1) Write a program in java input year and check whether it is: a leap year or not.

```
import java.util.Scanner;


public class practice {
   public static void main(String[] args) {
      Scanner scanner= new Scanner(System.in);

      System.out.println("enter a year");
      double year=scanner.nextDouble();
      scanner.nextLine();

      if (year%100==0 && year%400==0){
         System.out.println("leap year");
      }
      else if(year %4==0){
         System.out.println("leap year");
      }
      else{
         System.out.println("not a leap year");
      }

   }
}
```

2) Write a java program to check if three given side lengths (integers) can make a triangle or not.

```
import java.util.Scanner;

public class mains2{
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);

      System.out.println("Side 1: ");
      int side1 = scanner.nextInt();
      scanner.nextLine();

      System.out.println("Side 2: ");
      int side2 = scanner.nextInt();
      scanner.nextLine();

      System.out.println("Side 3: ");
      int side3 = scanner.nextInt();
      scanner.nextLine();

      if(side3 < side2  + side1 && side1 < side2  + side3 && side2 < side1 + side3 ){
         System.out.println("The three sides can make a triangle.");
      }
      else {
         System.out.println("Triangle formation not possible: ");
      }
   }
}
```

3) Write a program in java to check the number is odd or even.

```
import java.util.Scanner;

public class mains2 {
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);

      System.out.println("Enter number: ");
      double a = scanner.nextDouble();
      scanner.nextLine();

      if (a % 2 == 0) {
         System.out.println("Even Number");
      }
      else {
         System.out.println("Odd number");
      }
   }
}
```

4) Write a program in java to input three unequal numbers and display the smallest number

```
import java.util.Scanner;

public class mains2 {
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);

      System.out.println("Enter first number: ");
      double a = scanner.nextDouble();
      scanner.nextLine();

      System.out.println("Enter Second number: ");
      double b = scanner.nextDouble();
      scanner.nextLine();

      System.out.println("Enter Third number: ");
      double c = scanner.nextDouble();
      scanner.nextLine();

      if (a < b && a < c) {
         System.out.println(a + " is the smallest number");
      } else if (b < a && b < c) {
         System.out.println(b + " is the smallest number");
      } else {
         System.out.println(c + " is the smallest number");
      }
   }
}
```

5) Write a program in java to check the given number is positive or not.

```
import java.util.Scanner;

public class mains2{
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);

      System.out.println("Enter any Number: ");
      double num = scanner.nextDouble();
      scanner.nextLine();

      if (num == 0){
         System.out.println("Neutral ");
      }
      else if (num > 0){
         System.out.println("Positive number ");
      }
      else {
         System.out.println("Negetive Number ");
      }
   }
}
```

6) Write a program to input a number and check whether it is a Kaprekar number or not.

```
import java.util.Scanner;
public class mains2 {
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);

      System.out.print("Enter a positive whole number: ");
      int n = scanner.nextInt();

      scanner.close();

      int square = n * n;
      int numDigits = (int) Math.log10(n) + 1;
      int squareLength = (int) Math.log10(square) + 1;

      int rightPart = square % (int) Math.pow(10, numDigits);
      int leftPart = square / (int) Math.pow(10, numDigits);

      boolean isKaprekarNumber = false;
      if (squareLength == 2 * numDigits) {
         isKaprekarNumber = (rightPart + leftPart) == n;
      }
        else {
         int leftPartAdjusted = leftPart / 10;
         isKaprekarNumber = (rightPart + leftPartAdjusted) == n;
      }

      if (isKaprekarNumber) {
         System.out.println(n + " is a Kaprekar number.");
      } else {
         System.out.println(n + " is not a Kaprekar number.");
      }
   }
}
```

7) Write a program to input 10 integers and print the second largest number. Assume that there is at least one second largest number in the given set of integers.

```
import java.util.Scanner;

public class mains2 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        int[] numbers = new int[10];

        System.out.println("Enter 10 integers:");
        for (int i = 0; i < 10; i++) {
            numbers[i] = scanner.nextInt();
        }

        scanner.close();

        int largest = Integer.MIN_VALUE;
        int secondLargest = Integer.MIN_VALUE;

        for (int num : numbers) {
            if (num > largest) {
                secondLargest = largest;
                largest = num;
            } else if (num > secondLargest && num != largest) {
                secondLargest = num;
            }
        }

        System.out.println("The second largest number is: " + secondLargest);
    }
}
```

