```
#include <stdio.h>

#include <stdlib.h>


struct Node

{

    int key;

    struct Node *left;

    struct Node *right;

    int height;

};


int height(struct Node *N)

{

    if (N == NULL)

        return 0;

    return N->height;

}


int max(int a, int b)

{

    return (a > b) ? a : b;

}


struct Node *newNode(int key)
```

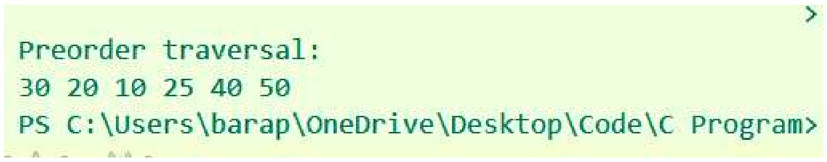
```
{
    struct Node *node = (struct Node *)malloc(sizeof(struct Node));
    node->key = key;
    node->left = NULL;
    node->right = NULL;
    node->height = 1;
    return node;
}

struct Node *rightRotate(struct Node *y)
{
    struct Node *x = y->left;
    struct Node *T2 = x->right;

    x->right = y;
    y->left = T2;

    y->height = max(height(y->left), height(y->right)) + 1;
    x->height = max(height(x->left), height(x->right)) + 1;

    return x;
}

struct Node *leftRotate(struct Node *x)
```

```
{
    struct Node *y = x->right;
    struct Node *T2 = y->left;

    y->left = x;
    x->right = T2;

    x->height = max(height(x->left), height(x->right)) + 1;
    y->height = max(height(y->left), height(y->right)) + 1;

    return y;
}

int getBalance(struct Node *N)
{
    if (N == NULL)
        return 0;
    return height(N->left) - height(N->right);
}

struct Node *insert(struct Node *node, int key)
{
    if (node == NULL)
        return (newNode(key));
```

```
if (key < node->key)

   node->left = insert(node->left, key);

else if (key > node->key)

   node->right = insert(node->right, key);

else

   return node;


node->height = 1 + max(height(node->left), height(node->right));


int balance = getBalance(node);


if (balance > 1 && key < node->left->key)

   return rightRotate(node);

if (balance < -1 && key > node->right->key)

   return leftRotate(node);

if (balance > 1 && key > node->left->key)

{

   node->left = leftRotate(node->left);

   return rightRotate(node);

}

if (balance < -1 && key < node->right->key)

{

   node->right = rightRotate(node->right);

   return leftRotate(node);
```

```
    }

    return node;
}

void preOrder(struct Node *root)
{
    if (root != NULL)
    {
        printf("%d ", root->key);
        preOrder(root->left);
        preOrder(root->right);
    }
}

void freeTree(struct Node *root)
{
    if (root)
    {
        freeTree(root->left);
        freeTree(root->right);
        free(root);
    }
}
```

```
int main()

{

   struct Node *root = NULL;



   root = insert(root, 10);

   root = insert(root, 20);

   root = insert(root, 30);

   root = insert(root, 40);

   root = insert(root, 50);

   root = insert(root, 25);



   printf("Preorder traversal: \n");

   preOrder(root);

   printf("\n");



   freeTree(root);

   return 0;

}
```



```
Preorder traversal:
30 20 10 25 40 50
PS C:\Users\barap\OneDrive\Desktop\Code\C Program>
```