TASK 1 – INSTALL JDK, SETUP JAVA ENVIRONMENT AND WRITE A PROGRAM TO PRINT — CODING IS FUN, ENJOY IT!

CODE

```java
public class helloWorld {
    public static void main(String [] args) {
        System.out.println("Coding is Fun, Enjoy it!!");
    }
}
```

OUTPUT

```
C:\Users\Dell\Java-Lab\Module 1>javac helloWorld.java

C:\Users\Dell\Java-Lab\Module 1>java helloWorld
Coding is Fun, Enjoy it!!
```

TASK 2 – WRITE A PROGRAM IN JAVA TO GENERATE FIRST N PRIME NUMBERS.

ALGORITHM

STEP 1: START

STEP 2: SET ct:=0, n:=0, i:=1, j:=1, take INPUT from user and store it in n_input

STEP 3: REPEAT STEP 4 to 12 UNTIL n<n_input

STEP 4: j:=1

STEP 5: ct:=0

STEP 6: REPEAT STEP 7 to 9 UNTIL j<=i

STEP 7: if i%j==0 then

STEP 8: ct:=ct+1

STEP 9: j:=j+1

STEP 10: if ct==2 then PRINT i

STEP 11: n:=n+1

STEP 12: i:=i+1

STEP 13: END

CODE

```java
import java.util.Scanner;
public class PrimeNumbers{
    public static void main(String[] args){
        int n;
        int status = 1;
        int num = 3;
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number of prime numbers you want to print: ");
        n = sc.nextInt();
        if(n>=1){
            System.out.println("First " + n + " prime numbers are");
            System.out.println(2);
        }
        for (int i=2; i<=n;)
        {
            for (int j=2; j <= Math.sqrt(num); j++ )
```

```
            {
                if (num%j == 0)
                {
                    status = 0;
                    break;
                }
            }
            if (status != 0)
            {
                System.out.println(num);
                i++;
            }
            status = 1;
            num++;
        }
        sc.close();
    }
}
```

OUTPUT

```
C:\Users\Dell\Java-Lab\Module 1>javac PrimeNumbers.java

C:\Users\Dell\Java-Lab\Module 1>java PrimeNumbers
Enter the number of prime numbers you want to print: 4
First 4 prime numbers are
2
3
5
7
```

TASK 3 – WRITE A PROGRAM TO ENTER TWO NUMBERS AND PERFORM MATHEMATICAL OPERATIONS ON THEM

ALGORITHM

STEP 1: START

STEP 2: SET a:=0, b:=0

STEP 3: Take two INPUTS from user and store it into variables A & B

STEP 4: PERFORM A+B and store it into variable C

STEP 5: PRINT the operation

STEP 6: PERFORM A-B and store it into variable C

STEP 7: PRINT the operation

STEP 8: PERFORM A*B and store it into variable C

STEP 9: PRINT the operation

STEP 10: PERFORM A/B and store it into variable C

STEP 11: PRINT the operation

STEP 12: PERFORM A%B and store it into variable C

STEP 13: PRINT the operation

STEP 14: END

CODE

```java
import java.util.Scanner;
public class mathematicalOperations {
    public static void main(String[] args) {
        Scanner in = new Scanner(System.in);
        System.out.print("Enter a number A: ");
        int a = in.nextInt();
        System.out.print("Enter a number B: ");
        int b = in.nextInt();
        int c;
        c = a+b;
        System.out.println("A = " + a);
        System.out.println("B = " + b);
        System.out.println("A + B = " + c);
        c = a-b;
        System.out.println("A - B = " + c);
        c = a*b;
        System.out.println("A * B = " + c);
        c = a/b;
        System.out.println("A / B = " + c);
        c = a%b;
        System.out.println("A % B = " + c);
        in.close();
    }
}
```

OUTPUT

```
C:\Users\Dell\Java-Lab\Module 1>javac mathematicalOperations.java

C:\Users\Dell\Java-Lab\Module 1>java mathematicalOperations
Enter a number A: 15
Enter a number B: 3
A = 15
B = 3
A + B = 18
A - B = 12
A * B = 45
A / B = 5
A % B = 0
```

