1. (3 pts)

a. Draw the expression tree for the

$$62 * x - ((3 * x) - 8)/(2 + (3/z))$$

b. Then do the necessary traversals to provide the expression in

i. Prefix form

- (* 62 x) (/ (- (* 3 x) 8) (+ 2 (/ 3 z)))

ii. Postfix form

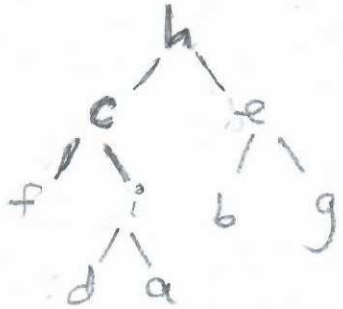
62 x * 3 x * 8 - 2 3 z / + / -

2. (3 pts) Draw a tree whose inorder traversal produces

$$f, c, d, i, a, h, b, e, g$$

while the postorder traversal produces

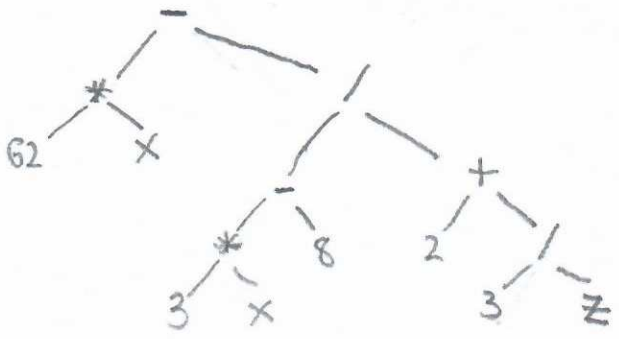
$$f, d, a, i, c, b, g, e, h$$



1. (3 pts)

a. Draw the expression tree for the

$$(62 * x) - ((3 * x) - 8)/(2 + (3/z))$$



b. Then do the necessary traversals to provide the expression in

i. Prefix form - * 62 x / - * 3 x 8 + 2 / 3 z

ii. Postfix form 62 x * 3 x * 8 - 2 3 z / + / -

2. (3 pts) Draw a tree whose inorder traversal produces

L r R

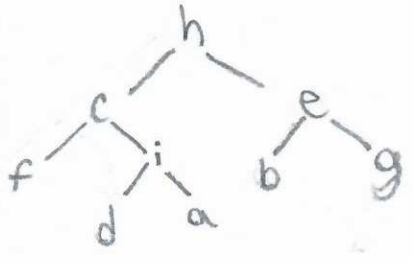
f, c, d, i, a, h, b, e, g

while the postorder traversal produces

L R r

f, d, a, i, c, b, g, e, h

Good



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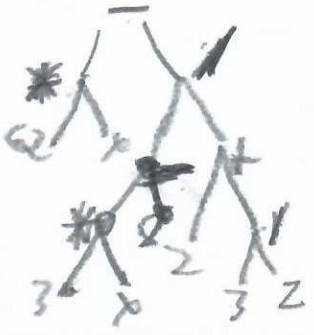

b. Then do the necessary traversals to provide the expression in

i. Prefix form

- * 62 x / - * 3 x 8 + 2 / 3 z

ii. Postfix form

62 x * 3 x * 8 - 2 3 z / + / -

2. (3 pts) Draw a tree whose inorder traversal produces

$$f, c, d, i, a, h, b, e, g$$

while the postorder traversal produces

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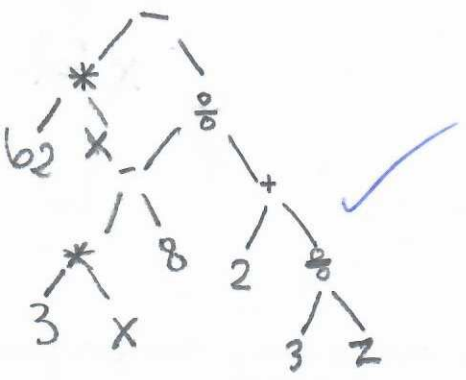


