

# CS 203 Computing and Algorithms III

## Graph Properties

### Requirements and Assumptions:

You will be given a graph  $G$  in an input file. Loading the file will be one of the options in the program. Once a graph is loaded, that is the graph you will use until another graph is loaded again.

0) Load a graph from file.

a) Find and print the connected components of the graph.

b) Find and print a path between two given nodes, if there is one.

c) Find and print the shortest path between two given nodes, if there is one.

d) Find and print a path between two nodes that avoids the given set of edges, if there is one.

e) Find and print a path between two nodes that avoids the given set of vertices, if there is one.

f) Find and print an Eulerian tour (a tour that travels every edge exactly once) if there is one.

### Internal Requirements:

1. The input graph should be read from a file whose name is given

2. The format of the input graph will be as follows

$V = \{ A, B, C, D, E, F \}$

Edges

(A, B)

(C,D)

(B,D)

etc until end of file is reached.

3. You must have several methods in your code, and at least one method for each option

4. If your output is a graph, it should be in the same format as the input above

5. If your output is a path, then use the following format

Path (A, D ) = [A, (A,B), B, (B,D), D]