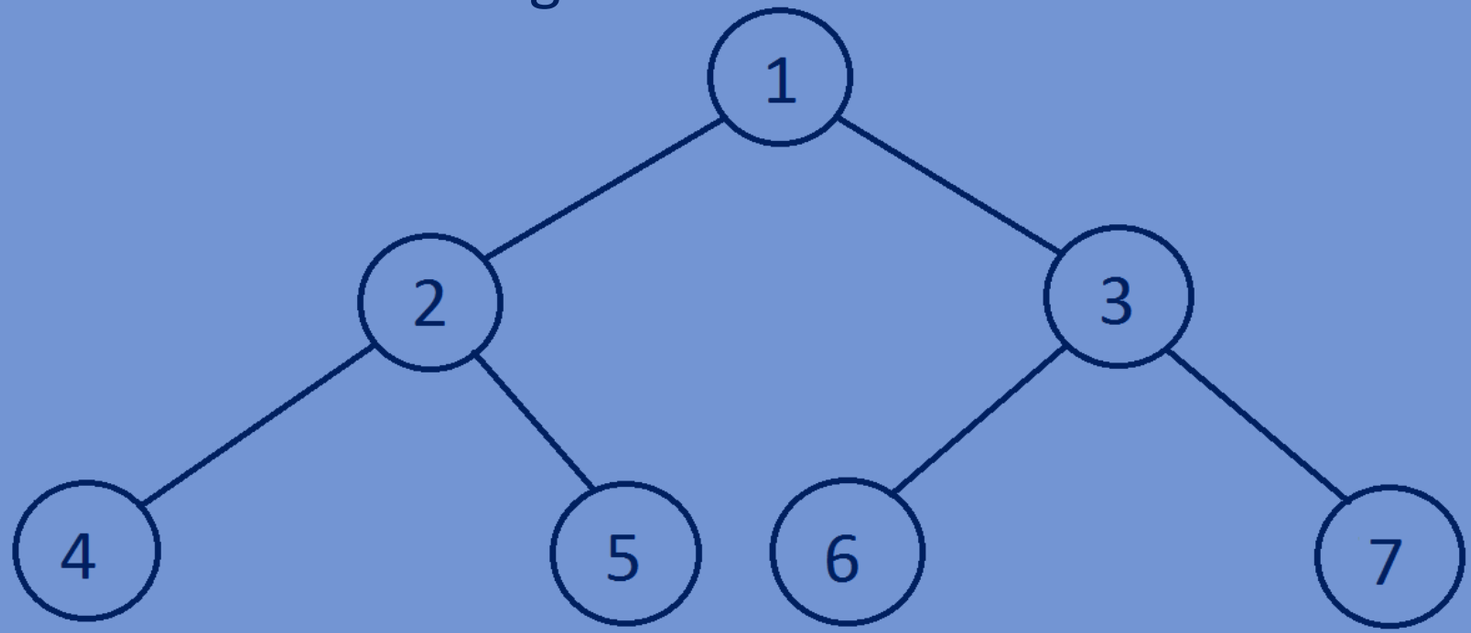
Data Structures

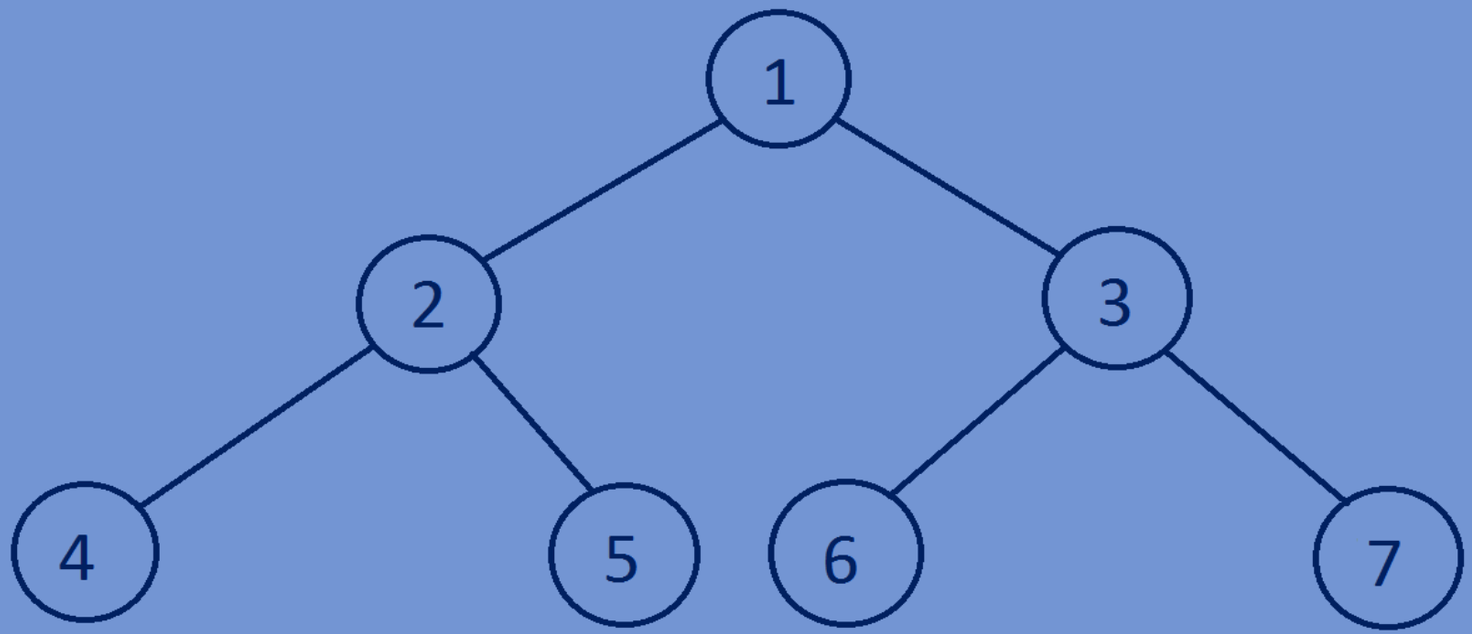
Minimum and Maximum value of a Binary tree