TASK 4 – WRITE A PROGRAM THAT CALCULATE PERCENTAGE MARKS OF THE STUDENT IF MARKS OF 6 SUBJECTS ARE GIVEN

ALGORITHM

STEP 1: START

STEP 2: SET max_marks := 0

STEP 3: INPUT max_marks

STEP 4: DECLARE variables A, B, C, D, E, F

STEP 5: DECLARE variable sum and assign it as A+B+C+D+E+F

STEP 6: DIVIDE sum by (6*max_marks)

STEP 7: MULTIPLY the result with 100

STEP 8: PRINT the percentage

CODE

```java
import java.util.Scanner;
public class percentageCalc {
    public static void main(String[] args) {
        Scanner in = new Scanner(System.in);
        int maxmarks,per;
        System.out.print("Enter maximum marks possible: ");
        maxmarks = in.nextInt();
        int marks[] = new int[6];
        for(int i=0; i<6; i++){
            System.out.print("Enter Subject " + (i+1) + " marks: ");
            marks[i] = in.nextInt();
        }
        per = 0;
        for(int j=0; j<6; j++){
            per = per + marks[j];
        }
        double per_f = ((double)per/(6*(double)maxmarks))*100;
        System.out.println("The percentage is: " + per_f + "%");
        in.close();
    }
}
```

OUTPUT

```
C:\Users\Dell\Java-Lab\Module 1>javac percentageCalc.java

C:\Users\Dell\Java-Lab\Module 1>java percentageCalc
Enter maximum marks possible: 30
Enter Subject 1 marks: 20
Enter Subject 2 marks: 21
Enter Subject 3 marks: 26
Enter Subject 4 marks: 29
Enter Subject 5 marks: 22
Enter Subject 6 marks: 15
The percentage is: 73.88888888888889%
```

TASK 5 – WRITE A PROGRAM TO FIND MAXIMUM OF THREE NUMBERS USING CONDITIONAL OPERATORS

ALGORITHM

STEP 1: START

STEP 2: TAKE 3 VARIABLES X,Y,Z

STEP 3: Apply Boolean Condition for greatest number from 3 numbers.

STEP 4: PRINT the greatest number.

STEP 5: END

CODE

```java
import java.util.Scanner;

public class max3 {
    static int maxof3(int x, int y, int z){
        if(x>y && x>x){
            return x;
        }
        else if(y>x && y>z){
            return y;
        }
```

```
        else{
            return z;
        }
    }
    public static void main(String[] args){
        Scanner in = new Scanner(System.in);
        System.out.print("Enter number 1: ");
        int a = in.nextInt();
        System.out.print("Enter number 2: ");
        int b = in.nextInt();
        System.out.print("Enter number 3: ");
        int c = in.nextInt();
        System.out.println("The maximum of the three numbers is: " + maxof3(a,b,c));
        in.close();
    }
}
```

OUTPUT

```
C:\Users\Dell\Java-Lab\Module 1>javac max3.java

C:\Users\Dell\Java-Lab\Module 1>java max3
Enter number 1: 4
Enter number 2: 9
Enter number 3: 3
The maximum of the three numbers is: 9
```

TASK 6 – WRITE A PROGRAM TO ACCEPT A LINE AND CHECK HOW MANY CONSONANTS AND VOWELS ARE THERE IN LINE

ALGORITHM

STEP 1: START

STEP 2: INITITALISE a String, INPUT the String from User

STEP 3: TRAVERSE through the string for count of vowels and consonants.

STEP 4: Increment the required counter for vowels and consonants if found.

STEP 5: DISPLAY the final Vowel and Consonant count.

