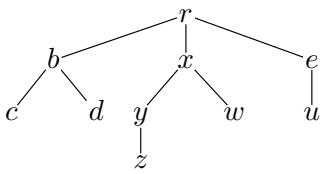
Homework #7 Name: _____

If a question is wrong, or has no acceptable answer, do not mark any choice.
If a question has several correct answers, choose the most accurate/complete/informative one.
On a separate sheet, write a detailed justification of your choice.
You will be graded on the accuracy and precision of this justification only.
You will get 1 point for each correct answer and 0 points for missing or incorrect answers.
Your grade will be written on the back of this page.

1. Which of the following is a post-order traversal of the tree to the right:



   [-A-] $r\,b\,c\,d\,x\,y\,z\,w\,e\,u$
   [-B-] $r\,b\,x\,e\,c\,d\,y\,w\,u\,z$
   [-C-] $z\,c\,d\,y\,w\,u\,b\,x\,e\,r$
   [-D-] $c\,d\,b\,z\,y\,w\,x\,u\,e\,r$

2. Consider again the previous tree.
   Which of the following is a pre-order traversal of the tree:

   [-A-] $r\,b\,c\,d\,x\,y\,z\,w\,e\,u$
   [-B-] $r\,b\,x\,e\,c\,d\,y\,w\,u\,z$
   [-C-] $z\,c\,d\,y\,w\,u\,b\,x\,e\,r$
   [-D-] $c\,d\,b\,z\,y\,w\,x\,u\,e\,r$

3. Consider again the previous tree.
   The set of all the siblings of b is:

   [-A-] $\{x\}$
   [-B-] $\{x, e\}$
   [-C-] $\{c, d\}$
   [-D-] $\{\}$

4. Consider again the previous tree.
   Its depth (also called height) is:

   [-A-] 2
   [-B-] 3
   [-C-] 5
   [-D-] 10

5. The Polish notation of the expression $a + b * c + d$ is (where "+" is left associative):

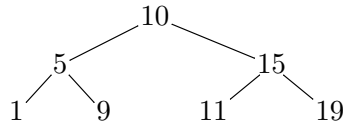
   [-A-] $+\,+\,a * b\,c\,d$
   [-B-] $+\,a * b\,c + d$
   [-C-] $+\,+\,*\,a\,b\,c\,d$
   [-D-] $+\,*\,b\,c + a\,d$

6. Language L consists of strings of a, b, and c with equal frequency.
String $s = aaaaabbbbbccccc$ (5 of each letter).
The length in bits of s with an optimal Huffman code is:

[-A-] 15
[-B-] 20
[-C-] 25
[-D-] 30

7. Consider the binary search tree to the right
If value 12 is inserted into the tree, the node holding this value will be:

[-A-] a child of 11
[-B-] the left child of 11
[-C-] the right child of 11
[-D-] not a child of 11



8. Consider again the previous tree.
If value 5 is deleted from the tree, the value of the node holding 5 is replaced by:

[-A-] 1
[-B-] 9
[-C-] either 1 or 9
[-D-] none of the above

9. Which traversal of a binary search tree produces a sorted sequence:

[-A-] Pre-order
[-B-] In-order
[-C-] Post-order
[-D-] Level-order

10. A binary tree is perfect is all its leaves are at the same depth.
The number of leaves in a perfect binary tree of depth d is:

[-A-] d^2
[-B-] 2^d
[-C-] $2^d - 1$
[-D-] $2^{d+1} - 1$

11. Let P be a problem with 20 outcomes.
The depth of a binary decision tree that solves P must be at least:

[-A-] 2
[-B-] 3
[-C-] 4
[-D-] 5