Logic building session 1

Q1. Write a Java Program to find GCD of two given numbers.

```java
package DSAquestions;

import java.util.Scanner;

public class Program {

    public static void main(String[] args) {
        // TODO Auto-generated method stub

            Scanner sc = new Scanner (System.in);
            System.out.println("Enter the first number : ");
            int number1 = sc.nextInt();
            System.out.print("Enter the second number : ");
            int number2 = sc.nextInt();
            int gcd = findGCD(number1, number2);
            System.out.println("The GCD of " + number1 + "
and " + number2 + " is: " + gcd);

            }
            public static int findGCD(int a, int b) {
            if (b == 0) {
            return a;
            } else {
```
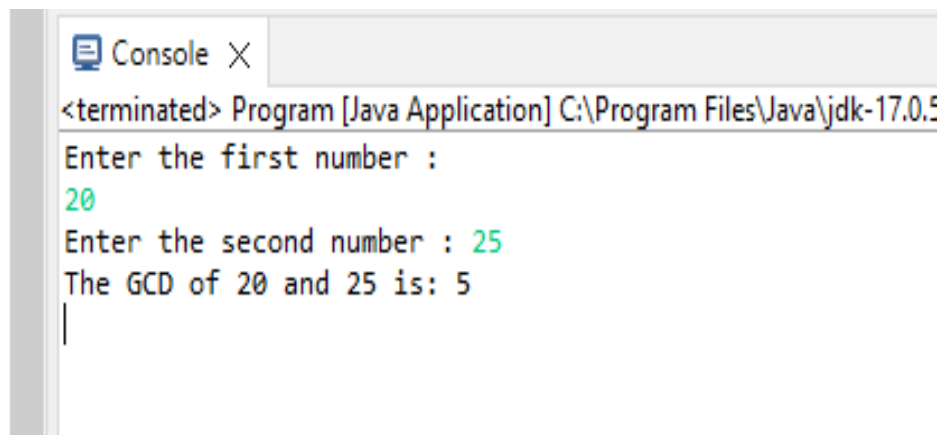
```
            return findGCD(b, a % b);

        }

    }

}
```

```
Console ×
<terminated> Program [Java Application] C:\Program Files\Java\jdk-17.0.5
Enter the first number :
20
Enter the second number : 25
The GCD of 20 and 25 is: 5
```

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

```java
package DSAquestions;

import java.util.Scanner;

public class Program1 {
    public static void main(String[] args) {
        Scanner sc = new Scanner (System.in);
        System.out.print("Enter the first number : ");
        int number1 = sc.nextInt();
        System.out.print("Enter the second number : ");
        int number2 = sc.nextInt();
        int lcm = findLCM(number1, number2);
        System.out.println("The LCM of " + number1 + " and " +
number2

        + " is: " + lcm);
        }
        public static int findLCM(int a, int b) {
        return (a * b) / findGCD(a, b);
        }
        public static int findGCD(int a, int b) {
        if (b == 0) {
        return a;
        } else {
```
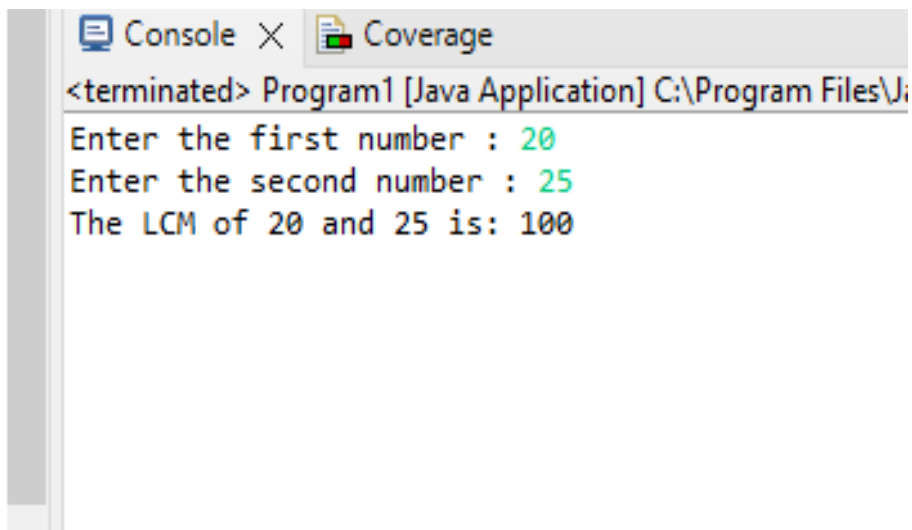
```
        return findGCD(b, a % b);

}

}

}
```

