

Advanced Algorithms

Programming Assignment 1

Topic:

Write a program to generate the minimum spanning tree for an input graph and evaluate its weight.

Programming language: C/C++ or Java

Due date: Dec. 20, 2004 (Monday)

Description:

Implement Kruskal's algorithm or Prim's algorithm to find the minimum spanning tree over a *weighted undirected graph*. Your program *must* have the capability to read a graph from a file. The file format is as follows. The first line has two numbers separated by a space. The first number tells you the number of nodes in the graph and the second one gives you its number of edges. Vertices are labeled by consecutive integers starting from 0. From the second line to the last line, each line contains three numbers: $n_j n_k w_i$, which asserts that the weight of the edge (n_j, n_k) is w_i .

Where to get the input files:

http://staffweb.ncnu.edu.tw/shieng/Algorithm/alg_main04.htm

There are seven test files. Your program must read one file at once and output the weight of the minimum spanning tree of the graph specified by this file. The file name of a graph should be sent to your program as an *argument*, therefore there is only one executable file for all of the test data. You *should not* hard-wire the file name in your code and compile seven executable files. You also need to allocate the memory dynamically, since our TA will run *different* test files (even larger than 1000 nodes) for your program while grading. You may get low grade if your program cannot handle the memory appropriately.

How to deliver you results:

Email your work to our teaching assistant (吳展碩, s2321504@ncnu.edu.tw) with the title “高演程式一”. It must contain at least 1) the source code; 2) the execution result; 3) a document on how to use your program; 4) the filled form with your own information. Good luck.