

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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Experiment 5

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Semester: 5th

Subject Name: AP

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Section/Group: 603_FL_IOT-B

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Subject Code: 22CSP-314

1. **Aim:** Write a program to find the max height of a binary tree.
2. **Objective:** The objective of this program is to find the max height of a binary tree.
3. **Implementation/Code:**

```
#include <iostream>

using namespace std;

struct TreeNode {

    int val;

    TreeNode* left;

    TreeNode* right;

    TreeNode(int x) : val(x), left(NULL), right(NULL) {}

};

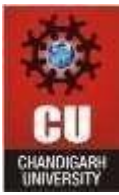
int maxHeight(TreeNode* root) {

    if (root == NULL) {

        return 0;

    }

    int leftHeight = maxHeight(root->left);
```



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```
        int rightHeight = maxHeight(root->right);

        return max(leftHeight, rightHeight) + 1;

    }

int main() {

    TreeNode* root = new TreeNode(1);

    root->left = new TreeNode(2);

    root->right = new TreeNode(3);

    root->left->left = new TreeNode(4);

    root->left->right = new TreeNode(5);

    root->right->right = new TreeNode(6);

    root->left->left->left = new TreeNode(7);

    cout << "Maximum height of the binary tree is: " <<
    maxHeight(root) << endl;

    delete root->left->left->left;

    delete root->left->left;

    delete root->left->right;

    delete root->left;

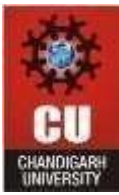
    delete root->right->right;

    delete root->right;

    delete root;

    return 0;

}
```



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4. Output:

A screenshot of a console window with a black background and white and green text. The window has a standard OS title bar with icons for maximize, minimize, and close. The output text is as follows:

```
Maximum height of the binary tree is: 4

...Program finished with exit code 0
Press ENTER to exit console.
```

5. Learning Outcomes:

- Understanding the structure and properties of binary trees.
- Using recursion to traverse trees and solve problems.
- Applying the divide and conquer strategy to compute tree height.
- Learning about time complexity ($O(n)$) and space complexity ($O(h)$).