STEP 6: END

CODE

```
import java.util.Scanner;
public class vowelTest {
    public static void main(String[] args) {
        int v=0, con=0;
        char x;
        Scanner in = new Scanner(System.in);
        System.out.print("Enter a string: ");
        String s = in.nextLine();
        s.toLowerCase();
        for(int i=0; i<s.length(); i++){
            x = s.charAt(i);
            if(x=='a'||x=='e'||x=='i'||x=='o'||x=='u'){
                v++;
            }
            else{
```

```
                con++;
            }
        }
        System.out.println("Total vowels: " + v);
        System.out.println("Total consonants: " + con);
        in.close();
    }
}
```

OUTPUT

```
C:\Users\Dell\Java-Lab\Module 1>javac vowelTest.java

C:\Users\Dell\Java-Lab\Module 1>java vowelTest
Enter a string: Tanish
Total vowels: 2
Total consonants: 4
```

TASK 7 – WRITE A PROGRAM TO CHECK NUMBER OF WORDS THAT START WITH A CAPITAL

ALGORITHM

STEP 1: START

STEP 2: INITIALISE a string and input it from the User

STEP 3: RUN a for Loop for i=0 to i+stringlength and traverse through the string

STEP 4: If a Capital is found after a “ “, increment counter by 1

STEP 5: DISPLAY the counter

STEP 6: END

CODE

```
// Checking Capital letter in string
import java.util.*;
public class checkCapitalLetter {
    public static void main(String args[]) {
        Scanner sc = new Scanner(System.in);
        System.out.println("enter a string");
        String a, inp;
        String str[];
        char c;
        int count = 0, i;
        inp = sc.nextLine();
        str = inp.split(" ");
        for (i = 0; i < str.length; i++){
            a = str[i];
            c = a.charAt(0);
            if (Character.isUpperCase(c)){
                count++;
            }
        }
        System.out.println(count);
        sc.close();
    }
}
```

OUTPUT

```
C:\Users\Dell\Java-Lab\Module 1>javac checkCapitalLetter.java

C:\Users\Dell\Java-Lab\Module 1>java checkCapitalLetter
enter a string
tHis Is A tEsT StrIng
3
```

TASK 8 – CREATE A CLASS WHICH ASK THE USER TO ENTER A SENTENCE, AND IT SHOULD DISPLAY COUNT OF EACH VOWEL TYPE IN THE SENTENCE. THE PROGRAM SHOULD CONTINUE TILL USER ENTERS A WORD "QUIT". DISPLAY THE TOTAL COUNT OF EACH VOWEL FOR ALL SENTENCES.

ALGORITHM

STEP 1: START

STEP 2: Take input of string

STEP3: Using while loop take inputs of the string and put the condition to stop the while loop when "quit" is entered as a string

STEP 4: Iterate the string and count number of vowels and consonant

STEP 5: Print the number of vowels and consonant

STEP 6: END

CODE

```java
import java.util.*;
public class CheckVowelUntilAsked {
    public static void main(String args[]) {
        Scanner sc = new Scanner(System.in);
        int i, vow = 0, cons = 0;
        char x;
        while (true) {
            String str;
            System.out.println("Enter String :");
            str = sc.nextLine();
            if (str.equals("quit")) {
                break;
            }
            else {
                for (i = 0; i < str.length(); i++) {
                    x = str.charAt(i);
                if (x == 'a' || x == 'e' || x == 'i' || x == 'o' || x == 'u')
                    vow++;
                else
                    cons++;
                }
                System.out.println("number of vowels : " + vow);
                System.out.println("number of consonant : " + cons);
                vow=0;
                cons=0;
            }
        }
        sc.close();
    }
}
```

OUTPUT

```
C:\Users\Dell\Java-Lab\Module 1>javac CheckVowelUntilAsked.java

C:\Users\Dell\Java-Lab\Module 1>java CheckVowelUntilAsked
Enter String :
Tanish
number of vowels : 2
number of consonant : 4
Enter String :
Test
number of vowels : 1
number of consonant : 3
Enter String :
AnotherTest
number of vowels : 3
number of consonant : 8
Enter String :
quit
```

TASK 9 – WRITE AN INTERACTIVE PROGRAM TO PRINT A STRING ENTERED IN A PYRAMID FORM.

