

Extra Credit Programming Assignment — due Friday, December 8

General description

Implement Prim's algorithm for constructing a minimum spanning tree (Section 24.2 of CLR) using two different priority queue datastructures: binary heaps and unsorted arrays.

Input

The code you turn in should read the graph *from the standard input* according to the following format. The first line starts with the letter `n` followed by a blank followed by the number of vertices. The second line starts with the letter `m` followed by a blank followed by the number of edges. The following `m` lines give the edges of the graph. Each line starts with letter `e`, followed by the two ends of an edge followed by the length of this edge, with spaces as separators. You may assume that:

- vertices of the graph are numbered from 0 to $n - 1$;
- edge lengths are integer numbers;
- each edge appears only once in the list of edges.

Sample input:

```
n 3
m 3
e 0 1 100
e 0 2 200
e 1 2 100
```

Output

Your code should print *to the standard output*

- the length of the minimum spanning tree for the input graph;
- the running time for Prim's algorithm using a heap as a priority queue; and
- the running time for Prim's algorithm using an unsorted array as a priority queue.

Sample output corresponding to the above sample input:

```
MST length: 200
PRIM-HEAP time: 0.00 sec.
PRIM-ARRAY time: 0.00 sec.
```

Programming language

You may use C, C++, or Java for completing the project. Your code should compile and execute on `acme`. By default your code will be compiled using `gcc`. If your source code is spread over several files or you are using a compiler other than `gcc`, you must also submit the appropriate `make` file with your project.

Turn-in

E-mail your source code (attachments preferred) in a message with the subject "3500c extra credit project submission" to `gte855t@prism.gatech.edu` by 11:59pm, Friday, December 8. If your code consists of several files, send a single `tar` file containing all of them.