ST LAB 1

SAHIL BONDRE: U18CO021

1. To determine the volume of a cone by using the formula

```
package lab_1.q_01;

import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        var sc = new Scanner(System.in);
        System.out.print("Enter radius: ");
        double r = sc.nextDouble();
        System.out.print("Enter height: ");
        double h = sc.nextDouble();
        double v = Math.PI * r * r * h / 3;
        System.out.printf("Volume: %.2f", v);
    }
}
```

```
Enter radius: 4.5
Enter height: 22
Volume: 466.53
Process finished with exit code 0
```

2. Java Program to find LCM of two numbers

```
package lab_1.q_02;

import java.util.Scanner;

public class Main {

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

    static int lcm(int a, int b) {
        return (a / gcd(a, b)) * b;
```

```
    }

    public static void main(String[] args) {
        var sc = new Scanner(System.in);
        System.out.print("Enter first number: ");
        int n1 = sc.nextInt();
        System.out.print("Enter second number: ");
        int n2 = sc.nextInt();
        int lcm = lcm(n1, n2);
        System.out.printf("LCM: %d", lcm);
    }
}
```

```
Enter first number: 4
Enter second number: 6
LCM: 12
Process finished with exit code 0
```

3. Java Program to replace the spaces of a string with a specific character

```
package lab_1.q_03;

import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        var sc = new Scanner(System.in);
        System.out.printf("Enter String: ");
        var s = sc.nextLine();
        System.out.printf("Enter Replacement Character: ");
        char c = sc.next().charAt(0);
        s = s.replace(' ', c);
        System.out.println(s);
    }
}
```

```
Enter String: sahil bondre
Enter Replacement Character: &
sahil&bondre

Process finished with exit code 0
```

4. Create a class which asks the user to enter a sentence, and it should display the count of each vowel type in the sentence. The program should continue till the user enters the word “quit”. Display the total count of each vowel for all sentences.

```
package lab_1.q_04;

import java.util.Scanner;

public class Solver {
    int vowelCount(String s) {
        s = s.toLowerCase();
        int count = 0;
        for (int i = 0; i < s.length(); i++) {
            char c = s.charAt(i);
            if (c == 'a' || c == 'e' || c == 'i' || c == 'o' || c ==
'u') {
                ++count;
            }
        }

        return count;
    }

    public void run() {
        var sc = new Scanner(System.in);
        String s = "";

        while (!(s = sc.nextLine()).equals("quit")) {
            System.out.printf("Vowels: %d\n", vowelCount(s));
        }
    }
}
```

```
package lab_1.q_04;

public class Main {
    public static void main(String[] args) {
        var r = new Solver();
        r.run();
    }
}
```

```
sahil
Vowels: 2
sahil bondre
Vowels: 4
quit
```

5. Write a Java method to compute the future investment value at a given interest rate for a specified number of years.

```java
package lab_1.q_05;

import java.util.Scanner;

public class Main {
    static double value(double p, double t, double r) {
        return p * Math.pow((1 + r) , t);
    }
    public static void main(String[] args) {
        var sc = new Scanner(System.in);
        System.out.printf("Enter Years: ");
        double t = sc.nextDouble();
        System.out.printf("Enter Principle: ");
        double p = sc.nextDouble();
        System.out.printf("Enter Rate: ");
        double r = sc.nextDouble();

        double v = value(p, t, r);
        System.out.printf("Value: %.2f", v);
    }
}
```

```
Enter Years: 10
Enter Principle: 1000
Enter Rate: 0.082
Value: 2199.24
Process finished with exit code 0
```

6. Define a class student having roll_number as data member and two functions get_number() and put_number(). Derive a class test from a class student having marks of two subjects and two member functions two get and display marks.