ALGORITHM

STEP 1: START

STEP 2: INITIALISE a String, and take its INPUT from user

STEP 3: RUN a FOR loop from i=1 to i=LengthOfString

STEP 4: RUN another nested FOR loop from j=1 to j=LengthOfString-i

STEP 5: PRINT The ongoing iteration

STEP 6: END

CODE

```java
import java.util.Scanner;
public class patternsProblem2 {
    public static void main(String [] args) {
        String s1;
        Scanner in = new Scanner(System.in);
        System.out.print("Enter a string: ");
        s1 = in.nextLine();
        int l = s1.length();
        for(int i=1; i<=l; i++) {
            for(int j=1; j<=l-i; j++) {
                System.out.print(" ");
            }
            for(int k=1; k<=i; k++) {
                System.out.print(s1.charAt(k-1));
                System.out.print(" ");
            }
            System.out.println();
        }
        in.close();
    }
}
```

OUTPUT

```
C:\Users\Dell\Java-Lab\Module 1>javac patternsProblem2.java

C:\Users\Dell\Java-Lab\Module 1>java patternsProblem2
Enter a string: Tanish
     T
    T a
   T a n
  T a n i
 T a n i s
T a n i s h
```

TASK 10 – WRITE AN INTERACTIVE PROGRAM TO PRINT A DIAMOND SHAPE.

ALGORITHM

STEP 1: START

STEP 2: Take INPUT from user of a Number

STEP 3: Run 3 simultaneous nested for loops for the pattern

STEP 4: PRINT the pattern

STEP 5: END

CODE

```
import java.util.Scanner;
public class StarDesign {
public static void main(String args[]) {
    System.out.println("Enter the number :");
    Scanner sc = new Scanner(System.in);
    int n =sc.nextInt();
    for(int i =1;i<=n;i++){
        int j;
        for(j=1;j<=n-i;j++){
            System.out.print(" ");
        }
        for(;j<=n;j++){
            System.out.print("* ");
        }
        System.out.println();
    }
    for(int i =n-1;i>=1;i--){
        int j;
        for(j=1;j<=n-i;j++){
            System.out.print(" ");
        }
        for(;j<=n;j++){
            System.out.print("* ");
        }
        System.out.println();
    }
    sc.close();
    }
}
```

OUTPUT

```
C:\Users\Dell\Java-Lab\Module 1>javac StarDesign.java

C:\Users\Dell\Java-Lab\Module 1>java StarDesign
Enter the number :
7
      *
     * *
    * * *
   * * * *
  * * * * *
 * * * * * *
* * * * * * *
 * * * * * *
  * * * * *
   * * * *
    * * *
     * *
      *
```

TASK 11 – WRITE A JAVA PROGRAM TO FIND AREA OF GEOMETRIC FIGURES USING METHOD OVERLOADING

ALGORITHM

STEP 1: Start

STEP 2: Make the static function of area for getting the area of different polygon.

STEP 3: Input different dimensions for different shapes and call area() functions inside the main function

STEP 4: Print the final result

STEP 5: End

CODE

```
class funcOverload {
    static void Area(int a){
        System.out.println(a*a);
    }
    static void Area(int a,int b){
        System.out.println(a*b);
    }
    static void Area(int a,int b,int c){
        int s = (a+b+c)/2;
        System.out.println((int)Math.sqrt((s*(s-a)*(s-b)*(s-c))));
    }
    public static void main(String[] args) {
        System.out.print("Area of Square of side 5 is :");
        Area(5);
        System.out.print("Area of rectange of side 5 and 7 is :");
        Area(5, 7);
        System.out.print("Area of triangle of sides 3 , 4 and 5 is :");
        Area(3, 4, 5);
    }
}
```

OUTPUT

```
C:\Users\Dell\Java-Lab\Module 1>javac funcOverload.java

C:\Users\Dell\Java-Lab\Module 1>java funcOverload
Area of Square of side 5 is :25
Area of rectange of side 5 and 7 is :35
Area of triangle of sides 3 , 4 and 5 is :6
```

