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CS 260 – HW3

3.1)

a. Which nodes are leaves?

   D , M, N, J, K, L, F

b. Which node is the root?

   A

c. What is the parent of node **C**?

   A

d. Which nodes are children of **C**?

   F, G, H

e. Which nodes are ancestors of **E**?

   B, A

f. Which nodes are descendants of **E**?

   I, M, N

g. What are the right siblings of **D** and **E**?

   F, G, H

h. Which nodes are to the left and to the right of **G**?

   F, H

i. What is the depth of node **C**?

   1

j. What is the height of node **C**?

   2

3.2)

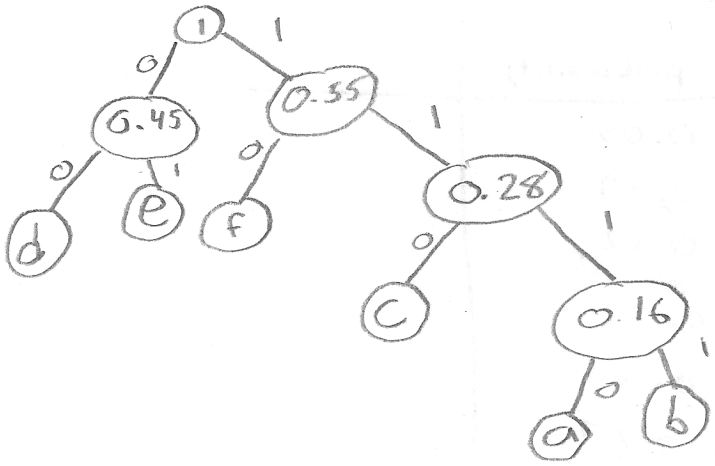
6

3.6)

	preorder(n) < preorder(m)	inorder(n) < inorder(m)	Postorder(n) < postorder(m)
n is to the left of m	**Check**	**Check**	**Check**
n is to the right of m			
n is a proper ancestor of m	**Check**		
n is a proper descendant of m		**Check**	**Check**

3.20

Symbol	probability
a	0.07
b	0.09
c	0.12
d	0.22
e	0.23
f	0.27



Symbol		
a	1110	$4 \times 0.07 = 0.28$
b	1111	$4 \times 0.09 = 0.36$
c	110	$3 \times 0.12 = 0.36$
d	00	$2 \times 0.22 = 0.44$
e	01	$2 \times 0.23 = 0.46$
f	10	$2 \times 0.27 = 0.54$

$\frac{2.45}{6} = \boxed{0.41}$

3.21

1) Suppose the probability of Symbol b is less than the probability of a and Symbol a has a greater depth than a

When chosing from the queue the symbol with the lower probability will be chosen, in this case it will be b. Therefore b has greater depth. Thus we have a contradiction, b probability can not be less than a's probability.

Analyze Implementation

The run time of a recursive function is 2^n. The graph seen verifies this. As the function calls itself over and over it slows down.

Memorization is a list of results so that the recursive presses is sped up. Instead of re-running the recursion each time the value is taken from the list if it exists.

The runtime of a recursive function with memorization depends on how specific the analyzer wants to go. Technically it is a decrease graph when analyzed really close. That is because if the "n" is not in the memorized list the runtime is O(n), but if it is it is O(1). When looking at the graph from far away it looks constant. It depends on the scale. So yes, technically it is a decreasing line.

My graph and data is consistent with this analysis.