**GANPAT UNIVERSITY**

**U. V. PATEL COLLEGE OF ENGINEERING**

**DEPARTMENT OF CE/IT**

**ACADEMIC YEAR: JAN - MAY 2021**

**Subject:** 2CEIT402: Design & Analysis of Algorithm

**Sem/Branch:** B.Tech 4th (CE/IT/CE-AI)

**1. Implement a function for each of following problems and count the number of steps executed/Time taken by each function on various inputs and write complexity of each function. Also draw a comparative chart. In each of the following function N will be passed by user.**

**(I) To calculate sum of 1 to N number using loop.**

**Code:**

#include<iostream> using namespace std;

int main()

{ int n=100000; int sum=0; for(int i=1;i<=n;i++)

{ sum=sum+1;

}

printf("%d",sum); return 0;

}

**(II) To calculate sum of 1 to N number using equation.**

**Code:**

#include<iostream> using namespace std;

int main()

{ int n=100000; int sum=n\*(n+1)/2; printf("%d",sum); return 0;

}

**(III) To calculate sum of 1 to N numbers using recursion.**

**Code:**

#include <iostream> using namespace std; int recursion(int n)

{ static int sum=0;

if(n==0) return sum; sum=sum+n; n=n-1;

recursion(n); } int main() {

int n=100000;

int sum=recursion(n); printf("%d",sum);

return 0;

}

# TABLE :-

|  |  |  |  |
| --- | --- | --- | --- |
| **NO.** | **PR 1** | **PR 2** | **PR 3** |
| 10 | 0.006418 | 0.006742 | 0.01120 |
| 100 | 0.006954 | 0.007551 | 0.008288 |
| 1000 | 0.006888 | 0.006331 | 0.006664 |
| 10000 | 0.00720 | 0.011462 | 0.006334 |
| 100000 | 0.006481 | 0.007733 | 0.009734 |

**Graph:**

**Conclusion:**

1. **Best case :-** Algo2(Sum of 1 to N using equation).
2. **Average case :-** Algo3(Sum of 1 to N using recursive).
3. **Worst case :-** Algo1(Sum of 1 to N using loop).