Experiment- 9A

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Subject Name: AP Lab-2 **Subject Code: 22CSH-352**

1. TITLE:

Pascal's Triangle.

2. AIM:

Given an integer numRows, return the first numRows of **Pascal's triangle.**

3. Algorithm

- **Initialize** the triangle with the first row `[1]`.
- **Iterate** through rows, where each new row is formed by adding adjacent elements from the previous row.
- **Append** the new row to the result and return the triangle after `numRows` iterations.

4. Implemetation/Code

```
class Solution {
public:
vector<vector<int>> generate(int numRows) {
vector<vector<int>> ans;

for (int i = 0; i < numRows; ++i)
ans.push_back(vector<int>(i + 1, 1));

for (int i = 2; i < numRows; ++i)
for (int j = 1; j < ans[i].size() - 1; ++j)
ans[i][j] = ans[i - 1][j - 1] + ans[i - 1][j];

return ans;
}

};
```

5. Output:

6. Time Complexity : O(N^2)

7. Space Complexity : O(N^2)

8. Learning Outcomes:-

- Learn how to build lists iteratively using previous values.
- Understand Pascal's Triangle properties and how each value is derived from previous rows.

Experiment - 9B

1. TITLE:

Number of 1 Bits.

2. AIM:

Given a positive integer n, write a function that returns the number of Bits in its binary representation (also known as the Hamming weight

3. Algorithm

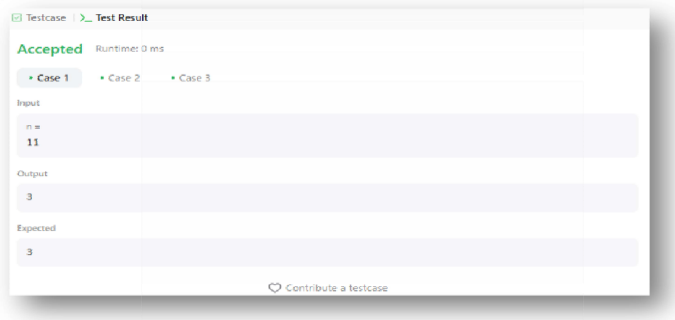
- **Iterate** while `n > 0`, checking the least significant bit (`n & 1`).
- **Count the number of 1s** and right shift `n` (`n >>= 1`).
- **Return the count** after processing all bits.

4. Implemetation/Code:

```
class Solution { public:
int hammingWeight(uint32_t n) { int ans = 0;
for (int i = 0; i < 32; ++i) if ((n >> i) & 1)
++ans;

return ans;
}
};
```

5. Output:



6. Time Complexity : O(log N)

7. Space Complexity : O(1)

8. Learning Outcomes:-

- Understanding & (AND) and >> (right shift) for efficient bit manipulation
- Counting set bits using simple iteration.