8) Write a Java program to check whether a given number is a happy number or unhappy number.

```
import java.util.HashSet;
import java.util.Scanner;
import java.util.Set;

public class mains2 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter a positive integer: ");
        int n = scanner.nextInt();

        scanner.close();

        Set<Integer> visitedNumbers = new HashSet<>();

        while (n != 1 && !visitedNumbers.contains(n)) {
            visitedNumbers.add(n);
            n = getNextNumber(n);
        }

        if (n == 1) {
            System.out.println("It's a happy number.");
        } else {
            System.out.println("It's an unhappy number.");
        }
    }

    public static int getNextNumber(int n) {
        int sum = 0;
        while (n > 0) {
            int digit = n % 10;
            sum += digit * digit;
            n /= 10;
        }
        return sum;
    }
}
```

9. WAP in Java, to create an ATM program for representing ATM transaction.

```
import java.util.Scanner;

public class ATMProgram {
    private static double balance = 1000; // Initial balance

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int choice;

        do {
            displayMenu();
            System.out.print("Enter your choice (1-4): ");
            choice = scanner.nextInt();

            switch (choice) {
                case 1:
                    withdrawMoney(scanner);
                    break;
                case 2:
                    depositMoney(scanner);
                    break;
                case 3:
                    checkBalance();
                    break;
                case 4:
                    System.out.println("Thank you for using the ATM. Goodbye!");
                    break;
```

```
            default:
                System.out.println("Invalid choice. Please enter a valid option.");
        }
    } while (choice != 4);
}

private static void displayMenu() {
    System.out.println("ATM Menu:");
    System.out.println("1. Withdraw Money");
    System.out.println("2. Deposit Money");
    System.out.println("3. Check Balance");
    System.out.println("4. Exit");
}

private static void withdrawMoney(Scanner scanner) {
    System.out.print("Enter the withdrawal amount: ");
    double withdrawalAmount = scanner.nextDouble();

    if (withdrawalAmount > 0 && withdrawalAmount <= balance) {
        balance -= withdrawalAmount;
        System.out.println("Withdrawal successful. Remaining balance: $" + balance);
    } else {
        System.out.println("Invalid withdrawal amount or insufficient funds.");
    }
}

private static void depositMoney(Scanner scanner) {
    System.out.print("Enter the deposit amount: ");
    double depositAmount = scanner.nextDouble();
```

```
        if (depositAmount > 0) {
            balance += depositAmount;
            System.out.println("Deposit successful. Updated balance: $" + balance);
        } else {
            System.out.println("Invalid deposit amount.");
        }
    }

    private static void checkBalance() {
        System.out.println("Your current balance: $" + balance);
    }
}
```

10) Write a Java program to check two numbers are Amicable numbers or not.

```
import java.util.Scanner;

public class AmicableNumbers {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the first number: ");
        int num1 = scanner.nextInt();

        System.out.print("Enter the second number: ");
        int num2 = scanner.nextInt();

        if (areAmicableNumbers(num1, num2)) {
            System.out.println(num1 + " and " + num2 + " are amicable numbers.");
        } else {
            System.out.println(num1 + " and " + num2 + " are not amicable numbers.");
        }
    }

    private static boolean areAmicableNumbers(int num1, int num2) {
        return (sumOfDivisors(num1) == num2) && (sumOfDivisors(num2) == num1);
    }

    private static int sumOfDivisors(int num) {
        int sum = 1; // 1 is always a divisor

        for (int i = 2; i <= Math.sqrt(num); i++) {
```

```
        if (num % i == 0) {
            sum += i;

            // If the divisors are not the same, add the other divisor
            if (i != (num / i)) {
                sum += (num / i);
            }
        }
    }

    return sum;
  }
}
```

11. A number N is said to be a mystery number if the number can be expressed by the sum of two numbers.

```
public class MysteryNumber {
    public static void main(String[] args) {
        findMysteryNumbers();
    }

    private static void findMysteryNumbers() {
        System.out.println("Mystery Numbers between 22 and 198:");
        for (int i = 22; i <= 198; i++) {
            if (isMysteryNumber(i)) {
                System.out.println(i);
            }
        }
    }

    private static boolean isMysteryNumber(int num) {
        // Check if the number is a multiple of 11
        if (num % 11 == 0) {
            int tensPlace = num / 10;
            int unitsPlace = num % 10;

            // Check if the sum of place values of unit and tens place is 11
            return (tensPlace + unitsPlace) == 11;
        }
        return false;
    }
}
```