TASK 12 – WRITE A PROGRAM IN JAVA TO CREATE A SIMPLE SCIENTIFIC CALCULATOR USING MATH CLASS

CODE

```java
import java.lang.Math;
import java.util.Scanner;

public class Calculator {
    static void add(int a, int b) {
        System.out.println(a + b);
    }
    static void subtract(int a, int b) {
        System.out.println(a - b);
    }
    static void multiply(int a, int b) {
        System.out.println(a * b);
    }
    static void divide(int a, int b) {
        System.out.println(a / b);
    }
    static void modulo(int a, int b) {
        System.out.println(a % b);
    }
    static void power(int a, int b) {
        System.out.println(Math.pow(a, b));
    }
    static void factorial(int a) {
        int fact = 1;
        for (int i = 1; i <= a; i++) {
            fact = fact * i;
        }
        System.out.println(fact);
    }
    static void squareRoot(int a) {
        System.out.println(Math.sqrt(a));
    }
    static void cubeRoot(int a) {
        System.out.println(Math.cbrt(a));
    }
    static void log(int a) {
        System.out.println(Math.log(a));
    }
    static void log10(int a) {
        System.out.println(Math.log10(a));
```

```
    }
    static void sin(int a) {
        System.out.println(Math.sin(a));
    }
    static void cos(int a) {
        System.out.println(Math.cos(a));
    }
    static void tan(int a) {
        System.out.println(Math.tan(a));
    }
    static void asin(int a) {
        System.out.println(Math.asin(a));
    }
    static void acos(int a) {
        System.out.println(Math.acos(a));
    }
    static void atan(int a) {
        System.out.println(Math.atan(a));
    }
    static void sinh(int a) {
        System.out.println(Math.sinh(a));
    }
    static void cosh(int a) {
        System.out.println(Math.cosh(a));
    }
    static void tanh(int a) {
        System.out.println(Math.tanh(a));
    }
    static void exp(int a) {
        System.out.println(Math.exp(a));
    }
    static void ceil(int a) {
        System.out.println(Math.ceil(a));
    }
    static void floor(int a) {
        System.out.println(Math.floor(a));
    }
    static void round(int a) {
        System.out.println(Math.round(a));
    }
    public static void main(String [] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the first number: ");
        int a = sc.nextInt();
        System.out.println("Enter the second number: ");
        int b = sc.nextInt();
        System.out.println("Enter the operation you want to perform: ");
        String operation = sc.next();
        switch (operation) {
            case "add":
                add(a, b);
                break;
            case "subtract":
                subtract(a, b);
```

```
            break;
        case "multiply":
            multiply(a, b);
            break;
        case "divide":
            divide(a, b);
            break;
        case "modulo":
            modulo(a, b);
            break;
        case "power":
            power(a, b);
            break;
        case "factorial":
            factorial(a);
            break;
        case "squareRoot":
            squareRoot(a);
            break;
        case "cubeRoot":
            cubeRoot(a);
            break;
        case "log":
            log(a);
            break;
        case "log10":
            log10(a);
            break;
        case "sin":
            sin(a);
            break;
        case "cos":
            cos(a);
            break;
        case "tan":
            tan(a);
            break;
        case "asin":
            asin(a);
            break;
        case "acos":
            acos(a);
            break;
        case "atan":
            atan(a);
            break;
        case "sinh":
            sinh(a);
            break;
        case "cosh":
            cosh(a);
            break;
        case "tanh":
            tanh(a);
```

```
                break;
            case "exp":
                exp(a);
                break;
            case "ceil":
                ceil(a);
                break;
            case "floor":
                floor(a);
                break;
            case "round":
                round(a);
                break;
            default:
                System.out.println("Invalid operation");
        }
        sc.close();
    }
}
```

TASK 13 – WRITE A PROGRAM IN JAVA TO SORT THE ELEMENTS OF LIST SO THAT THEY ARE IN ASCENDING ORDER.

CODE

```
import java.util.Scanner;
public class sortArray {
    public static void main(String [] args) {
        Scanner in = new Scanner(System.in);
        System.out.print("Enter the size of the array: ");
        int n = in.nextInt();
        int [] arr = new int[n];
        System.out.println("Enter the elements of the array: ");
        for(int i=0; i<n; i++) {
            arr[i] = in.nextInt();
        }
        for(int i=0; i<n; i++) {
            for(int j=i+1; j<n; j++) {
                if(arr[i] > arr[j]) {
                    int temp = arr[i];
                    arr[i] = arr[j];
                    arr[j] = temp;
                }
            }
        }
        System.out.println("The sorted array is: ");
        for(int i=0; i<n; i++) {
            System.out.print(arr[i] + " ");
        }
        in.close();
    }
}
```

OUTPUT

```
C:\Users\Dell\Java-Lab\Module 1>javac sortArray.java

C:\Users\Dell\Java-Lab\Module 1>java sortArray
Enter the size of the array: 4
Enter the elements of the array:
3
8
1
2
The sorted array is:
1 2 3 8
```

TASK 14 – WRITE A PROGRAM IN JAVA TO MULTIPLY TWO MATRICES.

