Name – Anshul Kumar

Section -CST SPL2

Roll no-11

JAVA LAB FILE

PCS-408

B.TECH IV SEMESTER

Q1. Write a java program to take input as a command line argument. Your name, course,

universit yrollno and semester. Display the information:

> **Name:**
>
> **UniversityRollNo:**
>
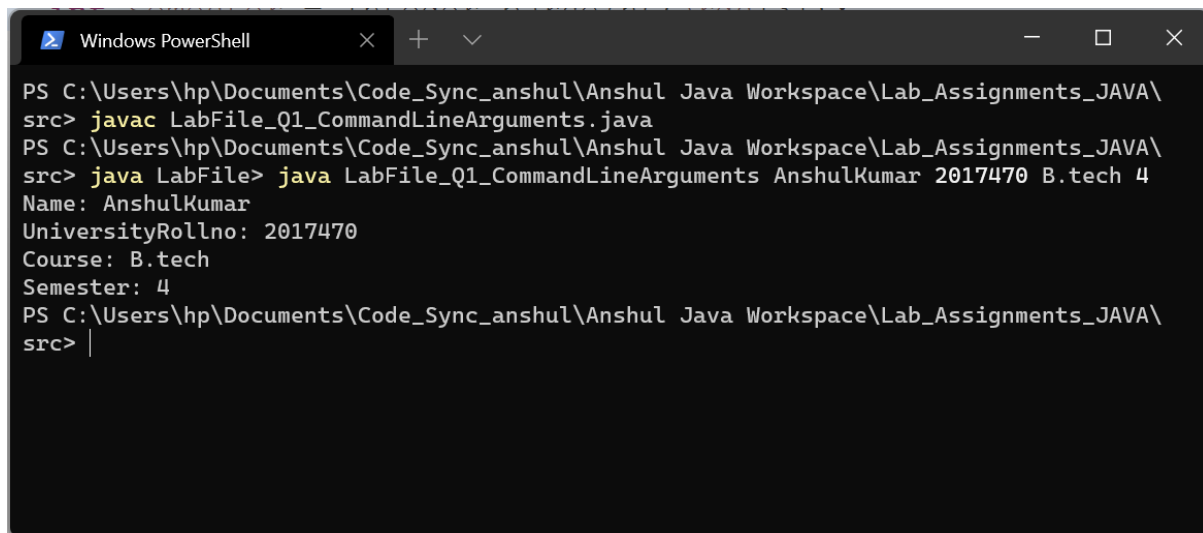> **Course:**
>
> **Semester:**

<center>Source Code:</center>

```java
public class LabFile_Q1_CommandLineArguments {
    public static void main(String[] args) {
        String Name = args[0];
        int UniversityRollno = Integer.parseInt(args[1]);
        String Course = args[2];
        int Semester = Integer.parseInt(args[3]);

        System.out.println("Name: "+ Name);
        System.out.println("UniversityRollno: "+
UniversityRollno);
        System.out.println("Course: "+ Course);
        System.out.println("Semester: "+ Semester);
    }
}
```

Output:

Windows PowerShell

```
PS C:\Users\hp\Documents\Code_Sync_anshul\Anshul Java Workspace\Lab_Assignments_JAVA\
src> javac LabFile_Q1_CommandLineArguments.java
PS C:\Users\hp\Documents\Code_Sync_anshul\Anshul Java Workspace\Lab_Assignments_JAVA\
src> java LabFile> java LabFile_Q1_CommandLineArguments AnshulKumar 2017470 B.tech 4
Name: AnshulKumar
UniversityRollno: 2017470
Course: B.tech
Semester: 4
PS C:\Users\hp\Documents\Code_Sync_anshul\Anshul Java Workspace\Lab_Assignments_JAVA\
src>
```

Q2. Using the switch statement, write a menu-driven program to calculate the maturity amount of a bank deposit.

