Find maximum (or minimum) in Binary Tree

Given a Binary Tree, find minimum elements in it. For example, maximum in the following Binary Tree is 11.

We strongly recommend to minimize your browser and try this yourself first.

In Binary Search Tree, we can find maximum by traversing right pointers until we reach rightmost node. But in Binary Tree, we must visit every node to figure out maximum. So the idea is to traverse the given tree and for every node return maximum of 3 values.

1) Node's data.

2) Maximum in node's left subtree.

3) Maximum in node's right subtree.

Below is C implementation of above approach.

```
// C program to find maximum and minimum in a Bianry Tree
#include <stdio.h>
#include <stdlib.h>
#include <limits.h>

// A tree node
struct node
{
    int data;
    struct node* left, *right;
};

// A utility function to create a new node
struct node* newNode(int data)
{
    struct node* node = (struct node*)
                        malloc(sizeof(struct node));
    node->data = data;
    node->left = node->right = NULL;
    return(node);
}

// Returns maximum value in a given Binary Tree
int findMax(struct node* root)
{
    // Base case
    if (root == NULL)
      return INT_MIN;

    // Return maximum of 3 values:
    // 1) Root's data 2) Max in Left Subtree
    // 3) Max in right subtree
    int res = root->data;
    int lres = findMax(root->left);
    int rres = findMax(root->right);
    if (lres > res)
      res = lres;
    if (rres > res)
      res = rres;
    return res;
}

// Driver program
int main(void)
{
    struct node*NewRoot=NULL;
    struct node *root = newNode(2);
    root->left        = newNode(7);
    root->right       = newNode(5);
    root->left->right = newNode(6);
    root->left->right->left=newNode(1);
    root->left->right->right=newNode(11);
    root->right->right=newNode(9);
    root->right->right->left=newNode(4);

    printf ("Maximum element is %d \n", findMax(root));

    return 0;
}
```

Output:

```
Maximum element is 11
```

Similarly, we can find minimum element in Binary tree by comparing three values. Below is C function to find minimum in Binary Tree.

```
// Returns minimum value in a given Binary Tree
int findMin(struct node* root)
{
    // Base case
    if (root == NULL)
      return INT_MAX;

    // Return minimum of 3 values:
    // 1) Root's data 2) Max in Left Subtree
    // 3) Max in right subtree
    int res = root->data;
    int lres = findMin(root->left);
    int rres = findMin(root->right);
    if (lres < res)
      res = lres;
    if (rres < res)
      res = rres;
    return res;
}
```