CODE

```java
import java.util.Scanner;

class matrixMultiplication1 {
    public static void main(String [] args) {
        //A Program to multiply two matrices
        Scanner in = new Scanner(System.in);
        System.out.print("Enter Rows of matrix A: ");
        int r1 = in.nextInt();
        System.out.print("Enter Columns of matrix A: ");
        int c1 = in.nextInt();
        System.out.print("Enter Rows of matrix B: ");
        int r2 = in.nextInt();
        System.out.print("Enter Columns of matrix B: ");
        int c2 = in.nextInt();
        if(r2 == c1){
            int [][] matrixA = new int[r1][c1];
            int [][] matrixB = new int[r2][c2];
            int i,j,k;
            for(i=0; i<r1; i++){
                for(j=0; j<c1; j++){
                    System.out.print("Enter element [" + i + "][" + j + "]");
                    matrixA[i][j] = in.nextInt();
                }
            }
            for(i=0; i<r2; i++){
                for(j=0; j<c2; j++){
                    System.out.print("Enter element [" + i + "][" + j + "]");
                    matrixB[i][j] = in.nextInt();
                }
            }
            System.out.println("The Matrix A is :");
            for(i=0; i<r1; i++){
                for(j=0; j<c1; j++){
                    System.out.print(matrixA[i][j] + " ");
                }
                System.out.println();
            }
            System.out.println("The Matrix B is :");
            for(i=0; i<r2; i++){
```

```
                for(j=0; j<c2; j++){
                    System.out.print(matrixB[i][j] + " ");
                }
                System.out.println();
            }
            int [][] matrixC = new int[r1][c2];
            for(i=0; i<r1; i++){
                for(j=0; j<c2; j++){
                    matrixC[i][j] = 0;
                    for(k=0;k<c1;k++){
                        matrixC[i][j] = matrixC[i][j] + (matrixA[i][k] + matrixB[k][j]);
                    }
                }
            }
            System.out.println("The Multiplied Matrix is :");
            for(i=0; i<r1; i++){
                for(j=0; j<c2; j++){
                    System.out.print(matrixC[i][j] + " ");
                }
                System.out.println();
            }
        }
        else{
            System.out.print("Multiplication Invalid!! Columns of Matrix A does not equal
Rows of Matrix B");
        }
        in.close();
    }
}
```

OUTPUT

```
C:\Users\Dell\Java-Lab\Module 1>java matrixMultiplication1
Enter Rows of matrix A: 3
Enter Columns of matrix A: 4
Enter Rows of matrix B: 4
Enter Columns of matrix B: 5
Enter element [0][0]1
Enter element [0][1]2
Enter element [0][2]3
Enter element [0][3]4
Enter element [1][0]5
Enter element [1][1]6
Enter element [1][2]7
Enter element [1][3]8
Enter element [2][0]9
Enter element [2][1]10
Enter element [2][2]11
Enter element [2][3]12
Enter element [0][0]13
Enter element [0][1]14
Enter element [0][2]15
Enter element [0][3]16
Enter element [0][4]17
Enter element [1][0]18
Enter element [1][1]19
Enter element [1][2]20
Enter element [1][3]1
Enter element [1][4]2
Enter element [2][0]3
Enter element [2][1]4
Enter element [2][2]5
Enter element [2][3]6
Enter element [2][4]7
Enter element [3][0]8
Enter element [3][1]9
Enter element [3][2]0
Enter element [3][3]1
Enter element [3][4]2
The Matrix A is :
1 2 3 4
5 6 7 8
9 10 11 12
The Matrix B is :
13 14 15 16 17
18 19 20 1 2
3 4 5 6 7
8 9 0 1 2
The Multiplied Matrix is :
52 56 50 34 38
68 72 66 50 54
84 88 82 66 70
```