The user is given the following options:

(i) Term Deposit

(ii) Recurring Deposit

<u>Source Code:</u>

```java
import java.util.Scanner;
public class LabFile_Q2_MaturityAmount {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int choice = 1;
        while(choice!=3){
            System.out.println("Maturity Amount of Bank Deposit:");
            System.out.println("1.Term Deposit");
            System.out.println("2.Recurring Deposit");
            System.out.println("3.Exit");
            choice = sc.nextInt();
        switch(choice){
            case 1:
                System.out.println("Enter Principal: ");
                float p = sc.nextFloat();
                System.out.println("Rate: ");
                float r = sc.nextFloat();
                System.out.println("Time Period: ");
                int t = sc.nextInt();
                float a =
(float)(p*(Math.pow((1+(r/100d)),t)));
                System.out.println("Maturity Amount: "+ a);
                break;
            case 2:
```

```java
                    System.out.println("Enter Monthly
Installment: ");
                     float P = sc.nextFloat();
                    System.out.println("Rate: ");
                    float R = sc.nextFloat();
                    System.out.println("Time Period: ");
                    int T = sc.nextInt();
                    float A = P * T + P * (T*(T+1) / 2) * (R /
100f) * (1f / 12f);
                    System.out.println("Maturity Amount: "+ A);
                    break;
                case 3:
                     System.out.println("End of Program");
                     break;
                default:
                    System.out.println("Invalid Choice!");
            }
        }
    }
}
```

Output:

```
Problems  @ Javadoc  Declaration  Console ×
<terminated> LabManual_Q2_MaturityAmount [Java Application]
Maturity Amount of Bank Deposit:
1.Term Deposit
2.Recurring Deposit
3.Exit
1
Enter Principal:
1000
Rate:
5
Time Period:
3
Maturity Amount: 1157.625
Maturity Amount of Bank Deposit:
1.Term Deposit
2.Recurring Deposit
3.Exit
2
Enter Monthly Installment:
1000
Rate:
5
Time Period:
3
Maturity Amount: 3025.0
Maturity Amount of Bank Deposit:
1.Term Deposit
2.Recurring Deposit
3.Exit
3
End of Program
```

Q3. Program to find if the given numbers are Friendly pair or not (Amicable or not). Friendly Pair are two or more numbers with a common abundance.

<div align="center">

Source Code:

</div>

```java
import java.util.Scanner;
public class LabFile_Q3_FriendlyPair {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter Two Number: ");
        int num1 = sc.nextInt();
        int num2 = sc.nextInt();
        int sum1 = divisorsSum(num1);
        int sum2 = divisorsSum(num2);
        if(sum1/num1 == sum2/num2)
            System.out.println("Friendly Pair");
        else
            System.out.println("Not Friendly Pair");
    }
    public static int divisorsSum(int num){
        int sum=0;
        for(int i=1;i<num;i++){
            if(num%i==0)
                sum+=i;
        }
        return sum;
    }
}
```

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Output:

Console ×
<terminated> LabFile_Q3_FriendlyPair [Java Application]
Enter Two Number:
6 28
Friendly Pair

Console ×
<terminated> LabFile_Q3_FriendlyPair [Java Application]
Enter Two Number:
30
140
Friendly Pair

Console ×
<terminated> LabFile_Q3_FriendlyPair [Java Application]
Enter Two Number:
80 200
Friendly Pair

Console ×
<terminated> LabFile_Q3_FriendlyPair [Java Application]
Enter Two Number:
6 38
Not Friendly Pair

Q4. Program to replace all 0's with 1 in a given integer. Given an integer as an input, all the 0's in the number has to be replaced with 1.

Source Code:

```java
import java.util.Scanner;
public class LabFile_Q4_Replace0with1 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a Number: ");
        int num = sc.nextInt();
        int rev = 0;
        while(num!=0){
            int digit = num%10;
            if(digit==0){
                rev = rev*10 + 1;
                num = num/10;
                continue;
            }
            rev = rev*10 + digit;
            num = num/10;
        }
        int res = 0;
        while(rev!=0){
            int digit = rev%10;
            res = res*10 + digit;
            rev = rev/10;
        }
        System.out.println(res);
    }
}
```

Output:

Console ×
<terminated> LabFile_Q4_Replace0with1
Enter a Number:
10011100
11111111

Console ×
<terminated> LabFile_Q4_Replace0with1
Enter a Number:
001200212
1211212

Console ×
<terminated> LabFile_Q4_Replace0with1
Enter a Number:
011010100
11111111

