depthFirstSearch

Your task is to write a function, depthFirstSearch, that performs a depth first search on a graph starting at the given vertex. It should print out the vertices as they are visited. If a vertex has multiple neighbours, visit the neighbour with the smallest vertex number first.

Hint: You are not provided with a stack ADT, so you must use recursion.

Download

Click here to download a zip of the files.

The Files

Graph.c	Contains the implementation of a graph ADT
Graph.h	Contains the interface of the graph ADT
testDepthFirstSearch.c	Contains the main function, which reads in a graph and a starting vertex from standard input, and then calls depthFirstSearch.
depthFirstSearch.c	Contains depthFirstSearch, the function you must implement
Makefile	A makefile to compile your code
tests/	A directory containing the inputs and expected outputs for some basic tests
autotest	A script that uses the tests in the tests directory to autotest your solution. You should only run this after you have tested your solution manually.

Examples

Your program should behave like these examples:

```
$ ./testDepthFirstSearch
Enter number of vertices: 9
Enter number of edges: 9
Enter edges in the form v-w: 0-1 0-7 1-2 1-5 3-4 3-5 3-6 3-7 5-8

Graph: nV = 9
Edges:
 0: 0-1 0-7
 1: 1-0 1-2 1-5
 2: 2-1
 3: 3-4 3-5 3-6 3-7
 4: 4-3
 5: 5-1 5-3 5-8
 6: 6-3
 7: 7-0 7-3
 8: 8-5

Enter src: 0
Depth first search starting at vertex 0: 0 1 2 5 3 4 6 7 8
```

```
$ ./testDepthFirstSearch
Enter number of vertices: 8
Enter number of edges: 8
Enter edges in the form v-w: 0-1 1-2 2-3 3-4 4-5 5-6 6-7 7-0

Graph: nV = 8
Edges:
 0: 0-1 0-7
 1: 1-0 1-2
 2: 2-1 2-3
 3: 3-2 3-4
 4: 4-3 4-5
 5: 5-4 5-6
 6: 6-5 6-7
 7: 7-0 7-6

Enter src: 3
Depth first search starting at vertex 3: 3 2 1 0 7 6 5 4
```

```
$ ./testDepthFirstSearch
Enter number of vertices: 10
Enter number of edges: 9
Enter edges in the form v-w: 0-1 1-2 1-3 2-4 2-5 3-5 3-6 7-8 8-9

Graph: nV = 10
Edges:
 0: 0-1
 1: 1-0 1-2 1-3
 2: 2-1 2-4 2-5
 3: 3-1 3-5 3-6
 4: 4-2
 5: 5-2 5-3
 6: 6-3
 7: 7-8
 8: 8-7 8-9
 9: 9-8

Enter src: 6
Depth first search starting at vertex 6: 6 3 1 0 2 4 5
```

Testing

You can test your program manually by compiling your code using `make`, and then running `./testDepthFirstSearch`, as shown above. After you are satisfied with your solution, you can autotest it by running `./autotest`. This will run some basic tests on your program.