Derive a class result from a class test having total_marks as data member and a display function.

```
package lab_1.q_06;

public class Student {
    private int rollNumber;

    public int getRollNumber() {
        return rollNumber;
    }

    public void setRollNumber(int rollNumber) {
        this.rollNumber = rollNumber;
    }

    public Student(int rollNumber) {
        this.rollNumber = rollNumber;
    }
}
```

```
package lab_1.q_06;

public class Test extends Student {
    private int dbms;
    private int dsa;

    public int getDbms() {
        return dbms;
    }

    public int getDsa() {
        return dsa;
    }

    public Test(int rollNumber, int dbms, int dsa) {
        super(rollNumber);
        this.dbms = dbms;
        this.dsa = dsa;
    }
    public void printDBMS() {
        System.out.printf("DBMS: %d\n", dbms);
    }
    public void printDSA() {
        System.out.printf("DSA: %d\n", dsa);
```

```
    }
}
```

```
package lab_1.q_06;

public class Result extends Test {
    private int totalMarks;

    public Result(int rollNumber, int dbms, int dsa) {
        super(rollNumber, dbms, dsa);
        this.totalMarks = dbms + dsa;
    }

    public int getTotalMarks() {
        return totalMarks;
    }

    public void printResult() {
        System.out.printf("Roll Number: %d\n", getRollNumber());
        printDBMS();
        printDSA();
        System.out.printf("Total: %d\n", totalMarks);
    }
}
```

```
package lab_1.q_06;

public class Main {
    public static void main(String[] args) {
        var result = new Result(21, 48, 45);
        result.printResult();
    }
}
```

```
Roll Number: 21
DBMS: 48
DSA: 45
Total: 93
```

7. Define a circle class with radius as data member, Add necessary constructors and member function to compute area of circle. Class should overload the = =

operator to compare two circle objects whether they are equal in radius.

Demonstrate its use in main().

```
package lab_1.q_07;

import java.util.Objects;

public class Circle {
    private double radius;

    public double getRadius() {
        return radius;
    }

    public void setRadius(double radius) {
        this.radius = radius;
    }

    public Circle(double radius) {
        this.radius = radius;
    }

    public double getArea() {
        return Math.PI * radius *radius;
    }

    @Override
    public boolean equals(Object o) {
        if (this == o) return true;
        if (o == null || getClass() != o.getClass()) return false;
        Circle circle = (Circle) o;
        return Double.compare(circle.radius, radius) == 0;
    }
}
```

```
package lab_1.q_07;

import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        var sc = new Scanner(System.in);
        System.out.printf("Enter Radii:");
        double r1 = sc.nextDouble();
```

```
        double r2 = sc.nextDouble();
        var circle = new Circle(r1);
        var circle1 = new Circle(r2);

        System.out.printf("Area: %.2f\nEqual: ", circle.getArea());
        System.out.println(circle1.equals(circle));
    }
}
```

```
Enter Radii:4.5 4.5
Area: 63.62
Equal: true
```

8. Write a Java program that takes the user to provide a single character from the alphabet. Print Vowel or Consonant, depending on the user input. If the user input is not a letter (between a and z or A and Z), or is a string of length > 1, print an error message.

```
package lab_1.q_08;

import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        var sc = new Scanner(System.in);
        String s = sc.nextLine();

        if (s.length() != 1) {
            System.out.println("Error");
            return;
        }

        char c = s.charAt(0);

        if ((c >= 'a' && c <= 'z') || (c >= 'A' && c <= 'Z')) {
            if (c == 'a' || c == 'e' || c == 'i' || c == 'o' || c == 'u'
|| c == 'A' || c == 'E' || c == 'I' || c == 'O' || c == 'U') {
                System.out.println("Vowel");
            } else {
                System.out.println("Constant");
            }
        } else {
            System.out.println("Error");
```

```
        }
    }
}
```

```
e
Vowel

Process finished with exit code 0
```

9. Write a program that accepts three numbers from the user and prints "increasing" if the numbers are in increasing order, "decreasing" if the numbers are in decreasing order, and "Neither increasing or decreasing order" otherwise.

```
package lab_1.q_09;

import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        var sc = new Scanner(System.in);
        int a, b, c;
        System.out.printf("Enter 3 numbers: ");
        a = sc.nextInt();
        b = sc.nextInt();
        c = sc.nextInt();

        if (a <= b && b <= c) {
            System.out.println("Increasing");
        } else if (a >= b && b >= c) {
            System.out.println("Decreasing");
        } else {
            System.out.println("Neither Increasing or Decreasing");
        }
    }
}
```

```
Enter 3 numbers: 9 5 1
Decreasing

Process finished with exit code 0
```