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Q5. **Printing an array into Zigzag fashion. Suppose you were given an array of integers, and you are told to sort the integers in a zigzag pattern. In general, in a zigzag pattern, the first integer is less than the second integer, which is greater than the third integer, which is less than the fourth integer, and so on. Hence, the converted array should be in the form of e1 < e2 > e3 < e4 > e5 < e6.**

Source Code:

```java
import java.util.Scanner;
public class LabFile_Q5_Zigzag {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter Length of Array: ");
        int n = sc.nextInt();
        System.out.println("Enter Elements of Array: ");
        int [] arr = new int[n];
        for(int i=0;i<n;i++){
            arr[i] = sc.nextInt();
        }
        for(int i=0;i<n-1;i++){
            if(isEven(i)){
                if(arr[i+1]<arr[i]){
                    int temp = arr[i];
                    arr[i] = arr[i+1];
                    arr[i+1] = temp;
                }
            }
            else if(!isEven(i)){
                if(arr[i]<arr[i+1]){
                    int temp = arr[i];
                    arr[i] = arr[i+1];
                    arr[i+1] = temp;
                }
            }
```

```java
        }
        for(int i=0;i<n;i++)
            System.out.print(arr[i]+" ");
    }
    public static boolean isEven(int index){
        if(index%2==0 || index==0)
            return true;
        else
            return false;
    }
}
```

Output:

```
Console ×
<terminated> LabFile_Q5_Zigzag [Java Application]
Enter Length of Array:
7
Enter Elements of Array:
4 3 7 8 6 2 1
3 7 4 8 2 6 1
```

```
Console ×
<terminated> LabFile_Q5_Zigzag [Java Application] (
Enter Length of Array:
7
Enter Elements of Array:
2 5 8 9 6 3 1
2 8 5 9 3 6 1
```

Q6. The problem to rearrange positive and negative numbers in an array . Method: This approach moves all negative numbers to the beginning and positive numbers to the end but changes the order of appearance of the elements of the array. Steps: 1. Declare an array and input the array elements. 2. Start traversing the array and if the current element is negative, swap the current element with the first positive element and continue traversing until all the elements have been encountered. 3. Print the rearranged array. Test case:

• **Input: 1 -1 2 -2 3 -3**

• **Output: -1 -2 -3 1 3 2**

Source Code:

```java
import java.util.Scanner;
public class LabFile_Q6_rearrangePositiveNegative {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter Length of Array: ");
        int n = sc.nextInt();
        System.out.println("Enter Elements of Array: ");
        int[] a = new int[n];
        for(int i=0;i<n;i++){
            a[i] = sc.nextInt();
        }
        int j=0,k=n-1;
        for(int i=0;i<n;i++){
            if(a[i]<0){
                int temp = a[i];
                a[i] = a[j];
                a[j] = temp;
                j++;
            }
        }
        for(int i : a){
```
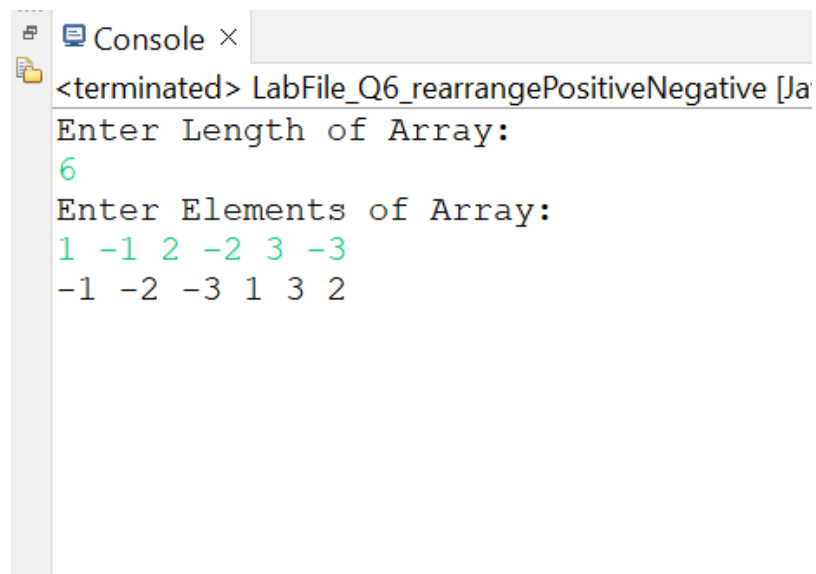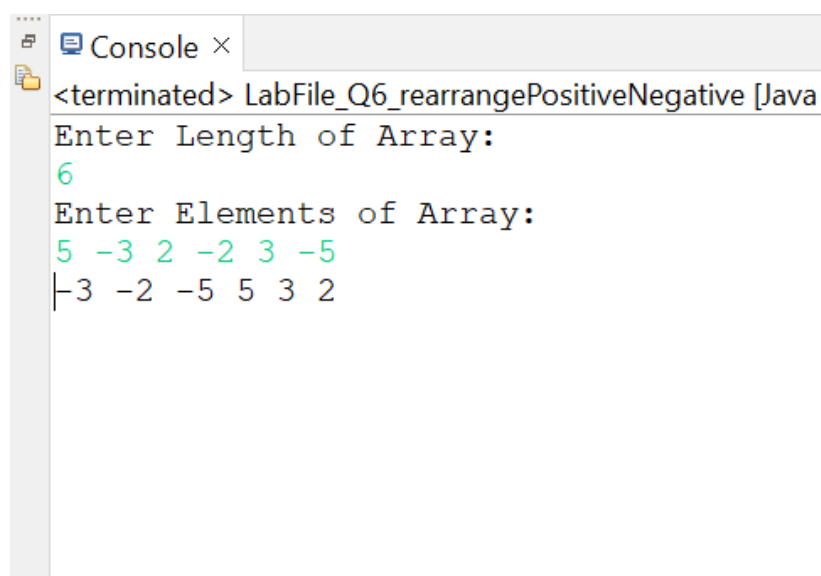
```
            System.out.print(i+" ");

    }

  }

}
```