Finding Minimum and Maximum value of a binary tree:

- Return max and min value of the binary tree.
- To find the minimum value,Traverse through the given binary tree and at each node return the minimum of :-
  - → Node's data.
  - → Minimum value of the left subtree of the node.
  - → Minimum value of the right subtree of the node.

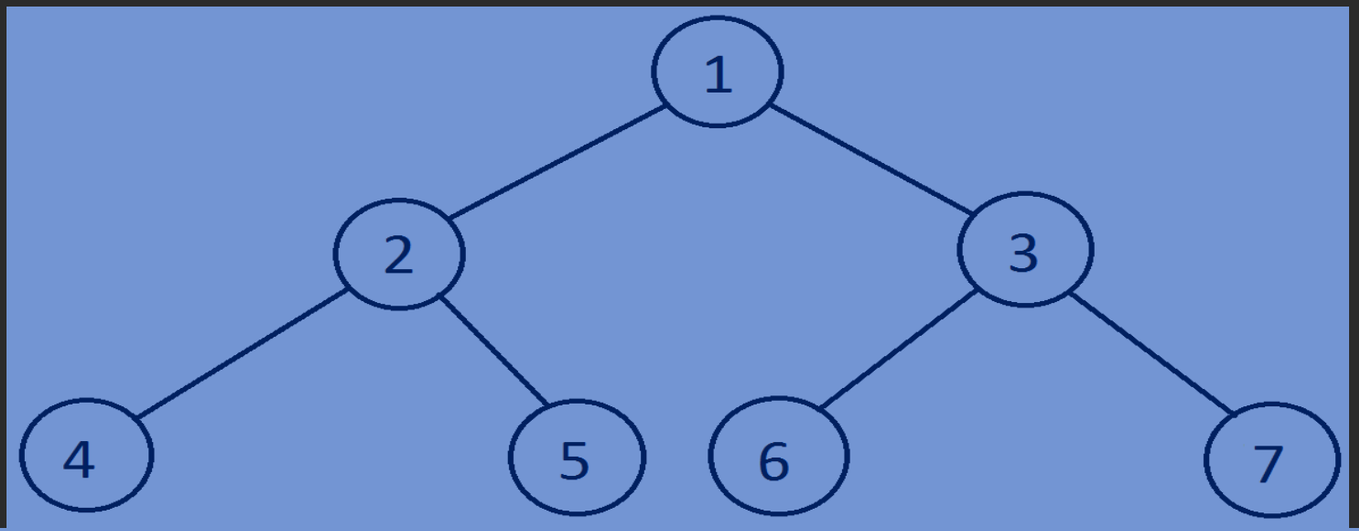


- To find the maximum value,Traverse through the given binary tree and at each node return the maximum of :-
  - → Node’s data.
  - → Maximum value of the left subtree of the node.
  - → Maximum value of the right subtree of the node.