Console ✕ Coverage

<terminated> Program1 [Java Application] C:\Program Files\J

```
Enter the first number : 20
Enter the second number : 25
The LCM of 20 and 25 is: 100
```

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

```java
package DSAquestions;

import java.util.Scanner;

public class Program3 {

    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();
        System.out.print("Prime factors of " + number + " are: ");
        printPrimeFactors(number);
    }
    public static void printPrimeFactors(int n) {
    while (n % 2 == 0) {
    System.out.print(2 + " ");
    n /= 2;
    }
    for (int i = 3; i <= Math.sqrt(n); i += 2) {
    while (n % i == 0) {
    System.out.print(i + " ");
```
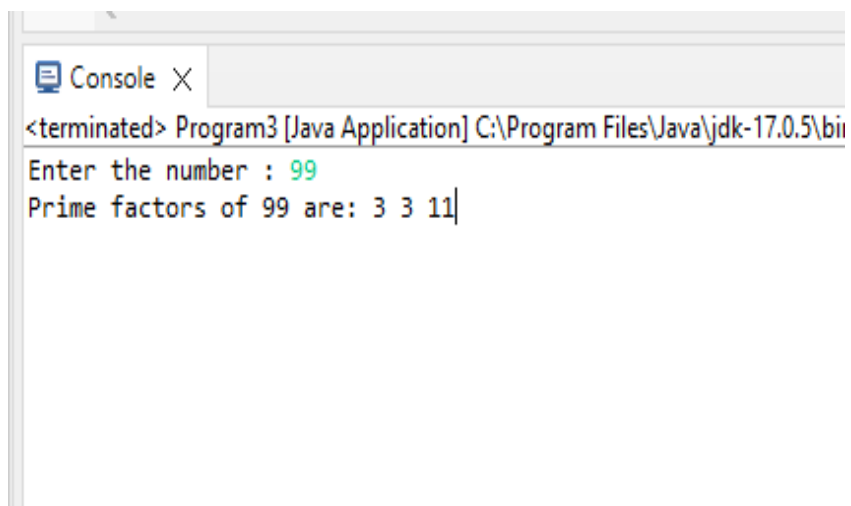
```java
            n /= i;
            }
        }
        if (n > 2) {
        System.out.print(n);
        }
    }

}
```

```
Console X
<terminated> Program3 [Java Application] C:\Program Files\Java\jdk-17.0.5\bii
Enter the number : 99
Prime factors of 99 are: 3 3 11
```

4. Decimal to binary number using recursion
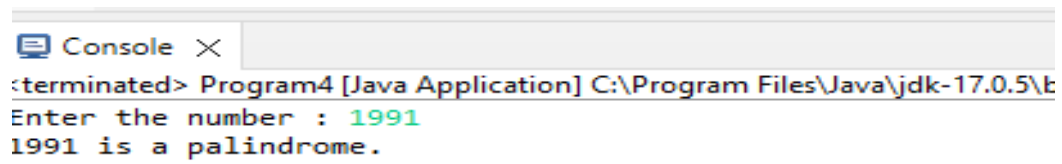
```
package DSAquestions;

import java.util.Scanner;

public class Program4 {

    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();
        if (isPalindrome(number)) {
        System.out.println(number + " is a palindrome.");
        } else {
        System.out.println(number + " is not a palindrome.");
        }
        }
        public static boolean isPalindrome(int number) {
        int originalNumber = number;
        int reverse = 0;
        while (number != 0) {
        int lastDigit = number % 10;
        reverse = reverse * 10 + lastDigit;
```

```
        number /= 10;

        }

        return originalNumber == reverse;

    }


}
```

```
Console ×
<terminated> Program4 [Java Application] C:\Program Files\Java\jdk-17.0.5\b
Enter the number : 1991
1991 is a palindrome.
```

