CS32 Homework 5 Solutions

* Arsh Malik

Q1 a).

Graphical user interface, application, Teams

Description automatically generated

Q1 b).

Outputs for different traversals:

1. Inorder: 10,15,20,23,30,36,40,50,60,64,70,75,80
2. Preorder: 50,20,10,15,40,30,23,36,60,70,64,80,75
3. Postorder: 15,10,23,36,30,40,20,64,75,80,70,60,50

Q1 c).

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Q2

a)

struct Node

{

int value;

Node\* left;

Node\* right;

Node\* parent;

}

b)

void insert(const int &val)

{

if the root of the tree is a nullptr

allocate a new node, set its value to val, left, right and parent pointers to nullptr. Then return.

Starting at the root of the tree

while we are not done

if val is equal to current node’s value,

then we return.

if val is less than current node’s value

if there is a left node,

then we go left

else

allocate a new node, set its value to val, left, right pointers to nullptr. Set its parent pointer to the current node. Set current node’s left pointer to the new node. Then return.

if val is greater than current node’s value,

if there is a right node

then we go right

else

allocate a new node, set its value to val, left, right pointers to nullptr. Set its parent pointer to the current node. Set current node’s right pointer to the new node. Then return.

}

Q3 a.)

Graphical user interface, application

Description automatically generated

Q3 b.)

Our array would look like {7, 5, 6, 3, 1, 2}

Q3 c.)

After executing h.remove(item) one more time, our array would be:

{6, 5, 2, 3, 1}

Q4.

1. O(C+S)
2. O(logC + S)

c)O(logC + logS)

d)O(logS)

e)O(1)

f)O(logC+S)

g)O(Slog(S))

h)O(C\*logS)