COP4414 - Project #3
Graph Man

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Development Environment

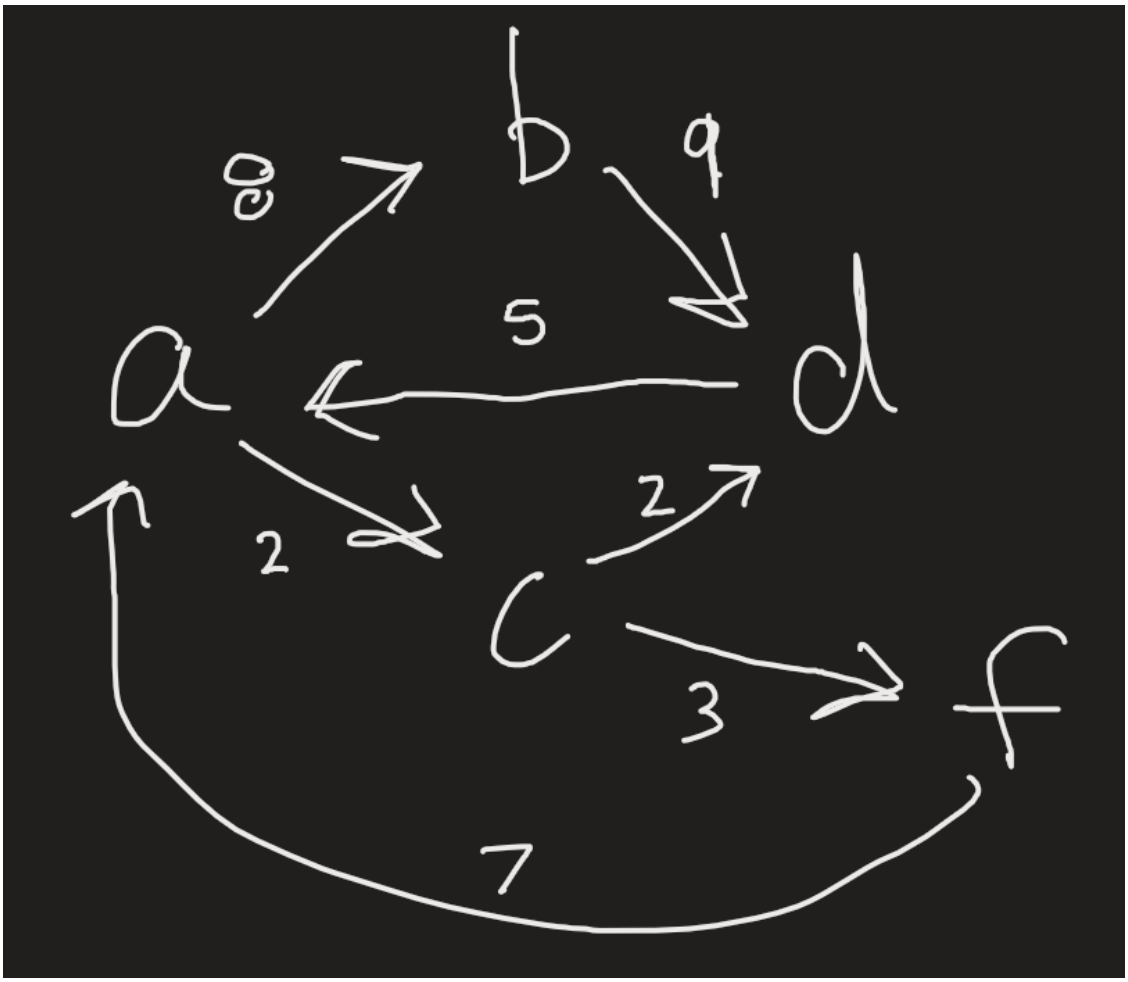
The program was developed using CLion (Version 2021.2.3) as the IDE on Windows 10 with MinGW-w64 being used as the compiler.

How to Run & Assumptions Made

In the main you will have to absolute path to your text file (line 33 in graphMan.cpp) with the graph information. The text file should be structured such that the first line indicates the number of nodes. Each node should be listed on its own line following the number. Every subsequent line after the nodes should be a comma delimited input of node1, node2 and its weight. See Graph File and Structure for an example. Otherwise, the program is rather self-explanatory when running. Just follow the given prompts.

