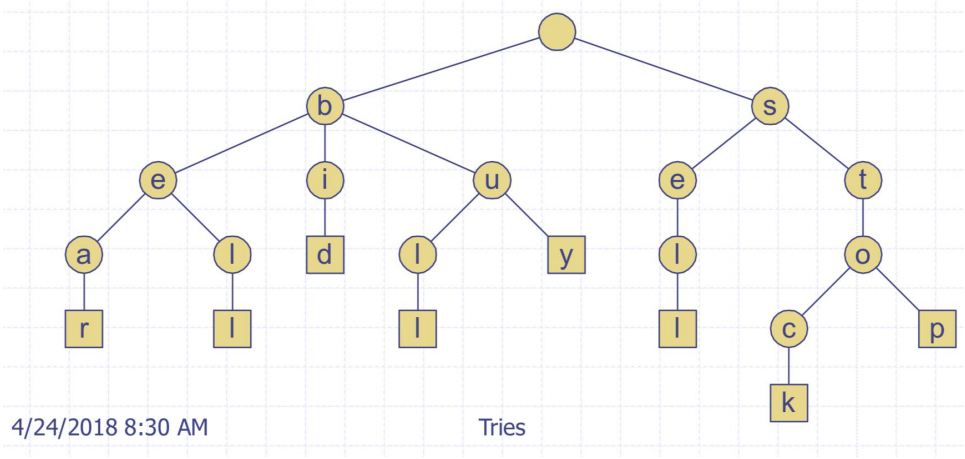
# CSC 355. Discrete Structures and Basic Algorithms
# Homework Assignment 6. Graphs Theory

**Instructions: Solve the following questions.**

A Trie is a tree structure that is built from a text and used for searching specific words. For example, the following is a Trie that is built from the following set of Strings:

{bear, bell, bid, bull, buy, sell, stock, stop}




As you can see, the children of each node are in alphabetical order, which makes it easier to search for a specific character, and each path from a root to a leaf node corresponds to a word. Typically, the leaf node would contain information about where the word occurs in the text.

**1. Multiple Choice.** If you wanted to print out all the words in the trie in alphabetical order, which of the following algorithms would be useful to use as a starting point?

A. Depth-first Search
B. Breadth-first Search
C. In-order traversal
D. Post-order traversal
E. None of the above

**2. Written Response.** Describe the algorithm from #1. You can write pseudocode or just describe in words.

**3. Multiple Choice.** If you wanted to print out all the words in the trie sorted by length (i.e. all the 1-character words, then all the 2-character words, and so on), which of the following algorithms would useful to serve as a starting point?

A. Depth-first Search
B. Breadth-first Search
C. In-order traversal
D. Post-order Traversal
E. None of the above.

**4. Represent the graph following the adjacency list.**

| | |
|---|---|
| 0 | 1, 3 |
| 1 | 2, 4 |
| 2 | 3 |
| 3 | 4 |
| 4 | |

**5. Represent the graph following the adjacency list.**

| | |
|---|---|
| 0 | 1, 2, 3 |
| 1 | 2, 4 |
| 2 | 1, 3 |
| 3 | 1, 4 |
| 4 | |

**6. Represent the graph following the adjacency matrix (add the name of the vertices).**

| | | | | |
|---|---|---|---|---|
| 0 | 1 | 1 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 |

**7. Represent the graph following the adjacency matrix (add the name of the vertices).**

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 1 | 1 | 0 | 1 | 0 |
| 0 | 0 | 1 | 0 | 1 |

**8. Represent the graph following the adjacency matrix (add the name of the vertices).**

| | | | | |
|---|---|---|---|---|
| 0 | 1 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | 1 |
| 0 | 1 | 0 | 0 | 1 |
| 0 | 1 | 0 | 0 | 0 |

**Submission Instructions**

You must upload your homework in a **pdf** file in the designated area in D2L.

**Grading Points**

Total Score: 25 points

*Each question has a value of 3.125 points*