Assignment 2

Sayak Ghorai || BT21GCS004 || B2 || Design and Analysis of Algorithm

Q: Write a code to find out the GCD of two numbers using both ‘normal’ and ‘euclidean’ method and find out which one is better and why?

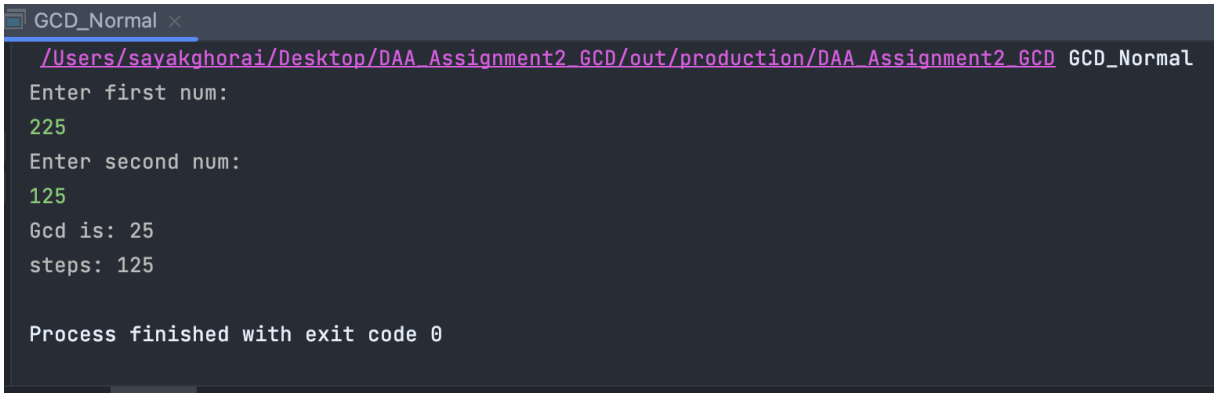
Answer:
Factorial using mormal method:

GCD_Normal.java | GCD_Euclidean.java

```java
import java.util.Scanner;

public class GCD_Normal {
    2 usages
    static int count;
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter first num: ");
        int num1=sc.nextInt();
        System.out.println("Enter second num: ");
        int num2=sc.nextInt();
        int min=0;
        if(num1>num2){
            min=num2;
        }
        else{
            min=num1;
        }
        int gcd=1;
        for(int i=1;i<min+1;i++){
            count++;
            if(num1%i==0 && num2%i==0) {
                gcd = i;
            }
        }
        System.out.println("Gcd is: "+gcd+"\nsteps: "+count);
    }
}
```

Output:



Factorial using Euclidean method:

GCD_Normal.java GCD_Euclidean.java

```java
import java.util.Scanner;

public class GCD_Euclidean {
    2 usages
    static int count;
    public static void main(String[] args) {
        Scanner sc=new Scanner(System.in);
        System.out.print(("Enter The First Num: "));
        int num1=sc.nextInt();
        System.out.println();
        System.out.println("Enter the Second Num: ");
        int num2=sc.nextInt();
        int min=0;
        if(num1>num2){
            min=num2;
        }
        else{
            min=num1;
        }
        int max=num2+num1-min;
        int remainder=1;
        do {
            remainder=max%min;
            max=min;
            min=remainder;
            count++;
        }while ((remainder!=0));
        System.out.println("GCD using Euclidean method is: "+max+"\nsteps taken: "+count);
        }
    }
```

Output:

Ans: the euclidean mechanism is better as it takes less steps than normal method.