Experiment No. 05

Semester	B.E. Semester VII – Computer Engineering
Subject	Big Data Analysis
Subject Professor In-charge	Prof. Pankaj Vanvari
Lab Professor In-charge	Dr. Umesh Kulkarni
Academic Year	2024-25

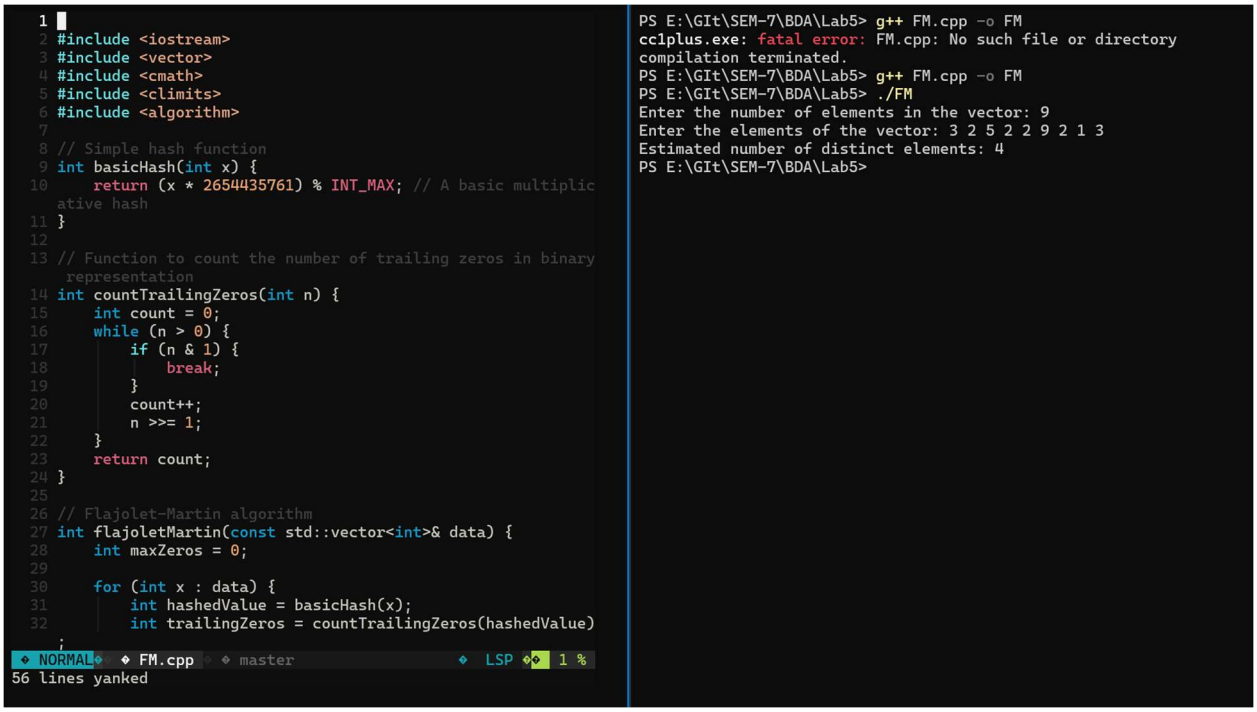
Student Name	Deep Salunkhe
Roll Number	21102A0014

Title: Flajolet Martin

```cpp
#include <iostream>
#include <vector>
#include <cmath>
#include <climits>
#include <algorithm>

// Simple hash function
int basicHash(int x) {
    return (x * 2654435761) % INT_MAX; // A basic multiplicative hash
}

// Function to count the number of trailing zeros in binary representation
int countTrailingZeros(int n) {
    int count = 0;
    while (n > 0) {
        if (n & 1) {
            break;
        }
        count++;
        n >>= 1;
    }
    return count;
```

```
}

// Flajolet-Martin algorithm
int flajoletMartin(const std::vector<int>& data) {
    int maxZeros = 0;

    for (int x : data) {
        int hashedValue = basicHash(x);
        int trailingZeros = countTrailingZeros(hashedValue);
        maxZeros = std::max(maxZeros, trailingZeros);
    }

    return std::pow(2, maxZeros); // Estimate the number of distinct elements
}

int main() {
    int n;
    std::cout << "Enter the number of elements in the vector: ";
    std::cin >> n;

    std::vector<int> data(n);
    std::cout << "Enter the elements of the vector: ";
    for (int i = 0; i < n; ++i) {
        std::cin >> data[i];
    }

    // Estimate the number of distinct elements using Flajolet-Martin
    int distinctCountEstimate = flajoletMartin(data);

    std::cout << "Estimated number of distinct elements: " <<
distinctCountEstimate << std::endl;

    return 0;
}
```

Output:



```
1
2  #include <iostream>
3  #include <vector>
4  #include <cmath>
5  #include <climits>
6  #include <algorithm>
7
8  // Simple hash function
9  int basicHash(int x) {
10     return (x * 2654435761) % INT_MAX; // A basic multiplic
   ative hash
11 }
12
13 // Function to count the number of trailing zeros in binary
    representation
14 int countTrailingZeros(int n) {
15     int count = 0;
16     while (n > 0) {
17         if (n & 1) {
18             break;
19         }
20         count++;
21         n >>= 1;
22     }
23     return count;
24 }
25
26 // Flajolet-Martin algorithm
27 int flajoletMartin(const std::vector<int>& data) {
28     int maxZeros = 0;
29
30     for (int x : data) {
31         int hashedValue = basicHash(x);
32         int trailingZeros = countTrailingZeros(hashedValue)
   ;
 NORMAL  FM.cpp  master                    LSP  1 %
56 lines yanked
```

```
PS E:\GIt\SEM-7\BDA\Lab5> g++ FM.cpp -o FM
cc1plus.exe: fatal error: FM.cpp: No such file or directory
compilation terminated.
PS E:\GIt\SEM-7\BDA\Lab5> g++ FM.cpp -o FM
PS E:\GIt\SEM-7\BDA\Lab5> ./FM
Enter the number of elements in the vector: 9
Enter the elements of the vector: 3 2 5 2 2 9 2 1 3
Estimated number of distinct elements: 4
PS E:\GIt\SEM-7\BDA\Lab5>
```