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C243 Data Structures

Homework 10

Due date: Tuesday, November 25, 2014.

Ex. 1. Download the following files:
graph.h
graph.cc
main.cc
Makefile
graph1.txt
graph2.txt

They compile with the command "make" and the program can be executed with the command "graph". The two text files contain two examples of graphs that can be read by the program.

You will have to implement the 3 functions that have their body missing at the end of the graph.cc file and make some modifications to main.cc. A fourth one can be implemented for extra credit.

a. write - This function should write the graph to a file according to the format described in class and in the notes. You have to make sure that the file is compatible with the read function - meaning that you should be able to read the graph back from the file. You also have to be careful not to write each edge twice if the graph is undirected.

b. input - This function should ask the user for the number of nodes in the graph, then initialize the graph with that number of vertices, which will assign the names as uppercase letters in sequence. Don't ask the user for the names but give them a warning about the way the names were assigned. Then it should input edges in the form first name second name. The input should end with anything that is not an uppercase letter.

c. printBf or printDf. Choose one of these two functions to implement, and let me know in the text of the submission which one you've chosen. These functions should implement the breadth-first and depth-first traversal of the graph where the processing of a node is just writing out the name. For the printBf you'll need a queue class. You can use either the class from homework 3, of the STL class queue (see the textbook for a reference).

Optional (3 extra credit points): implement both the breadth-first and the depth-first traversal functions above.

d. Modify the menu functions in main.cc by adding the options of writing the graph to a file or to input it from the user.

Turn in: All the files that you modify.