EXPERIMENT-1.1

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Semester: 5th	**Date of Performance:** 03/08/22
Subject Name: DAA Lab	**Subject Code:** 20CST-311

1. Aim/Overview of the practical:

Code and analyse to compute the greatest common divisor (GCD) of two numbers.

2. Task to be done/ Which logistics used:

Vs Code IDE, C++ Language, C++ Compiler, Concepts of Recursion etc.

3. Algorithm:

The Euclidean Algorithm for calculating GCD of two numbers A and B can be given as follows:

STEP-1. If A=0 then GCD (A, B) =B since the Greatest Common Divisor of 0 and B is B.

STEP-2. If B=0 then GCD (a, b) =a since the Greatest Common Divisor of 0 and a is a.

STEP-3. Let R be the remainder of dividing A by B assuming A > B. (R = A % B)

STEP-4. Find GCD (B, R) because GCD (A, B) = GCD (B, R). Use the above steps again.

4. Steps for experiment/practical/Code:

```
//SANSKAR AGRAWAL UID-20BCS5914

 #include<iostream>
 using namespace std;
 int GCD(int a,int b)
 {
      if(a%b==0)
          return b;
      if(b%a==0)
          return a;
      if(a>b)
         return GCD(a%b,b);
      else
         return GCD(a,b%a);
}
int main()
{
    int a,b;
    cout<<"\n\n"<<"Enter the 1st number: ";
    cin>>a;
    cout<<"Enter the 2nd number: ";
    cin>>b;
    cout<<"GCD of two numbers "<<a<<" and "<<b<<"is:"<< GCD(a,b);
    return 0;
}
```

5. Observations/Discussions/ Complexity Analysis:

Complexity-> O (log (min (a, b))

In this program we have used a recursive function to find the GCD or HCF of two numbers. Here Euclidian's formula is used. The recursive function takes two arguments and every time in the body it checks if a%b then return 0 that's basically the base case of the recursion. And if a>b then basically it calls the recursive function by passing (a%b, b) and else (a, b%a). In the main () I have initialized some required variables and took user inputs for that and finally called required function to calculate the GCD of two input numbers.

6. Result/Output/Writing Summary:

```
Output

/tmp/fdYhlSp8nK.o
SANSKAR AGRAWAL  UID-20BCS5914

 Enter the 1st number: 18
 Enter the 2nd number: 32
 GCD of two numbers 18 and 32 is:2
```

Learning outcomes (What I have learnt):

1. Here I have learned some concepts of Recursion.
2. I have also learned the Euclidian's Formula.
3. Here I successfully learned to calculate the GCD of two numbers.
4. I have also done some Arithmetic Operations here.

Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			