b. Then do the necessary traversals to provide the expression in

i. Prefix form

$- * (62x) \div (- (* (3x) 8) + (2 \div (3z)))$

ii. Postfix form

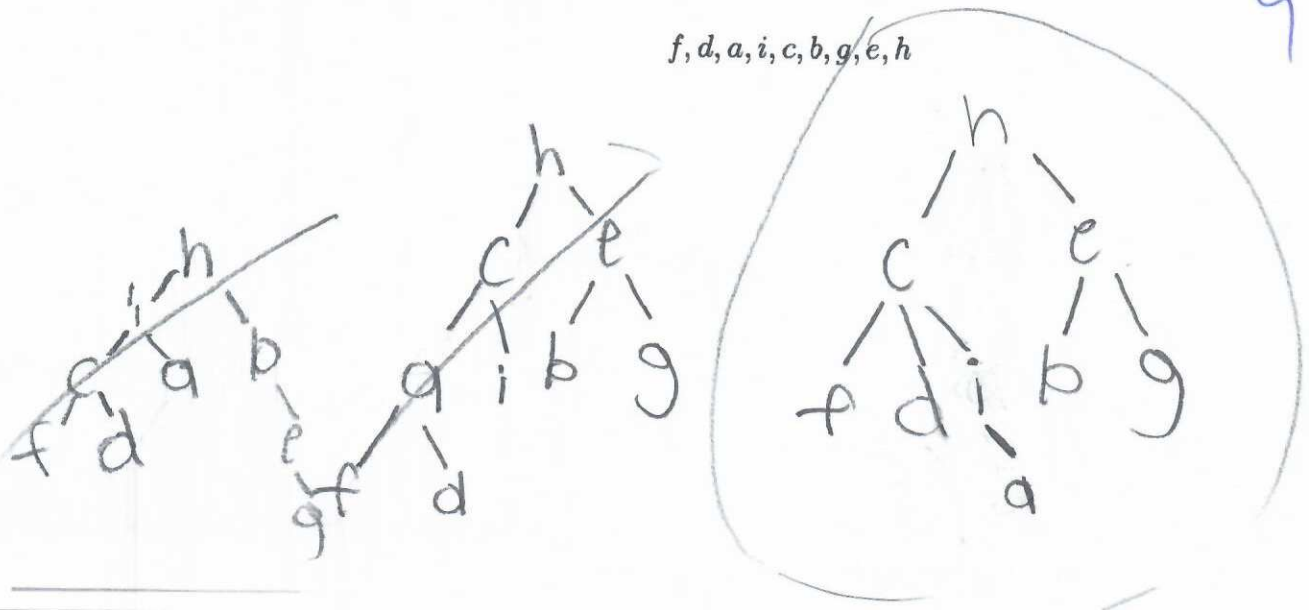
$62x * 3x * 8 - 23z \div + \div -$

2. (3 pts) Draw a tree whose inorder traversal produces

$$f, c, d, i, a, h, b, e, g$$

while the postorder traversal produces

$$f, d, a, i, c, b, g, e, h$$



3. (4 pts) For a set of ten data items (letters A-J),

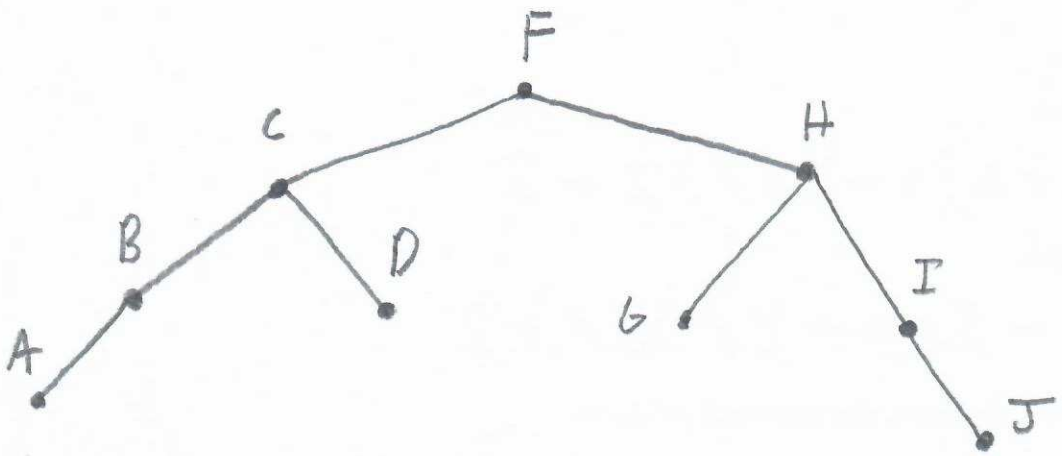
a. what is the minimum worst-case number of comparisons a search algorithm must perform?

$d = 1 + \lfloor \log_2(n) \rfloor = 1 + \lfloor \log_2(10) \rfloor = 1 + 3$

4

b. Find an order in which to enter the data so that the corresponding binary search tree (BST) has the minimum depth (and draw the BST).

[A, B, C, D, E, F, G, H, I, J]

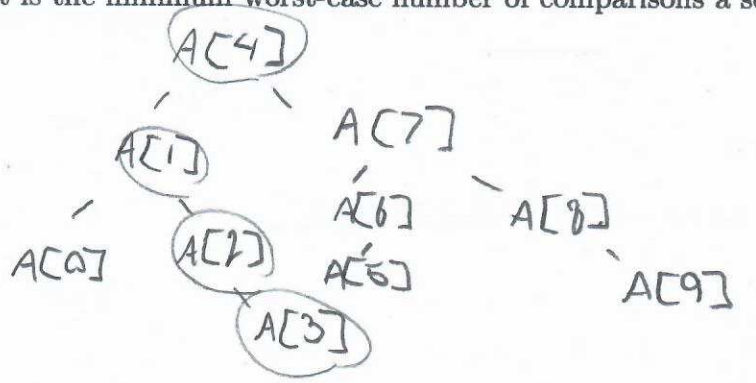