Output:

Console ×
<terminated> LabFile_Q6_rearrangePositiveNegative [Ja
```
Enter Length of Array:
6
Enter Elements of Array:
1 -1 2 -2 3 -3
-1 -2 -3 1 3 2
```

Console ×
<terminated> LabFile_Q6_rearrangePositiveNegative [Java
```
Enter Length of Array:
6
Enter Elements of Array:
5 -3 2 -2 3 -5
-3 -2 -5 5 3 2
```

Q7. Program to find the saddle point coordinates in a given matrix. A saddle point is an element of the matrix, which is the minimum element in its row and the maximum in its column.

For example, consider the matrix given below

Mat[3][3]

1 2 3

4 5 6

7 8 9

Here, 7 is the saddle point because it is the minimum element in its row and maximum element in its column.

Source Code:

```java
import java.util.Scanner;
public class LabFile_Q7_SaddlePoint_Matrix {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the row/column of Matrix: ");
        int n = sc.nextInt();
        int[][] M = new int[n][n];
        System.out.println("Enter Matrix Elements: ");
        for(int i=0;i<n;i++){
            for(int j=0;j<n;j++){
                M[i][j] = sc.nextInt();
            }
        }
        for(int i=0;i<n;i++){
            int minRow = M[i][0];
            int colInd = 0;
            for(int j=1;j<n;j++){
                if(minRow>M[i][j]){
```

```
                minRow = M[i][j];
                colInd = j;
            }
        }
        int j;
        for(j=0;j<n;j++){
            if(minRow<M[j][colInd])
                break;
            if(j==n-1){
                System.out.printf("Saddle Point: %d",minRow);
                break;
            }
        }
    }
}
}
```

Output:

```
Console ×
<terminated> LabFile_Q7_SaddlePoint_Matrix [Java Application]
Enter the row/column of Matrix:
3
Enter Matrix Elements:
1 2 3
4 5 6
7 8 9
Saddle Point: 7
```

```
Console ×
<terminated> LabFile_Q7_SaddlePoint_Matrix [Java Application]
Enter the row/column of Matrix:
3
Enter Matrix Elements:
1 3 5
7 9 11
13 15 17
Saddle Point: 13
```

Q8. Program to find all the patterns of 0(1+)0 in the given string. Given a string containing 0's and 1's, find

the total number of 0(1+)0 patterns in the string and output it.

0(1+)0 - There should be at least one '1' between the two 0's.

For example, consider the following string.