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

```java
package DSAquestions;

import java.util.Scanner;

public class Program5 {

    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();
        if (isPrime(number)) {
        System.out.println(number + " is a prime number.");
        } else {
        System.out.println(number + " is not a prime number.");
        }
        }
        public static boolean isPrime(int n) {
        if (n < 2) {
        return false;
        }
        for (int i = 2; i <= Math.sqrt(n); i++) {
        if (n % i == 0) {
```
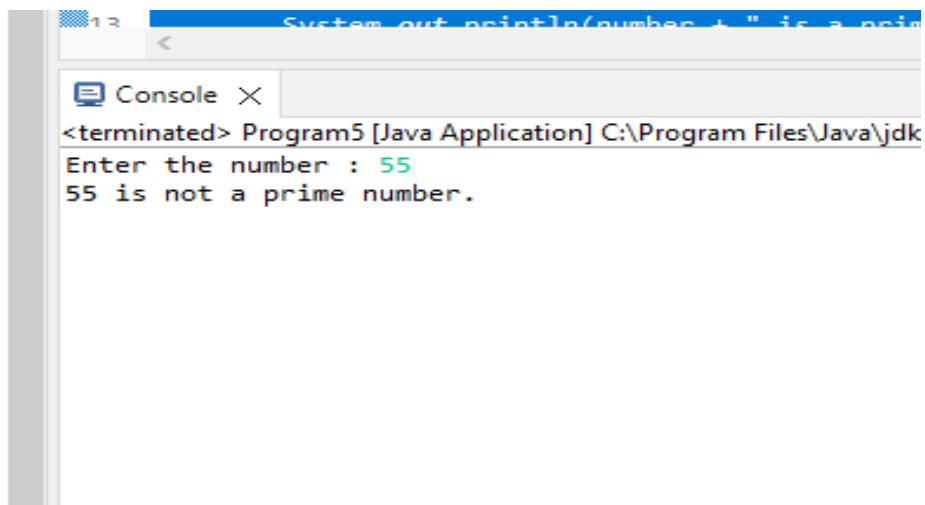
```
        return false;
        }
        }
        return true;
    }


}
```

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

```java
package DSAquestions;

import java.util.Scanner;

public class Program6 {

    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(); //153

        if (isArmstrong(number)) {
        System.out.println(number + " is an Armstrong number.");
        } else {
        System.out.println(number + " is not an Armstrong number.");
        }
        }
        // Method to check if a number is an Armstrong number
        public static boolean isArmstrong(int number) {
        int originalNumber, remainder, result = 0, n = 0;
        originalNumber = number;
        // Finding the number of digits
```
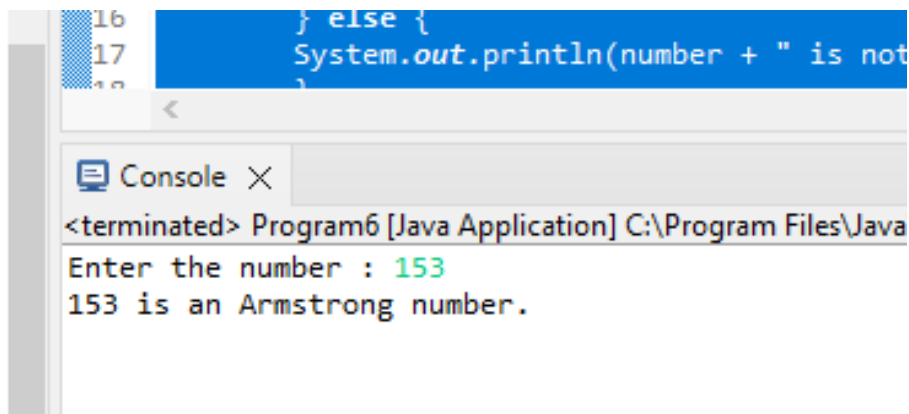
```java
        while (originalNumber != 0) {

        originalNumber /= 10;

        ++n;

        }

        originalNumber = number;

        // Checking if the number is Armstrong

        while (originalNumber != 0) {

        remainder = originalNumber % 10;

        result += Math.pow(remainder, n);

        originalNumber /= 10;

        }

        if (result == number) {

        return true;

        } else {

        return false;

        }

    }

}
```

