Homework lecture 11

Shortest Path

Given *n* cities (numbered from 1 to *n*) and *m* roads connecting cities. The dirty level between two cities *u, v* is D[*u,v*] (D[*u,v*] might be negative). You have two tasks:

a. Write a program to find a path from a starting point *s* to the end point *e* such that the total dirty level on the path is the smallest.

b. Write a program to find the shortest paths for all pairs of vertices

Input: Data come from file dirty.txt in the following format:

- The first line contains four integer numbers *n, m, s, e*
- *m* following lines each contains 3 integer numbers *u, v, d* indicating that the dirty level of road from *u* to *v* is *d*.

Output: Results are written to file "dirty.out" in the following format:

- The first line contains the total dirty level of the path from *s* to *e*.
- The second line contains cities on the path from *s* to *e*.
- The next *n* lines each contains *n* integer numbers are the shortest distance matrix for all pairs of vertices. (output INF if there is no path between two cities).

Example:

dirty.txt	dirty.out
5 9 3 2 1 2 5 2 3 2 4 3 4 4 5 1 5 1 1 5 2 3 3 5 7 1 4 2 3 1 3	8 3 1 2 0 5 6 2 3 5 0 2 7 8 3 8 0 5 6 2 4 4 0 1 1 3 5 3 0