IC250 Lab 6

This assignment has three compulsory questions and one optional question.

1. **Describing a graph.** A graph can be described by its adjacency list, or by its adjacency matrix. Given one of these, write a program to generate the other. In other words, given the adjacency matrix of a graph, generate its adjacency list and vice versa.

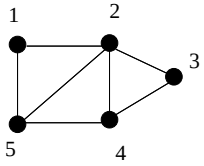
   The input should be read from a file. You can either write two seperate programs for this, or one program which accepts the necessary input to perform the conversion. The output of both programs must be written into file. The file generated by one program should be readable by the other program.

   A graph, and its two representations are shown in the figure.

2. **Breadth-first search (BFS).** BFS is a basic operation which can be performed on a graph. One possible way to implement BFS is by using a queue. Write a program to read an input a graph from file (adjacency matrix or list), accept a start vertex, and perform BFS from that vertex. Print the vertices in the order visited by BFS.

3. **Depth-first search (DFS).** The other basic operation is DFS. One possible way to implement DFS is by using a stack. Write a program to read an input a graph from file (adjacency matrix or list), accept a start vertex, and perform DFS from that vertex. Print the vertices in the order visited by DFS.

4. **Optional.** For a given graph and a given start vertex, the output of DFS is not unique. How can you generate different outputs from DFS? The same holds for BFS. Write a program to generate the different possible outputs for both DFS and BFS.



	1	2	3	4	5
1	0	1	0	0	1
2	1	0	1	1	1
3	0	1	0	1	0
4	0	1	1	0	1
5	1	1	0	1	0

1 → 2 → 5
2 → 1 → 5 → 3 → 4
3 → 2 → 4
4 → 2 → 5 → 3
5 → 4 → 1 → 2