Input: 01101111010

Output: 3

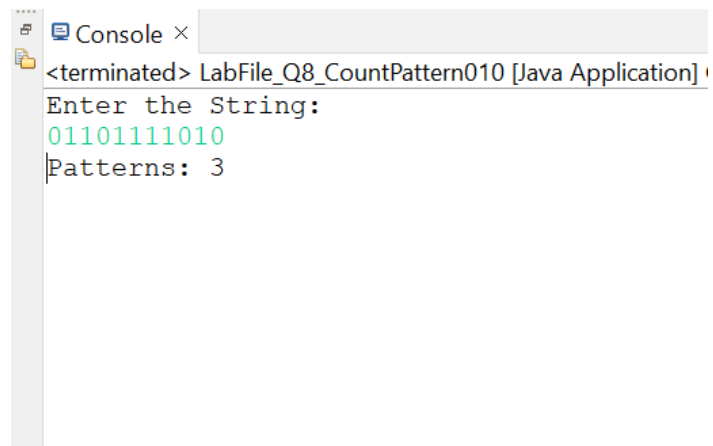<div align="center">

Source Code:

</div>

```java
import java.util.Scanner;
public class LabFile_Q8_CountPattern010 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the String: ");
        String str = sc.next();
        int count = 0;
        char prev = str.charAt(0);
        for(int i=1;i<str.length();i++)
        {
          if (str.charAt(i) == '1' && prev == '0'){
                while (str.charAt(i) == '1'){
                    if(i==str.length()-1)
                        break;
                    i++;
                }
                if (str.charAt(i) == '0')
                    count++;
            }
            prev = str.charAt(i);
        }
            System.out.println("Patterns: "+count);
```
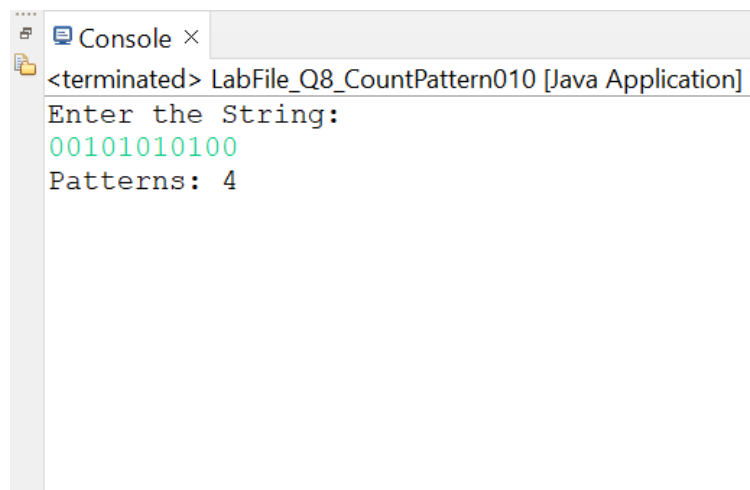
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```
    }

}
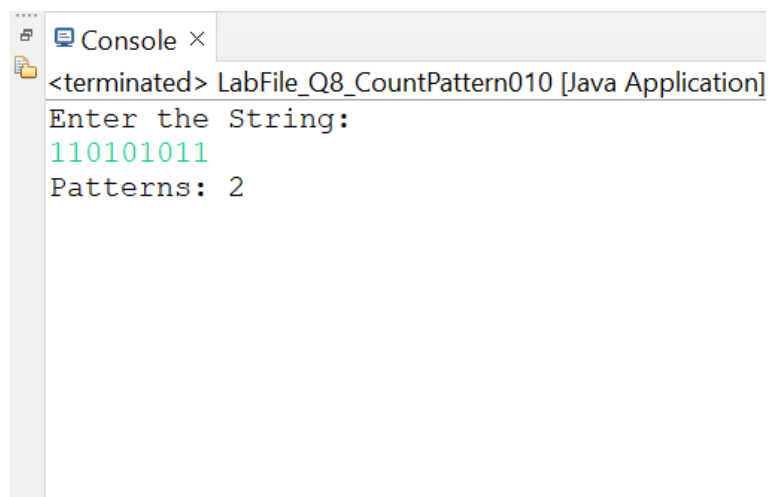```

**<u>Output:</u>**

```
Console ×
<terminated> LabFile_Q8_CountPattern010 [Java Application]
Enter the String:
01101111010
Patterns: 3
```

```
Console ×
<terminated> LabFile_Q8_CountPattern010 [Java Application]
Enter the String:
00101010100
Patterns: 4
```

```
Console ×
<terminated> LabFile_Q8_CountPattern010 [Java Application]
Enter the String:
110101011
Patterns: 2
```

Q9. Write a java program to delete vowels from given string using StringBuffer class.

