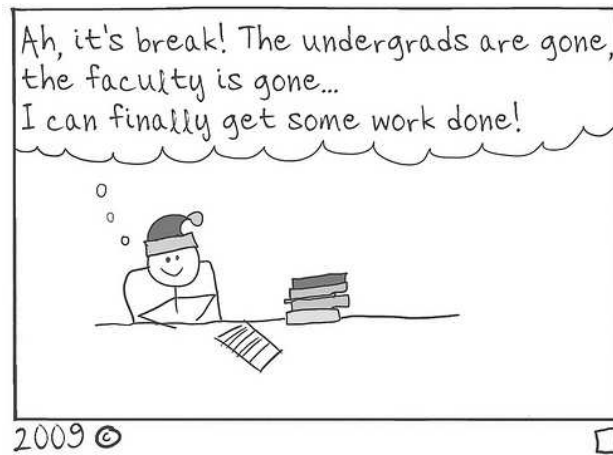
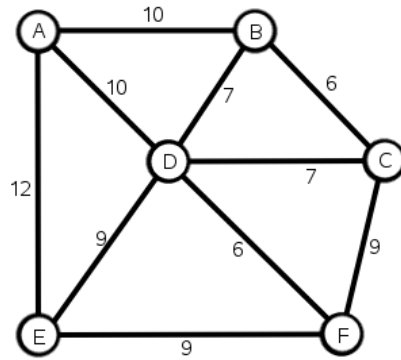
for every pair of nodes (i, j) with weights h_i and h_j and distance $d(i, j)$ between these nodes (i.e. the length of the path from node i to node j), determining $\beta_{ST} = \max_{i,j}(\beta_{ij})$ (with corresponding nodes S and T) and locating the optimal solution at a point $\frac{h_T}{h_S+h_T}d(S, T)$ on the unique path from S to T .

- Justify this solution approach for the demand-weighted 1-center problem on trees. How many evaluations of β_{ij} are necessary to solve a problem. Formulate an idea of an algorithm which reduces the number of evaluations.
- Find the demand-weighted 1-center of the following tree.



Aufgabe 36:

- Formulate a binary search algorithm for the vertex P -center problem on a general graph based on the ideas explained in Section 6.4.1.
- For the following network, solve the vertex 2-center problem. Clearly show the results of each iteration of the algorithm including the lower and upper bounds on the implied coverage distance, the coverage distance used in solving each of the set covering problems, and the number of facilities needed to cover all nodes within that distance.



Bemerkung: Aktuelle Informationen zur Vorlesung und zu den Übungen finden Sie im Internet unter:

http://www.math.uni-wuppertal.de/opt/location_ss2010/