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

```java
package DSAquestions;

import java.util.Scanner;

public class Program7 {
    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;

}

}
```

📺 Console ✕

<terminated> Program7 [Java Application] C:\Program Files\Java\jdk-17

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
package DSAquestions;

import java.util.Scanner;

public class Program8 {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        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.");

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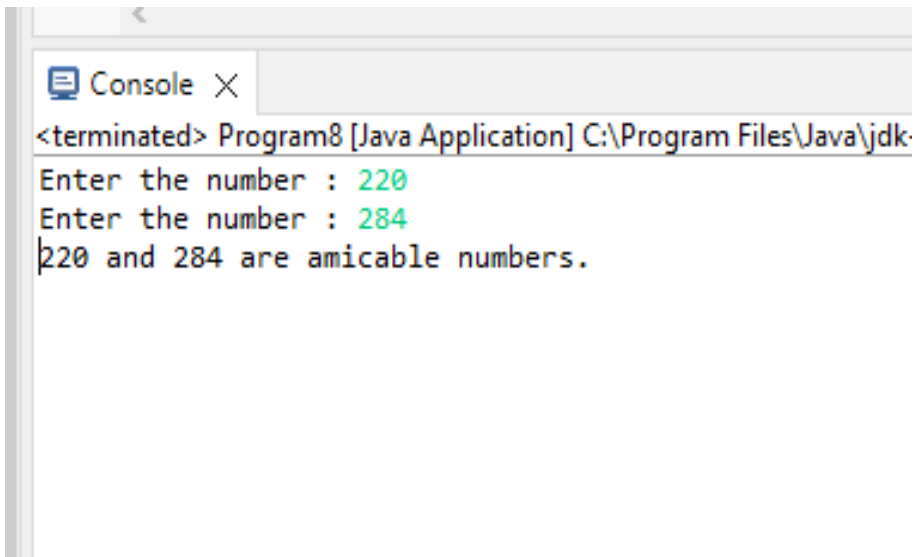
```java
public static boolean areAmicableNumbers(int num1, int num2) {
return (sumOfProperDivisors(num1) == num2 &&

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;
}

}
```



```
Console X
<terminated> Program8 [Java Application] C:\Program Files\Java\jdk·
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.

```java
package DSAquestions;


import java.util.Scanner;


public class Program9 {


    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();
        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) {
```
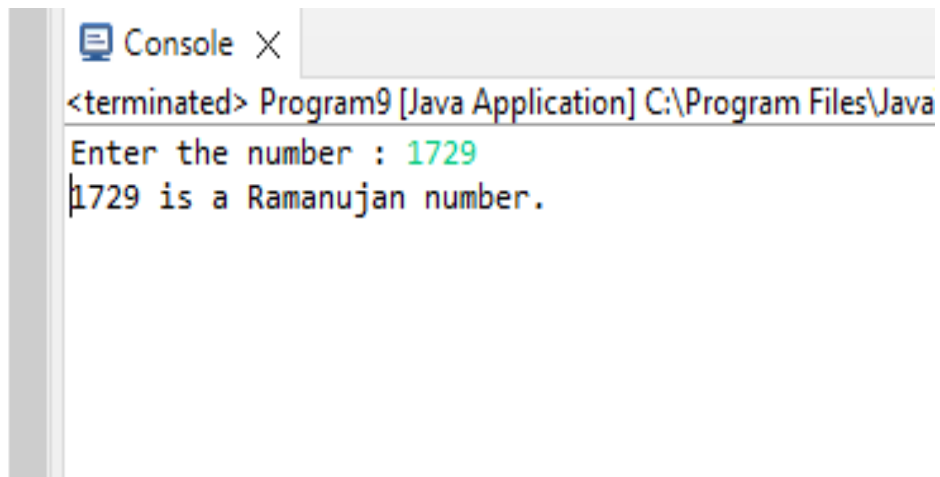
```
            return true;
            }
            }
            }
            }
        return false;
    }


}
```

Console ×

<terminated> Program9 [Java Application] C:\Program Files\Java

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

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

```java
package DSAquestions;

import java.util.Scanner;

public class Program10 {

    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;
    }


}
```



```
Console  ×
<terminated> Program10 [Java Application] C:\Program Files\Java
Enter the number : 5
5 is an Automorphic number.
```