Mathematics u34605 (algorithms and data structures) Michaelmas 2020

December 7, 2020

1 Fourth assignment, due midnight 31/12/20

Use the submit-work program to submit your C program (nothing else).

The assignment is to implement Dijkstra's shortest weighted path algorithm. Your program must take the source from the command line and the graph from standard input.

There is a program dijkstra-base.c in the sample code. It is missing run_dijkstra() but contains everything else.

There are some sample data files tt 2-2, 6-15, 8-20 in the module data subdirectory. Here are sample runs— I can't guarantee that the output is correct.

The input format is much the same as for graphs or directed graphs, but the edge weights are included.

```
\% a.out 0 < 2-2
2.2
0 1 1 0.375489
1 1 0 0.633885
with source 0, weights 0 0.375489
% a.out 2 < 6-15
6 15
0 2 1 0.300089 5 0.0735218
1 2 0 0.590313 4 0.0698645
2 2 0 0.826766 1 0.427533
3 3 0 0.250928 1 0.0693003 2 0.815126
4 3 0 0.298336 1 0.211372 3 0.977906
5 3 1 0.0110994 2 0.119589 4 0.944324
with source 2, weights 0.795733 0.427533 0 1.4753 0.497397 0.869255
% a.out 3 < 8-20
8 20
0 2 6 0.748679 7 0.071426
1 2 0 0.329821 7 0.872748
2 3 0 0.996817 1 0.492601 5 0.621455
3 2 1 0.498223 2 0.588217
```

4 3 1 0.687886 2 0.678705 3 0.750996 5 2 3 0 4 0.234205 6 2 4 0.362566 5 0.875065 7 4 1 0.23313 2 0.247767 5 0.371342 6 0.0093914 with source 3, weights 0.828044 0.498223 0.588217 0 1.27143 1.20967 0.908861 0.89947