12) Krishnamurthy Number

```
import java.util.Scanner;

public class KrishnamurthyNumber {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Input a number
        System.out.print("Enter a number: ");
        int number = scanner.nextInt();

        // Check if it's a Krishnamurthy number
        if (isKrishnamurthyNumber(number)) {
            System.out.println(number + " is a Krishnamurthy number.");
        } else {
            System.out.println(number + " is not a Krishnamurthy number.");
        }
    }

    private static boolean isKrishnamurthyNumber(int num) {
        int originalNumber = num;
        int sum = 0;

        while (num > 0) {
            int digit = num % 10;
            sum += factorial(digit);
            num /= 10;
        }
```

```
        return sum == originalNumber;
    }

    private static int factorial(int n) {
        if (n == 0 || n == 1) {
            return 1;
        } else {
            return n * factorial(n - 1);
        }
    }
}
```

13) Create a Java program that converts the given number into words.

```
import java.util.Scanner;

public class NumberToWords {
    private static final String[] units = {
        "", "One", "Two", "Three", "Four", "Five", "Six", "Seven", "Eight", "Nine"
    };

    private static final String[] teens = {
        "", "Eleven", "Twelve", "Thirteen", "Fourteen", "Fifteen", "Sixteen", "Seventeen",
"Eighteen", "Nineteen"
    };

    private static final String[] tens = {
        "", "Ten", "Twenty", "Thirty", "Forty", "Fifty", "Sixty", "Seventy", "Eighty", "Ninety"
    };

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter a number: ");
        int number = scanner.nextInt();

        if (number == 0) {
            System.out.println("Zero");
        } else {
            System.out.println(convertToWords(number));
        }
```

```
}

private static String convertToWords(int number) {
    if (number < 0 || number > 99999) {
        return "Invalid input. Please enter a number between 0 and 99999.";
    }

    if (number == 0) {
        return "Zero";
    }

    String words = "";

    // Handle thousands place
    if ((number / 1000) > 0) {
        words += convertToWords(number / 1000) + " Thousand ";
        number %= 1000;
    }

    // Handle hundreds place
    if ((number / 100) > 0) {
        words += units[number / 100] + " Hundred ";
        number %= 100;
    }

    // Handle tens and units place
    if (number > 0) {
        if (number < 10) {
            words += units[number];
```

```
        } else if (number < 20) {
            words += teens[number - 10];
        } else {
            words += tens[number / 10] + " " + units[number % 10];
        }
    }

    return words.trim();
  }
}
```

14. Create a java program to accept a number and check whether the number is perfect number or not.

```
import java.util.Scanner;

public class PerfectNumber {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Input a number
        System.out.print("Enter a number: ");
        int number = scanner.nextInt();

        // Check if it's a perfect number
        if (isPerfectNumber(number)) {
            System.out.println(number + " is a perfect number.");
        } else {
            System.out.println(number + " is not a perfect number.");
        }
    }

    private static boolean isPerfectNumber(int num) {
        int sum = 1; // Start with 1 because every number is divisible by 1

        for (int i = 2; i <= Math.sqrt(num); i++) {
            if (num % i == 0) {
                sum += i;

                // If the divisors are not the same, add the other divisor
```

```
            if (i != (num / i)) {
                sum += (num / i);
            }
        }
    }

    return sum == num;
  }
}
```

15) Write a menu driven program to input a month number between 1 to 12 and print the corresponding month name. That is for 1 display January, for 2 display February for 3 display March, etc.

```
import java.util.Scanner;


public class MonthName {
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);
         int choice;
         System.out.print("Enter the month number (1-12, 0 to exit): ");
         choice = scanner.nextInt();
         scanner.close()
          switch (choice) {
             case 1:
                System.out.println("January");
                break;
             case 2:
                System.out.println("February");
                break;
             case 3:
                System.out.println("March");
                break;
             case 4:
                System.out.println("April");
                break;
             case 5:
                System.out.println("May");
                break;
             case 6:
```

```
                System.out.println("June");
                break;
            case 7:
                System.out.println("July");
                break;
            case 8:
                System.out.println("August");
                break;
            case 9:
                System.out.println("September");
                break;
            case 10:
                System.out.println("October");
                break;
            case 11:
                System.out.println("November");
                break;
            case 12:
                System.out.println("December");
                break;
            case 0:
                System.out.println("Exiting the program. Goodbye!");
                break;
            default:
                System.out.println("Invalid month number. Please enter a valid option.");
        }
    } while (choice != 0);
  }
}
```