Test Files

The following test files utilize the following graph



testGraph.cpp

```
C:\Users\camer\CLionProjects\Project3\cmake-build-debug\testGraph.exe
Done adding! Now testing major functions
Printing adjList
a >> b c
b >> d
c >> f d
d >> a
f >> a
Breadth First Search path starting from: a
a, b, c, d, f
Depth First Search path starting from: a
a, c, d, f, b
Depth First Search (ordered by increasing degree) path starting from: a
a, b, d, c, f
a >> c >> d
Distance is: 4

Process finished with exit code 0
```

A simple test file for see if the graph functions work correctly. A predetermined graph is created and utilized.

testMenu.cpp

Tests all graph functions with a menu. A predetermined graph is created and utilized.

```
C:\Users\camer\CLionProjects\Project3\cmake-build-debug\testMenu.exe
  GraphMan
  ------------------------------------------------
Please select one of the following:
 [1] Print the shortest path between two nodes
 [2] Print adjacency list
 [3] Breath First Search
 [4] Depth First Search
 [5] Ordered Depth First Search
 [6] Exit Program
Enter your selection:1
 Please enter the source vertex you want to begin searching from:
a
Please enter the destination vertex you want to begin searching from:
f
a >> c >> f
Distance is: 5
```

```
  GraphMan
  ------------------------------------------------
Please select one of the following:
 [1] Print the shortest path between two nodes
 [2] Print adjacency list
 [3] Breath First Search
 [4] Depth First Search
 [5] Ordered Depth First Search
 [6] Exit Program
Enter your selection:2
 Printing adjList
a >> b c
b >> d
c >> f d
d >> a
f >> a
```

```
  GraphMan
  ------------------------------------------
Please select one of the following:
 [1] Print the shortest path between two nodes
 [2] Print adjacency list
 [3] Breath First Search
 [4] Depth First Search
 [5] Ordered Depth First Search
 [6] Exit Program
Enter your selection:3
 Please enter the vertex you want to begin searching from:
a
Breadth First Search path starting from: a
a, b, c, d, f
  GraphMan
  ------------------------------------------
Please select one of the following:
 [1] Print the shortest path between two nodes
 [2] Print adjacency list
 [3] Breath First Search
 [4] Depth First Search
 [5] Ordered Depth First Search
 [6] Exit Program
Enter your selection:4
 Please enter the vertex you want to begin searching from:
a
Depth First Search path starting from: a
a, c, d, f, b
  GraphMan
  ------------------------------------------
Please select one of the following:
 [1] Print the shortest path between two nodes
 [2] Print adjacency list
 [3] Breath First Search
 [4] Depth First Search
 [5] Ordered Depth First Search
 [6] Exit Program
```

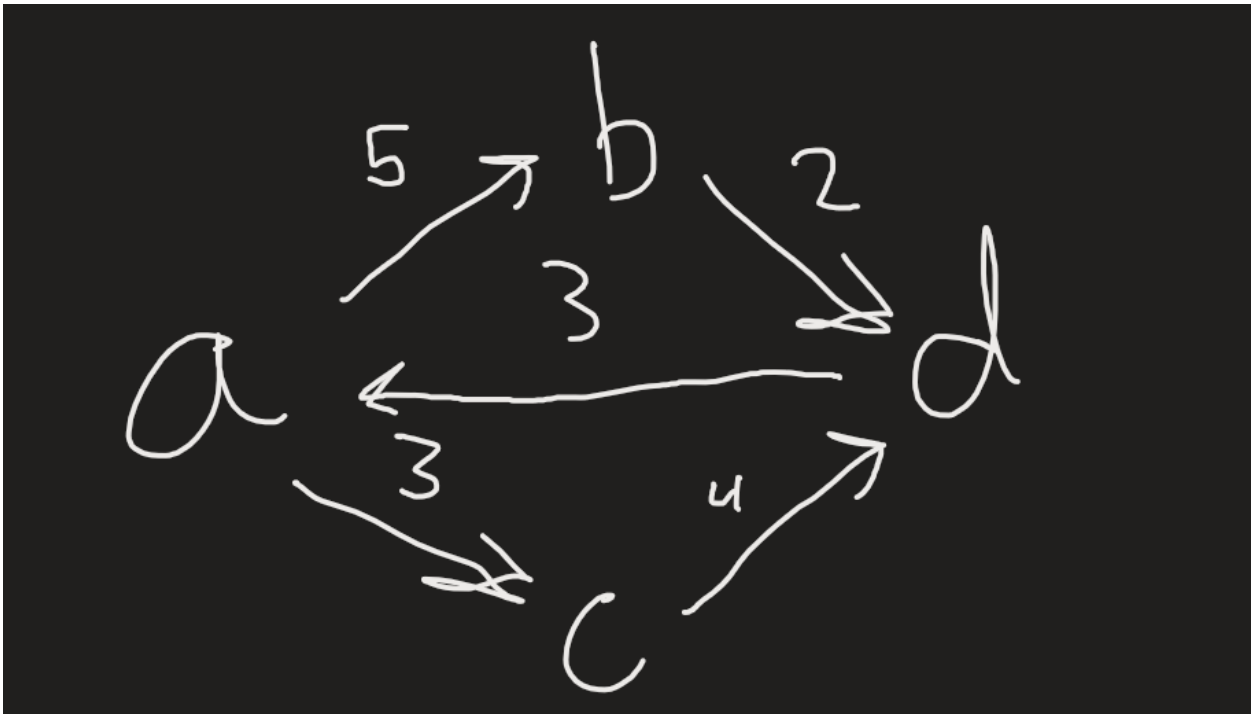
```
  GraphMan
  ------------------------------------------
Please select one of the following:
 [1] Print the shortest path between two nodes
 [2] Print adjacency list
 [3] Breath First Search
 [4] Depth First Search
 [5] Ordered Depth First Search
 [6] Exit Program
Enter your selection:5
 Please enter the vertex you want to begin searching from:
a
Depth First Search (ordered by increasing degree) path starting from: a
a, b, d, c, f
  GraphMan
  ------------------------------------------
Please select one of the following:
 [1] Print the shortest path between two nodes
 [2] Print adjacency list
 [3] Breath First Search
 [4] Depth First Search
 [5] Ordered Depth First Search
 [6] Exit Program
Enter your selection:6

Process finished with exit code 0
```

