

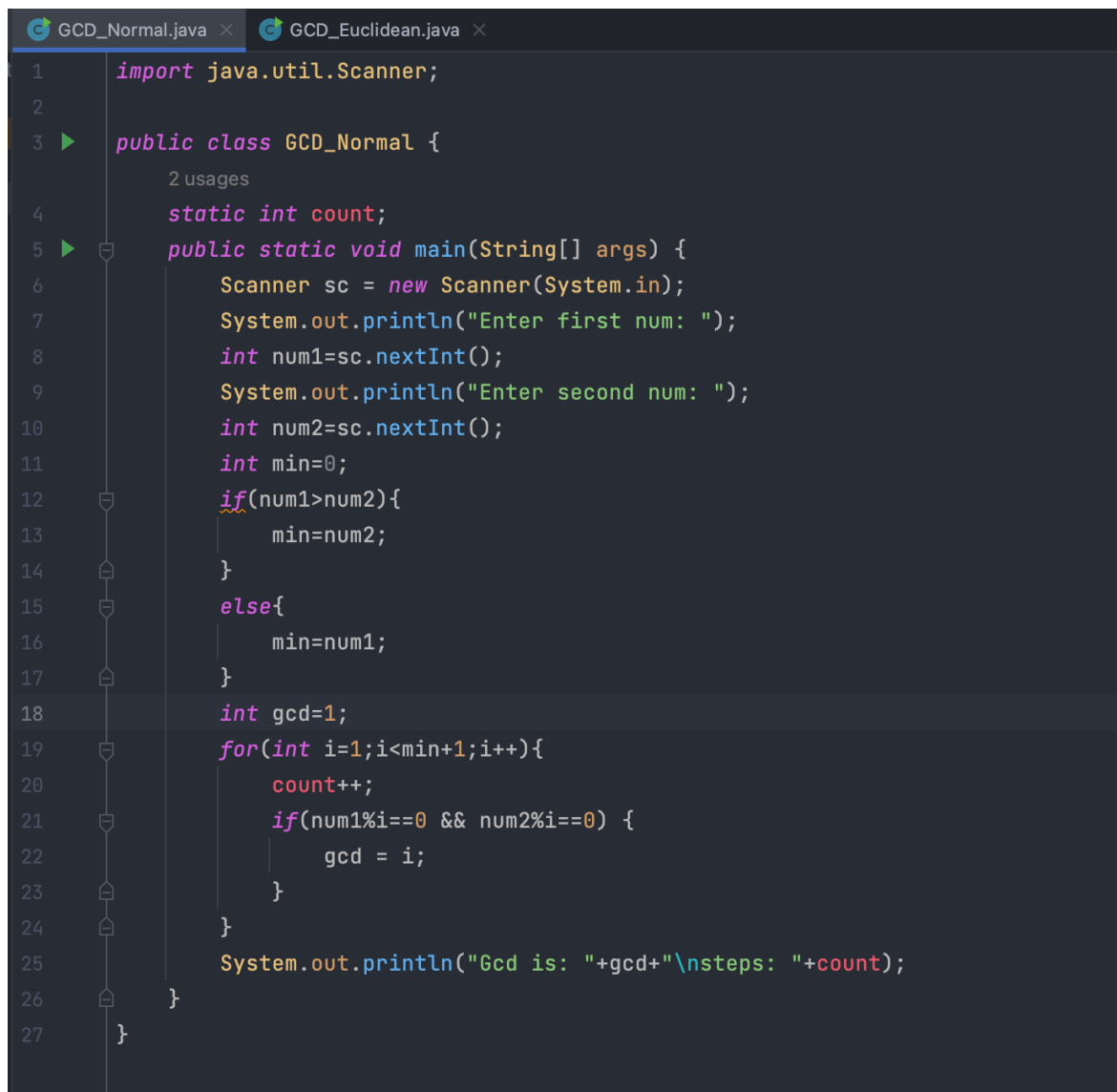
Assignment 2

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 normal method:



```
1  import java.util.Scanner;
2
3  public class GCD_Normal {
4      static int count;
5      public static void main(String[] args) {
6          Scanner sc = new Scanner(System.in);
7          System.out.println("Enter first num: ");
8          int num1=sc.nextInt();
9          System.out.println("Enter second num: ");
10         int num2=sc.nextInt();
11         int min=0;
12         if(num1>num2){
13             min=num2;
14         }
15         else{
16             min=num1;
17         }
18         int gcd=1;
19         for(int i=1;i<min+1;i++){
20             count++;
21             if(num1%i==0 && num2%i==0) {
22                 gcd = i;
23             }
24         }
25         System.out.println("Gcd is: "+gcd+"\nsteps: "+count);
26     }
27 }
```

Output:

```
GCD_Normal x
/Users/sayakghorai/Desktop/DAA_Assignment2_GCD/out/production/DAA_Assignment2_GCD GCD_Normal
Enter first num:
225
Enter second num:
125
Gcd is: 25
steps: 125

Process finished with exit code 0
```

Factorial using Euclidean method:

```
GCD_Normal.java x GCD_Euclidean.java x
1 import java.util.Scanner;
2
3 public class GCD_Euclidean {
4     2 usages
5     static int count;
6     public static void main(String[] args) {
7         Scanner sc=new Scanner(System.in);
8         System.out.print("Enter The First Num: ");
9         int num1=sc.nextInt();
10        System.out.println();
11        System.out.println("Enter the Second Num: ");
12        int num2=sc.nextInt();
13        int min=0;
14        if(num1>num2){
15            min=num2;
16        }
17        else{
18            min=num1;
19        }
20        int max=num2+num1-min;
21        int remainder=1;
22        do {
23            remainder=max%min;
24            max=min;
25            min=remainder;
26            count++;
27        }while ((remainder!=0));
28        System.out.println("GCD using Euclidean method is: "+max+"\nsteps taken: "+count);
29    }
```

Output:

```
/Users/sayakghorai/Desktop/DAA_Assignment2_GCD/out/production/DAA_Assignment2_GCD GCD_Euclidean
Enter The First Num: 225
Enter the Second Num:
125
GCD using Euclidean method is: 25
steps taken: 3
```

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