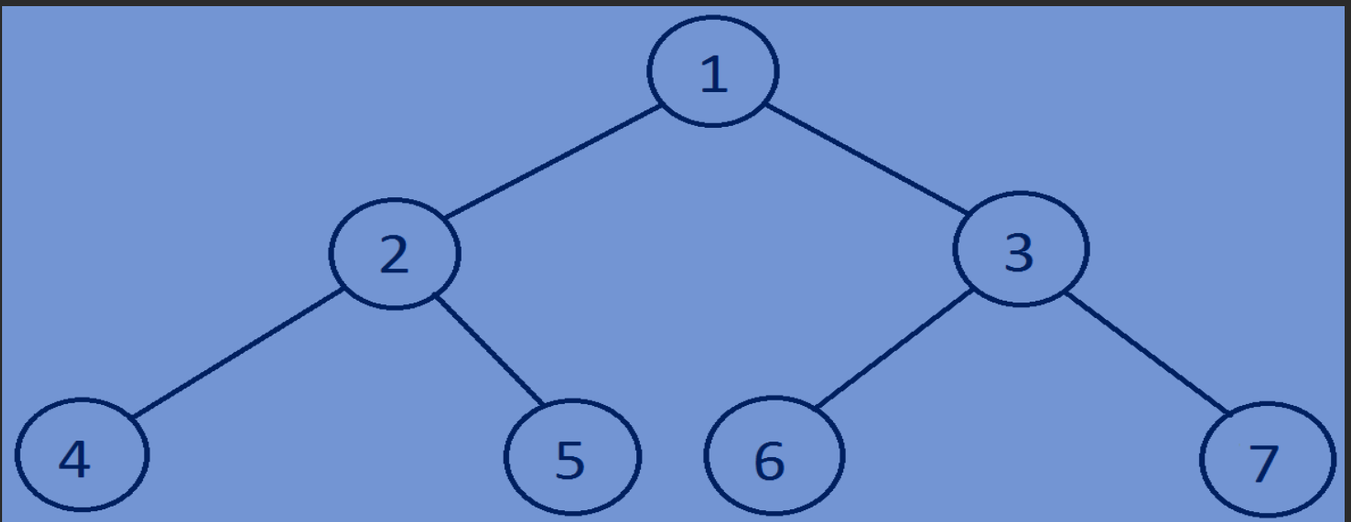
Function for finding the minimum value of a binary tree:

```
//finding min val of a binary tree
int MinValue(Btree *tree){
    if(tree==NULL){
        return INT_MAX;
    }
    int rootval=tree->data;
    int leftval=MinValue(tree->left);
    int rightval=MinValue(tree->right);
    if(leftval<rootval){
        rootval=leftval;
    }
    if(rightval<rootval){
        rootval=rightval;
    }
    return rootval;
}
```



Function for finding the Maximum value of a binary tree:

```
//finding max val of a binary tree
int MaxValue(Btree *tree){
    if(tree==NULL){
        return INT_MIN;
    }
    int rootval=tree->data;
    int leftval=MaxValue(tree->left);
    int rightval=MaxValue(tree->right);
    if(leftval>rootval){
        rootval=leftval;
    }
    if(rightval>rootval){
        rootval=rightval;
    }
    return rootval;
}
```



Whole program:

```c
#include<stdio.h>
#include<stdlib.h>
#include<limits.h>
//creating a Binary tree node.
typedef struct Btree{
    int data;
    struct Btree *left;
    struct Btree *right;
}Btree;
//create newnode
Btree *newnode(int data){
    Btree *tree=(Btree*)malloc(sizeof(Btree));
    tree->data=data;
    tree->left=NULL;
    tree->right=NULL;
    return tree;
}
//finding min val of a binary tree
int MinValue(Btree *tree){
    if(tree==NULL){
```

```
        return INT_MAX;
    }
    int rootval=tree->data;
    int leftval=MinValue(tree->left);
    int rightval=MinValue(tree->right);
    if(leftval<rootval){
        rootval=leftval;
    }
    if(rightval<rootval){
        rootval=rightval;
    }
    return rootval;
}
//finding max val of a binary tree
int MaxValue(Btree *tree){
    if(tree==NULL){
        return INT_MIN;
    }
    int rootval=tree->data;
    int leftval=MaxValue(tree->left);
    int rightval=MaxValue(tree->right);
    if(leftval>rootval){
        rootval=leftval;
    }
```

```
    if(rightval>rootval){
        rootval=rightval;
    }
    return rootval;
}
//main function
int main(){
    Btree *tree;
    tree=newnode(200);
    tree->left=newnode(2);
    tree->right=newnode(3);
    tree->left->left=newnode(4);
    tree->left->right=newnode(5);
    tree->right->left=newnode(-2000);
    tree->right->right=newnode(7);
    printf("%d\n",MinValue(tree));
    printf("%d\n",MaxValue(tree));
    return 0;
}
```

Output:

-2000

200