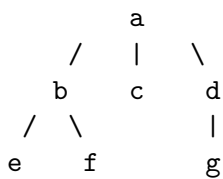


CS 4804 Homework 0

Written Problems

1. Order the following functions of n by their asymptotic growth rates:
(a) 2^n , (b) $\log_2 n$, (c) $\binom{n}{5}$, (d) n , (e) $5n$, (f) 5.0 , (g) n^2
2. List the basic operations and behaviors for the following data structures:
(a) lists, (b) queues, (c) stacks, (d) priority queues.
3. Consider the following tree:



- (a) Starting from node a as a root, what is the level-order traversal of this tree?
 - (b) Treating the tree as a graph, what is a breadth-first search order starting from node d?
4. Describe or name (if it has a famous name) an algorithm to solve the following problems in polynomial time, or indicate that it is NP-Hard. If it has a polynomial time algorithm, what is its asymptotic running time?
 - (a) Finding the shortest path between any two nodes in a graph
 - (b) Finding the shortest path between all pairs of nodes in a graph
 - (c) Finding the shortest path through a graph that visits all nodes

Programming Problems

Go to <http://courses.cs.vt.edu/cs4804/Fall16/hw0.html> to try the python and autograder tutorial.