Source Code:

```java
import java.util.Scanner;


public class LabFile_Q9_deleteVowels_StringBuffer {


    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter String: ");
        String str = sc.nextLine();
        StringBuffer sb = new StringBuffer(str);
        for(int i=0;i<sb.length();i++) {
            if(isVowel(sb.charAt(i))){
                sb.replace(i, i+1,"");
                i--;
            }
        }
        str = sb.toString();
        System.out.println("After Removing Vowels: \n"+str);
    }
    public static boolean isVowel(char ch) {
        if(ch=='a'||ch=='e'||ch=='i'||ch=='o'||ch=='u'||
           ch=='A'||ch=='E'||ch=='I'||ch=='O'||ch=='U') {
            return true;
        }
        else {
            return false;
```

```
        }

    }

}
```

Output:

```
Console  ×
<terminated> LabFile_Q9_deleteVowels_StringBuffer [Java Application
Enter String:
This String Contains aeiou 5 Vowels AEIOU.
After Removing Vowels:
Ths Strng Cntns  5 Vwls .
```

```
Console  ×
<terminated> LabFile_Q9_deleteVowels_StringBuffer [Java Application
Enter String:
aeiou Hello World graphic era University
After Removing Vowels:
 Hll Wrld grphc r nvrsty
```

Q10. Write a java program to create a class named 'Bank ' with the following data members:

Name of depositor

Address of depositor

Account Number

Balance in account

<p align="center">**Source Code:**</p>

```java
import java.util.Scanner;

class bank{
    String name;
    String address;
    int accountNumber;
    int balance;
    static int uniqueAccNumber = 1001;

    public void enterDetails() {
        Scanner sc = new Scanner(System.in);
        System.out.println("\nEnter Name: ");
        name = sc.nextLine();
        System.out.println("Enter Address: ");
        address = sc.nextLine();
        accountNumber += uniqueAccNumber++;
        System.out.println("Enter Balance: ");
        balance = sc.nextInt();
        System.out.printf("Account No. [%d] alotted to [%s]
\n",accountNumber,name);
    }
    public void displayInfo() {
        System.out.println("Name: "+name);
        System.out.println("Address: "+address);
        System.out.println("Account Number: "+accountNumber);
        System.out.println("Account Balance: "+balance);
```

```java
        }

        public void deposit(int deposit) {

                balance += deposit;

                System.out.println("Rs."+deposit+" deposited to Account");

                System.out.println("Account Balance: "+balance);

        }

        public void withdraw(int withdraw) {

                balance -= withdraw;

                System.out.println("Rs."+withdraw+" withdrawal from Account");

                System.out.println("Account Balance: "+balance);

        }

        public void addressChange(String address) {

                this.address = address;

        }

}


public class LabFile_Q10_Bank {

        public static void main(String[] args) {

                Scanner sc = new Scanner(System.in);

                System.out.println("Enter the no. of Depositors: ");

                int n = sc.nextInt();

                bank [] user = new bank[n];


                for(int i=0;i<n;i++) {

                        user[i] = new bank();

                        user[i].enterDetails();

                }


                int choice;

                do {

                        System.out.println("\n[ BANK – MAIN MENU ]");

                        System.out.println("1. Show Information ");
```

```java
                System.out.println("2. Deposit Money ");
                System.out.println("3. Withdraw Money ");
                System.out.println("4. Change Address ");
                System.out.println("5. End ");
                choice = sc.nextInt();


                switch(choice) {
        case 1: System.out.println("Enter Account Number : ");
                int a = sc.nextInt()-1000;
                user[a].displayInfo();
                break;
        case 2: System.out.println("Enter Account Number : ");
                int b = sc.nextInt()-1000;
                System.out.println("Enter Money to Deposit : ");
                user[b].deposit(sc.nextInt());
                break;
         case 3: System.out.println("Enter Account Number : ");
                int c = sc.nextInt()-1000;
                System.out.println("Enter Money to Withdraw : ");
                user[c].withdraw(sc.nextInt());
                break;

           case 4: System.out.println("Enter Account Number : ");
                int d = sc.nextInt()-1000;
                System.out.println("Enter Address to Change : ");
                user[d].addressChange(sc.next());
                break;
           case 5: System.out.println("Thank You...");
                break;
        default: System.out.println("Try Again...");
                break;
                }
            }while(choice!=5);
```

```
        }

}
```

