

# LAB TASK # 08

## MOHAMMAD BASIL ALI KHAN

### 20K-0477

#### Task#01:

- Code

```
Task#01.cpp X
Task#01.cpp > main()
1  #include<iostream>
2  #define INT_MIN (-2147483647 - 1)
3  #define INT_MAX 2147483647
4
5  using namespace std;
6
7  class Node{
8  public:
9      int data;
10     Node *left;
11     Node *right;
12
13     Node()
14     {
15         left = NULL;
16         right = NULL;
17         data = 0;
18     }
19
20     Node(int val){
21         left = NULL;
22         right = NULL;
23         data = val;
24     }
25     int isBST(Node* Node)
26     {
27         return(isBSTUtil(Node, INT_MIN, INT_MAX));
28     }
29     int isBSTUtil(Node* Node, int min, int max)
30     {
31         if(Node==NULL)
32             return 1;
33         if (Node->data < min || Node->data > max)
```

```
Task#01.cpp X
Task#01.cpp > main()
26     {
27         return(isBSTUtil(Node, INT_MIN, INT_MAX));
28     }
29     int isBSTUtil(Node* Node, int min, int max)
30     {
31         if(Node==NULL)
32             return 1;
33         if (Node->data < min || Node->data > max)
34             return 0;
35
36         return
37             isBSTUtil(Node->left, min, Node->data-1) && isBSTUtil(Node->right, Node->data+1, max);
38     }
39
40 };
41 int main(){
42     Node obj;
43     Node *root = new Node(40);
44     root->left = new Node(9);
45     root->right = new Node(11);
46     root->left->left = new Node(1);
47     root->left->right = new Node(30);
48
49     if(obj.isBST(root)){
50         cout << "Is BST" << endl;
51         cout << "10 Marks Assigned";
52     }
53     else{
54         cout << "Not a BST" << endl;
55         cout << "0 Marks Assigned";
56     }
57 }
```

- Output

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
Windows PowerShell
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PS E:\FAST\3rd Semester\DS Lab\Lab Task 08> cd "e:\FAST\3rd Semester\DS Lab\Lab Task 08\" ; if ($?) { g++ Task#01.cpp -o Task#01 } ; if ($?) { .\Task#01 }
Not a BST
0 Marks Assigned
PS E:\FAST\3rd Semester\DS Lab\Lab Task 08> |
```

## Task#02:

- Code

```
Task#02.cpp x
Task#02.cpp > Display(Node *)
1 #include<iostream>
2
3 using namespace std;
4
5 class Node{
6 public:
7     int data;
8
9     Node *left, *right;
10
11     Node(int val)
12     {
13         data = val;
14         left = NULL;
15         right = NULL;
16     }
17
18 };
19
20
21 Node *insertBST(Node *key, int val)
22 {
23     if(key==NULL)
24     {
25         return new Node(val);
26     }
27     if(val < key->data)
28     {
29         key->left = insertBST(key->left, val);
30     }
31     else
32     {
33         key->right = insertBST(key->right, val);
34     }
35 }
```

```
Task#02.cpp x
Task#02.cpp > Display(Node *)
30     }
31     else
32     {
33         key->right = insertBST(key->right, val);
34     }
35     return key;
36 }
37
38 void Display(Node *key)
39 {
40     if(key==NULL)
41     {
42         return;
43     }
44     Display(key->left);
45     cout << key->data << " ";
46     Display(key->right);
47     cout << key->data << " ";
48 }
49
50 int main()
51 {
52     Node *key = NULL;
53     key = insertBST(key, 15);
54     insertBST(key, 10);
55     insertBST(key, 20);
56     insertBST(key, 8);
57     insertBST(key, 12);
58     insertBST(key, 16);
59     insertBST(key, 25);
60     Display(key);
61 }
62
```

- **Output**

```
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Windows PowerShell
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PS E:\FAST\3rd Semester\DS Lab\Lab Task 08> cd "e:\FAST\3rd Semester\DS Lab\Lab Task 08\" ; if ($?) { g++ Task#02.cpp -o Task#02 } ; if ($?) { .\Task#02 }
8 8 10 12 12 10 15 16 16 20 25 25 20 15
PS E:\FAST\3rd Semester\DS Lab\Lab Task 08>
```