Chair for Algorithms
and Data Structures
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Efficient Route Planning
SS 2011

http://ad-wiki.informatik.uni-freiburg.de/teaching

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Exercise Sheet 6

Submit until Friday, Juli 15 at 2:00pm

Exercise 1 (3 points)

Implement the precomputation for transit node routing, based on contraction hierarchies, as described in the lecture. That is, for a given graph, use contraction hiearchies to determine a set $X = Y$ of transit nodes, and then compute and store for each node u, sets $X(u) \subseteq X$ and $Y(u) \subseteq Y$ of access nodes ($X(u) = Y(u)$ for symmetric graphs), as well as the distances $\text{dist}(u, x)$ and $\text{dist}(y, u)$ for each $x \in X(u)$ and $y \in Y(u)$.

Find a threshold which gives you a good combination of the size of $|X| = |Y|$ (the smaller the better) and $\sum_u |X(u)|$ and $\sum_v |Y(v)|$ (the smaller the better). Post these numbers in a table that will be provided on the Wiki, along with the time needed for this part of the precomputation.

Exercise 2 (3 points)

Compute and store all $\text{dist}(x, y)$ for all x and y with $x \in X$ and $y \in Y$. Report the time needed for this part of the precomputation on the Wiki, too.

Exercise 3 (3 points)

Implement that part of the query algorithm that, assuming that $L(s, t) = \text{false}$, computes the distance between s and t based on the precomputed distances.

Exercise 4 (optional)

If you want, also implement a method for computing a correct value for $L(s, t)$, that is, such that if $L(s, t) = \text{false}$ then the the distance computed via the precomputed distances is the correct $\text{dist}(s, t)$.

Exercise 5 (1 point)

Don't forget your *feedback-exercise-sheet-6.txt*, we really want to know how you are doing!