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.

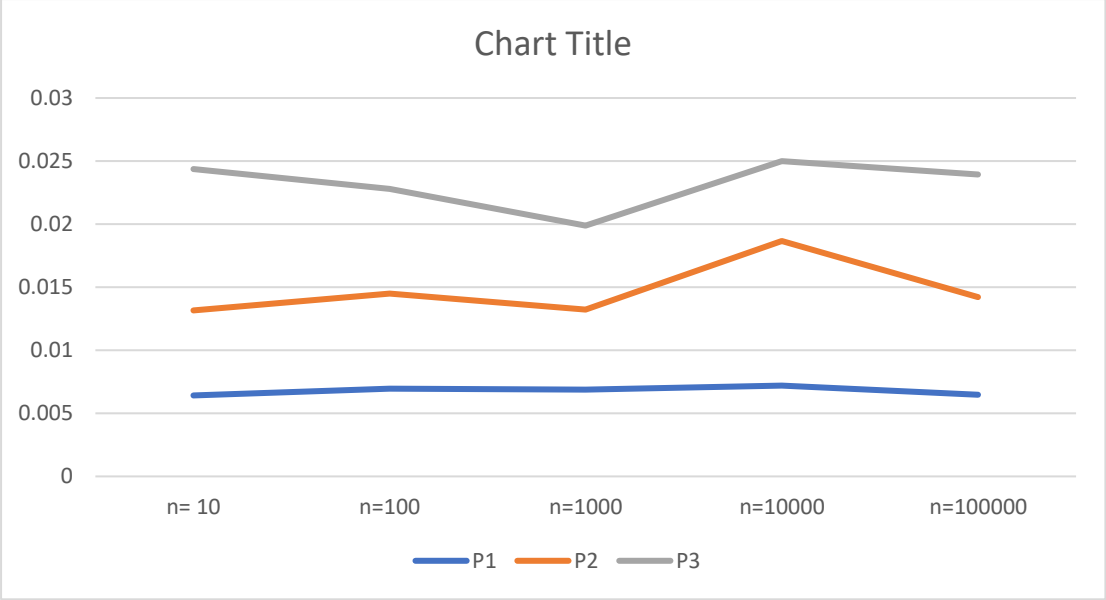
Code:

```
#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).