graphMan.cpp

The complete program reads a txt file to generate the graph.

Graph File and Structure

```
4
a
b
c
d
a,b,5
a,c,3
b,d,2
c,d,4
d,a,3
```



Execution

```
C:\Users\camer\CLionProjects\Project3\cmake-build-debug\graphMan.exe
  GraphMan
  ---------------------------------------------
Please select one of the following:
 [1] Print the shortest path between two nodes
 [2] Print adjacency list
 [3] Breath First Search
 [4] Depth First Search
 [5] Ordered Depth First Search
 [6] Exit Program
Enter your selection:1
 Please enter the source vertex you want to begin searching from:
a
Please enter the destination vertex you want to begin searching from:
d
a >> c >> d
Distance is: 7
  GraphMan
  ---------------------------------------------
Please select one of the following:
 [1] Print the shortest path between two nodes
 [2] Print adjacency list
 [3] Breath First Search
 [4] Depth First Search
 [5] Ordered Depth First Search
 [6] Exit Program
Enter your selection:2
 Printing adjList
a >> b c
b >> d
c >> d
d >> a
```

```
  GraphMan
  ------------------------------------------
Please select one of the following:
 [1] Print the shortest path between two nodes
 [2] Print adjacency list
 [3] Breath First Search
 [4] Depth First Search
 [5] Ordered Depth First Search
 [6] Exit Program
Enter your selection:3
 Please enter the vertex you want to begin searching from:
a
Breadth First Search path starting from: a
a, b, c, d
  GraphMan
  ------------------------------------------
Please select one of the following:
 [1] Print the shortest path between two nodes
 [2] Print adjacency list
 [3] Breath First Search
 [4] Depth First Search
 [5] Ordered Depth First Search
 [6] Exit Program
Enter your selection:4
 Please enter the vertex you want to begin searching from:
a
Depth First Search path starting from: a
a, c, d, b
```

```
  GraphMan
  ------------------------------------------
Please select one of the following:
 [1] Print the shortest path between two nodes
 [2] Print adjacency list
 [3] Breath First Search
 [4] Depth First Search
 [5] Ordered Depth First Search
 [6] Exit Program
Enter your selection:5
 Please enter the vertex you want to begin searching from:
a
Depth First Search (ordered by increasing degree) path starting from: a
a, b, d, c
  GraphMan
  ------------------------------------------
Please select one of the following:
 [1] Print the shortest path between two nodes
 [2] Print adjacency list
 [3] Breath First Search
 [4] Depth First Search
 [5] Ordered Depth First Search
 [6] Exit Program
Enter your selection:6

Process finished with exit code 0
```