

Week 10

Breadth-First Search and Depth-First Search

Preliminary :

- The class lecture
- A BFS animation: <https://www.youtube.com/watch?v=x-VTfcmrLEQ>
- A DFS animation: <https://www.youtube.com/watch?v=NUgMa5coCoE>

Suggested materials : Chapter 22 of the reference book (uploaded to Class Materials)

Supplements:

- bfs-template.py, dfs-template.py
- Four test case files, each contains the edge list of a graph

WORKSHOP

- 1) The bfs-template.py provides
 - The code that reads an edge list and stores the graph in the program as an adjacency list.
 - The initialization of variables of Breadth-First Search according to chapter 22 of CLRS's text book (the suggested materials above).
 - The output code that print the vertices and its resulted variables according to Breadth-First Search

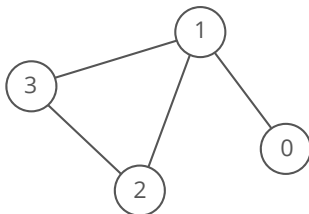
Complete the algorithm part of the code i.e. the Breadth-First Search. Assume that the source of BFS is vertex 1 (index 0 in the adjacency list)

- 2) Two simple undirected graph (u1.in and u2.in) are provided. Test your code for correctness with these test cases.

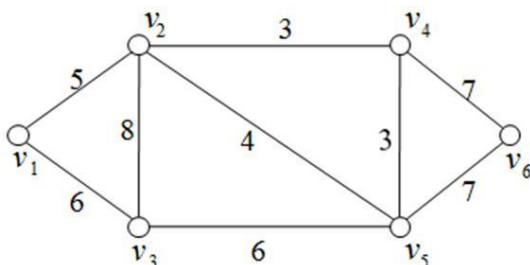
From the printed output, make sure that you understand how to examine the values of d and p (parent) to verify that your Breadth-First Search code is correct.

- 3) Construct an input file for each of the following graphs and test your BFS program on it. For the time being, you can ignore the weights of the weighted graph.

a)



b)



- 4) The dfs-template.py provides
- The code that reads an edge list and stores the graph in the program as an adjacency list.
 - The initialization of variables of Depth-First Search according to chapter 22 of CLRS's text book (the suggested materials above).
 - The output code that print the vertices and its resulted variables according to Depth-First Search

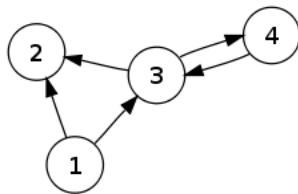
Complete the algorithm part of the code i.e. the Depth-First Search.

- 5) Two simple directed graph (d1.in and d2.in) are provided. Test your code for correctness with these test cases.

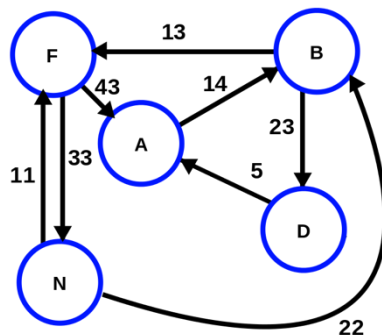
From the printed output, make sure that you understand how to examine the values of d, f, and p to verify that your Depth-First Search code is correct.

- 6) Construct an input file for each of the following graphs and test your DFS program on it. For the time being, you can ignore the weights of the weighted graph.

a)



b)



EXTRA (optional)

Try solving this problem.

https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ALDS1_11_C