16. Write a program to input three integers and check whether it forms a Pythagorean triplet or not.

```
import java.util.Scanner;

public class PythagoreanTriplet {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Input three integers
        System.out.print("Enter the first integer: ");
        int a = scanner.nextInt();

        System.out.print("Enter the second integer: ");
        int b = scanner.nextInt();

        System.out.print("Enter the third integer: ");
        int c = scanner.nextInt();

        // Check if they form a Pythagorean triplet
        if ((a * a + b * b == c * c) || (a * a + c * c == b * b) || (b * b + c * c == a * a)) {
            System.out.println("The numbers form a Pythagorean triplet.");
        } else {
            System.out.println("The numbers do not form a Pythagorean triplet.");
        }
    }
}
```

17) Java Hotel Menu Program that creates hotel menu to help customers place orders.

```
import java.util.Scanner;
public class practice {
   public static void main(String[] args) {
      Scanner scanner= new Scanner(System.in);

      System.out.println("Welcome To Dhaba ");
      System.out.println(" ");
      System.out.println("To order South Indian Dish, Enter 1");
      System.out.println("To order North Indian Dish, Enter 2");
      System.out.println("To order Rajasthani Dish, Enter 3");
      System.out.println("To order Gujrati Dish, Enter 4");
      System.out.println("To order Bengali Dish, Enter 5");
      System.out.println("To order Desserts, Enter 6");
      System.out.println(" ");
      System.out.println("To exit, Enter 9");

      int choice = scanner.nextInt();
      scanner.close();

      if (choice == 1){
         System.out.println("Welcome to Flavours of South");
         System.out.println("You Get: ");
         System.out.println("Idli, Dhosa,\nSamber, coconut chutney");
      }
      else if (choice == 2){
         System.out.println("Welcome to Flavours of North");
         System.out.println("You Get: ");
         System.out.println("aloo paratha, gobi ka paratha,\nachaar ");
      }
      else if (choice == 3){
         System.out.println("Welcome to Flavours of Rajasthan");
         System.out.println("You Get: ");
         System.out.println("water, laal maas,\nMirchi vada, mohan mass ");
      }
      else if (choice == 4){
         System.out.println("Welcome to Flavours of Punjab");
         System.out.println("You Get: ");
```

```
            System.out.println("Khandvi, Dhokla,\nHandvo, Gathiya");
        }
        else if (choice == 5) {
            System.out.println("Welcome to Flavours of Bengal");
            System.out.println("You Get: ");
            System.out.println("Mach bhaat, dim bhaat,\ndaal, chicken kasha, rasgulla");
        }
        else if (choice == 6) {
            System.out.println("Welcome to Desserts");
            System.out.println("You Get: ");
            System.out.println("vanilla ice cream, rasgulla,\ngulab jamun");
        }
        else {
            System.out.println("Thank you for visiting us again");
        }
    }
}
```

18) An interesting method of multiplication of integers (not very large numbers).

19) The 1st day of 2021 was Friday, write a Menu driven program to input any day number within the month of January and print which day was it. Also check whether the day number entered is a valid date or not.

```
import java.util.Scanner;

public class mains2 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        int startDay = 5;
        int maxDays = 31;
        String[] days = {"Sunday", "Monday", "Tuesday", "Wednesday", "Thursday",
"Friday", "Saturday"};

        System.out.print("Enter the day number within January: ");
        int dayNumber = scanner.nextInt();

        if (dayNumber >= 1 && dayNumber <= maxDays) {
            int dayOfWeek = (startDay + dayNumber - 1) % 7;
            System.out.println("The day number " + dayNumber + " in January was: " +
days[dayOfWeek]);
        } else {
            System.out.println("Invalid day number.");
        }
    }
}
```

20) Sphenic Number

```
public class SphenicNumber {
    public static void main(String[] args) {
        int number = 30; // Replace this with the number you want to check

        if (isSphenicNumber(number)) {
            System.out.println(number + " is a Sphenic Number.");
        } else {
            System.out.println(number + " is not a Sphenic Number.");
        }
    }

    private static boolean isSphenicNumber(int num) {
        int count = 0;
        int[] primeFactors = new int[3];

        for (int i = 2; i <= num; i++) {
            while (num % i == 0) {
                if (count < 3) {
                    primeFactors[count++] = i;
                } else {
                    // If more than 3 prime factors found, it cannot be a sphenic number
                    return false;
                }
                num /= i;
            }
        }
```

```
        // If exactly 3 distinct prime factors found and the product is the original number
        return count == 3 && num == 1;
    }
}
```