1. Write a Java Program to find GCD of two given numbers.

```
 public class Q1
 {
      public static int gcdOfNumbers(int n1,int n2)
                               //(4 ,6),(6,4),(4,2),(2,0)
      {
           if(n2 == 0) //n2= 0
                return n1; //2(printed)
           else
                return gcdOfNumbers(n2, n1 % n2);
           //                       6 , 4%6(4)
           //                       4, 6%4(2)
           //                   2, 4%2(0)
      }

     public static void main(String[] args)
     {
           Scanner sc = new Scanner(System.in);
          int n1 = sc.nextInt(); //taking 4 input from user
          int n2 = sc.nextInt(); //taking 6 input from user

          int res = gcdOfNumbers(n1,n2); //4,6
          System.out.println(res); //2

            sc.close();
    }
 }
```

2. Write a java program to LCM of TWO given number.

```
package com.example.main;
import java.util.Scanner;
public class Q2
{
     public static void main(String[] args)
     {
           Scanner sc = new Scanner(System.in);
          int n1 = sc.nextInt(); //taking 4 input from user
          int n2 = sc.nextInt(); //taking 8 input from user

          int lcm = (n1 > n2) ? n1 : n2 ;
          //         4 > 8(F)         8
          //LCM=8
            while(true)
          {
             if(lcm % n1 == 0 && lcm % n2 == 0)
           //      (8%4 => 0   && 8%8 => 0)=> TRUE

              {
                  System.out.print("LCM of "+n1+" and "+n2+" : "+lcm);
                  //                         4           8        8
                  break;
              }
              lcm++;
           }
```

```
            sc.close();
   }
}
```

3. Write a Java Program to print all the Prime Factors of the Given Number.

```
public class Q3
{

      public static void printPrimeFactors(int n) //20
      {
             while (n % 2 == 0)  //20%2=> 0(T), 10%2=>0(T),5%2=>1(F)
             {
                  System.out.print(2 + " "); //2 2
                  n /= 2; //20/2=>10, 10/2=>5
             }
             for (int i = 3; i <= Math.sqrt(n); i += 2)
             { //           3<=Math.sqrt(5)(F)
                  while (n % i == 0)
                  {
                        System.out.print(i + " ");
                        n /= i;
                  }
             }
             if (n > 2) //5>2(T)
             {
                  System.out.print(n); //5
             }
            }

     public static void main(String[] args)
     {
           Scanner sc = new Scanner (System.in);
             System.out.print("Enter the number : ");
             int number = sc.nextInt();
             System.out.print("Prime factors of " + number + " are: ");
             printPrimeFactors(number);

            sc.close();
   }
}
/*
Enter the number : 20
Prime factors of 20 are: 2 2 5
*/
```

4. Check whether the Given Numbers a Palindrome or NOT.

```
public class Q4
  {
       public static boolean isPalindrome(int number)
       {
              int temp = number;
              int rev = 0;
              while (number != 0)
              {
                    int rem = number % 10;
                    rev = rev * 10 + rem;
                    number /= 10;
              }
              return temp == rev;
        }

        public static void main(String[] args)
        {

         Scanner sc = new Scanner (System.in);
         System.out.print("Enter the number : ");
         int number = sc.nextInt();

         if (isPalindrome(number))
         {
              System.out.println(number + " is a palindrome.");
         }
         else
         {
              System.out.println(number + " is not a palindrome.");
         }

        }
  }
/*
     Enter the number : 1221
     1221 is a palindrome.
*/
```

5. Write a Java Program to check whether the Given Number is Prime Number or NOT.

```
public class Q5
{
        public static boolean isPrime(int n)
        {

             for(int i=2;i<n/2;i++)
             {
                   if(n%i == 0)
                        return true;
             }
             return false;
        }


      public static void main(String[] args)
      {
           Scanner sc = new Scanner(System.in);
           System.out.print("Enter number : ");
          int n = sc.nextInt();

        if (isPrime(n))
        {
             System.out.println(n + " is not a prime number.");
        }
        else
        {
             System.out.println(n + " is a prime number.");
      }
           sc.close();
   }
}
/*
     Enter number : 5
     5 is a prime number.

     Enter number : 10
     10 is not a prime number.
*/
```

6. Write a Java Program to check whether the given number is Armstrong Numberor NOT.

```
public class Q6
{
        public static int isArmstrong (int n)
        {
             int sum = 0;
             int temp = n;

             while(n > 0)
             {
                  int rem = n%10;
                  sum += rem*rem*rem;
                  n /= 10;
             }
             return sum;

        }


      public static void main(String[] args)
      {
           Scanner sc = new Scanner(System.in);
           System.out.print("Enter number : ");
         int n = sc.nextInt();
         int armStrong = isArmstrong(n);

        if (n == armStrong)
        {
             System.out.println(n + " is a Armstrong number.");
        }
        else
        {
             System.out.println(n + " is not a Armstrong number.");
      }
           sc.close();
   }
}
/*
     Enter number : 128
```

```
    128 is not a Armstrong number.

    Enter number : 153
    153 is a Armstrong number.

*/
```