The order is [F, C, H, B, D, A, G, I, J]

depth: 3 this BST is optimal

3. (4 pts) For a set of ten data items (letters A-J), A[0] - A[9]

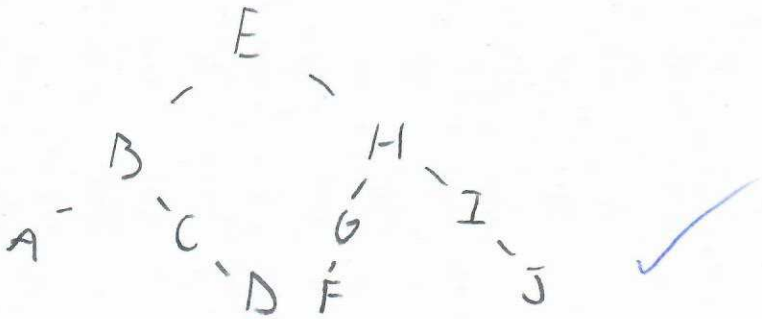
a. what is the minimum worst-case number of comparisons a search algorithm must perform?



4 comparisons ✓

b. Find an order in which to enter the data so that the corresponding binary search tree (BST) has the minimum depth (and draw the BST).

A = [A, B, C, D, E, F, G, H, I, J]



✓

Order: E, B, H, A, C, D, G, I, F, J

Depth 3

3. (4 pts) For a set of ten data items (letters A-J),

a. what is the minimum worst-case number of comparisons a search algorithm must perform?

$\lfloor \log 10 \rfloor + 1 = 3 + 1 = 4$

b. Find an order in which to enter the data so that the corresponding binary search tree (BST) has the minimum depth (and draw the BST).

A, B, C, D, E, F, G, H, I, J