Experiment 5

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Subject Name: AP
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1. **Aim:** Write a program to find the max height of a binary tree.

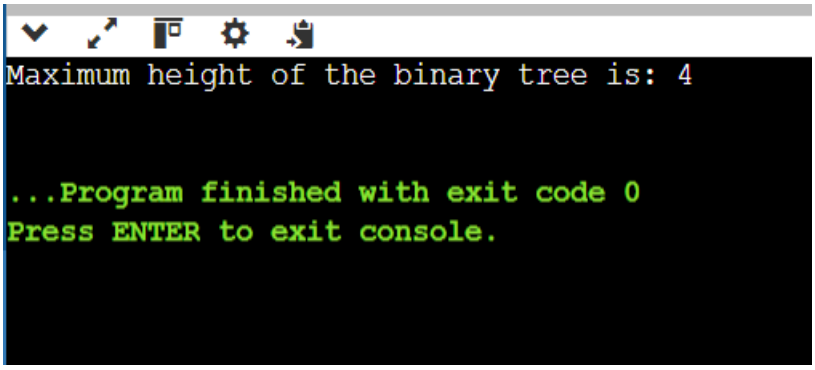
2. **Objective:** The objective of this program is to find the max height of a binary tree.

3. **Implementation/Code:**

```
#include <iostream>

using namespace std;

struct TreeNode {

    int val;

    TreeNode* left;

    TreeNode* righ;

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

};

int maxHeight(TreeNode* root) {

    if (root == NULL) {

        return 0;

    }

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

```
    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;

}
```

4. **Output:**



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)).