7. Write a Java Program to check whether the given number is Perfect Numberor NOT.

```
public class Q7
{
    public static void main(String[] args)
    {
     Scanner sc = new Scanner(System.in);

     System.out.print("Enter the number : ");
     int number = sc.nextInt(); //28

     if (isPerfectNumber(number))
     {
         System.out.println(number + " is a perfect number.");
     }
     else
     {
         System.out.println(number + " is not a perfect number.");
     }
    }
     // Method to check if a number is a perfect number
     public static boolean isPerfectNumber(int number)
     {
     if (number < 1)
     {
         return false; // Perfect numbers are positive integers
     }
     int sum = 0;
     // Find all divisors and add them
     for (int i = 1; i <= number / 2; i++)
     {
         if (number % i == 0)
         {
             sum += i;
         }
     }
             // Check if the sum of divisors is equal to the number
     return sum == number;
    }

 }
/*
    Enter the number : 16
    16 is not a perfect number.

    Enter the number : 28
    28 is a perfect number.
*/
```

8. Write a Java Program to check whether the given numbers are Amicable Numbersor NOT.

```java
public class Q8
{
    public static void main(String[] args)
    {
      Scanner sc = new Scanner(System.in);
     System.out.print("Enter the number : ");
      int number1 = sc.nextInt(); // 220

      System.out.print("Enter the number : ");

      int number2 = sc.nextInt(); // 284

      if (areAmicableNumbers(number1, number2))
      {
      System.out.println(number1 + " and " + number2 + " are amicable 
numbers.");
      }
      else
      {
          System.out.println(number1 + " and " + number2 + " are not amicable 
numbers.");

      }
    }
    public static boolean areAmicableNumbers(int num1, int num2)
    {
      return (sumOfProperDivisors(num1) == num2 &&

      sumOfProperDivisors(num2) == num1);
    }

      public static int sumOfProperDivisors(int num)
      {
          int sum = 0;
          for (int i = 1; i <= num / 2; i++)
          {
              if (num % i == 0)
              {
                  sum += i;
              }
         }
         return sum;
    }

}
/*
    Enter the number : 120
    Enter the number : 250
    120 and 250 are not amicable numbers.

    Enter the number : 220
    Enter the number : 284
    220 and 284 are amicable numbers.

*/
```

9. Write a Java Program to check whether the given number is Ramanujam's Numberor NOT.

```
public class Q9
{
     public static void main(String arg[])
     {
           Scanner sc = new Scanner(System.in);
             System.out.print("Enter the number : ");
             int number = sc.nextInt();
             if (isRamanujanNumber(number)) {
             System.out.println(number + " is a Ramanujan number.");
             } else
             {
                  System.out.println(number + " is not a Ramanujan number.");
             }
     }
     public static boolean isRamanujanNumber(int n)
     {
       int count = 0;
       int limit = (int) Math.cbrt(n);
       for (int i = 1; i <= limit; i++)
       {
             for (int j = i + 1; j <= limit; j++)
             {
                  int sum = (int) (Math.pow(i, 3) + Math.pow(j, 3));
                  if (sum == n)
                  {
                        count++;
                        if (count == 2)
                        {
                             return true;
                        }
                      }
             }
       }
     return false;
     }

}
/*
     Enter the number : 1256
     1256 is not a Ramanujan number.

     Enter the number : 1729
     1729 is a Ramanujan number.
*/
```

10. Write a Java Program check whether the given number is Automorphic Numberor NOT.

```
public class Q10{

      public static void main(String[] args) {
       // TODO Auto-generated method stub
       Scanner sc = new Scanner(System.in);
       System.out.print("Enter the number : ");
       int number = sc.nextInt(); //5,25,6,36,
       if (isAutomorphicNumber(number))
       {
             System.out.println(number + " is an Automorphic number.");
       }
       else
       {
             System.out.println(number + " is not an Automorphic number.");
       }
       }

       public static boolean isAutomorphicNumber(int n)
       {
       int square = n * n;
       while (n > 0) {
       if (n % 10 != square % 10)
       {
             return false;
       }
             n /= 10;
             square /= 10;
       }
           return true;
       }

}
/*
Enter the number : 5
5 is an Automorphic number.

Enter the number : 25
25 is an Automorphic number.

Enter the number : 56
56 is not an Automorphic number.

Enter the number : 81
81 is not an Automorphic number.
*/
```