1   Administrivia

You may:

1. Choose a reasonable language, but be sure it compiles and/or runs on home.cs.siue.edu.

2. Choose a partner.

3. If you use an LLM, don't forget the transcript. Cite your sources otherwise.

2   Assignment

Implement the Uniform Cost Best-First algorithm (aka Dijkstra's) and use your implementation to find the shortest path from node 1 to all other nodes. Then, modify your algorithm to implement breadth-first and depth-first search. Compare the performance and path lengths of the three algorithms and turn in your code and your findings.

We'll all work on the same problem set, so I'm providing several graphs as simple text files: 10-node graph, 20-node graph, and a 100-node graph. Compute solutions for all three.

The text files are organized as follows:

- First line of the file is the number of vertices.

- Each other line is a list of integers separated by spaces.

- The first number in these lines is the name of the vertex.

- The remaining numbers in these lines are pairs, denoting the name of a neighbor node and the weight or distance from the vertex named by the first number of the line.

As an example of how to read the graph files, consider that the simple graph used in lectures can be written as:

```
5
A B 6 D 1
D A 1 B 2 E 1
B A 6 D 2 E 2
E D 1 B 2 C 5
C E 5 B 5
```