CSCI 3104 Spring 2022
Instructor: Profs. Chen and Layer

Quiz 5 - BFS/DFS

Due Date ..... February 11
Name ..... **Your Name**
Student ID ..... **Your Student ID**

Contents

1 Instructions

- The solutions **should be typed**, using proper mathematical notation. We cannot accept hand-written solutions. Here's a short intro to LaTeX.
- You should submit your work through the **class Canvas page** only. Please submit one PDF file, compiled using this LaTeX template.
- You may not need a full page for your solutions; pagebreaks are there to help Gradescope automatically find where each problem is. Even if you do not attempt every problem, please submit this document with no fewer pages than the blank template (or Gradescope has issues with it).
- You **may not collaborate with other students**. **Copying from any source is an Honor Code violation. Furthermore, all submissions must be in your own words and reflect your understanding of the material.** If there is any confusion about this policy, it is your responsibility to clarify before the due date.
- Posting to **any** service including, but not limited to Chegg, Discord, Reddit, StackExchange, etc., for help on an assignment is a violation of the Honor Code.
- You **must** virtually sign the Honor Code (see Section 2). Failure to do so will result in your assignment not being graded.

2 Honor Code (Make Sure to Virtually Sign)

Problem 1.

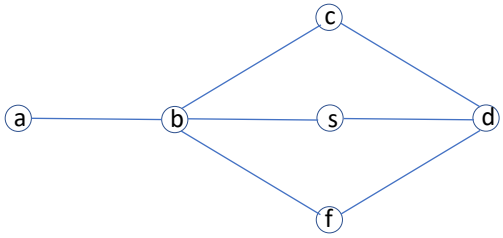
- My submission is in my own words and reflects my understanding of the material.
- Any collaborations and external sources have been clearly cited in this document.
- I have not posted to external services including, but not limited to Chegg, Reddit, StackExchange, etc.
- I have neither copied nor provided others solutions they can copy.

Agreed (signature here). I agree to the above. Ethan Richman. □

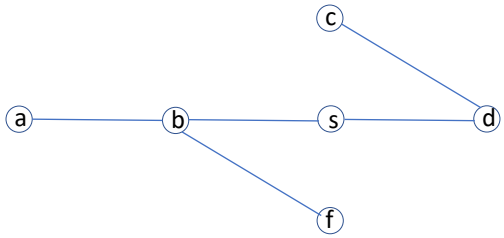
3 Standard 5- BFS/DFS

3.1 Problem 2

Problem 2. Consider the following graph with the source node s:



(i). Is it possible to obtain the following tree using BFS? Clearly justify your answer.



Answer. It is not possible to obtain the tree using BFS. When running BFS every unvisited neighbor to the current vertex is examined before moving on the the next node. Depending on which vertex you index to next after s which is either b or d there would be an edge going from either {b,c} AND {b,f} or {d,c} AND {d,f}. □

(ii). Is it possible to obtain a shortest path tree using BFS? Clearly justify your answer; and if your answer is yes, give such a shortest path tree obtained using BFS. Here the length of a path is defined as the number of edges on the path.

Answer. It is possible the shortest path tree you get looks like this.

□