Output:

```
Console ×
LabFile_Q10_Bank [Java Application] C:\Program Files\Java\jdk-17.0.2\b
Enter the no. of Depositors:
3

Enter Name:
Anshul Kumar
Enter Address:
Dehradun, India
Enter Balance:
15000
Account No. [1001] alotted to [Anshul Kumar]

Enter Name:
Ayush Bisht
Enter Address:
Delhi, India
Enter Balance:
25000
Account No. [1002] alotted to [Ayush Bisht]

Enter Name:
Akshat Sharma
Enter Address:
Punjab, India
Enter Balance:
35000
Account No. [1003] alotted to [Akshat Sharma]

[ BANK - MAIN MENU ]
1. Show Information
2. Deposit Money
3. Withdraw Money
4. Change Address
5. End
```

```
[ BANK - MAIN MENU ]
1. Show Information
2. Deposit Money
3. Withdraw Money
4. Change Address
5. End
1
Enter Account Number :
1002
Name: Akshat Sharma
Address: Punjab, India
Account Number: 1003
Account Balance: 35000
```

```
[ BANK - MAIN MENU ]
1. Show Information
2. Deposit Money
3. Withdraw Money
4. Change Address
5. End
2
Enter Account Number :
1002
Enter Money to Deposit :
15000
Rs.15000 deposited to Account
Account Balance: 50000
```

```
[ BANK - MAIN MENU ]
1. Show Information
2. Deposit Money
3. Withdraw Money
4. Change Address
5. End
3
Enter Account Number :
1002
Enter Money to Withdraw :
40000
Rs.40000 withdrawal from Account
Account Balance: 10000
```

Q11. Define a class WordExample having the following description:

Data members/instance variables:

private String strdata : to store a sentence.

Parameterized Constructor

WordExample(String) : Accept a sentence which may be terminated by either'.', '? 'or '!' only.

The words may be separated by more than one blank space and are in UPPER CASE.

Member Methods:

Void countWord(): Find the number of words beginning and ending with a vowel.

Void placeWord(): Place the words which begin and end with a vowel at the beginning, followed

by the remaining words as they occur in the sentence.

<div align="center">

<u>Source Code:</u>

</div>

```java
import java.util.Scanner;
class WordExample{
    private String str;
    WordExample(String st){
        StringBuffer s = new StringBuffer(st.toUpperCase());
        if(s.substring(s.length()-1).equals(".") ||
            s.substring(s.length()-1).equals("?") ||
            s.substring(s.length()-1).equals("!") ){
                str = s.toString();
        }
    }
    public void countWord() {
        int l = str.length();
        str = str.substring(0,l-1);
        String arr[]=str.split(" ");
        int count=0;
```

```
        for(int i=0;i<arr.length;i++){

            String a = arr[i];

            int n = a.length();

            if(isVowel(a.charAt(0)) && isVowel(a.charAt(n-1)))

                count++;

        }

        System.out.println("Total Words Starting and Ending with
Vowel:\n"+count);

    }

    public void placeWord() {

        int l = str.length();

        str = str.substring(0,l-1);

        String arr[]=str.split(" ");

        String vow = "";

        String not_vow = "";

        for(int i=0;i<arr.length;i++){

            String a = arr[i];

            if(isVowel(a.charAt(0)) &&
isVowel(a.charAt(a.length()-1)))

                vow+=a+" ";

            else

                not_vow+=a+" ";

        }

        System.out.println("Final String : \n"+vow+not_vow);

    }

    public static boolean isVowel(char ch) {

        if(ch=='A'||ch=='E'||ch=='I'||ch=='O'||ch=='U')

            return true;

        return false;

    }
```
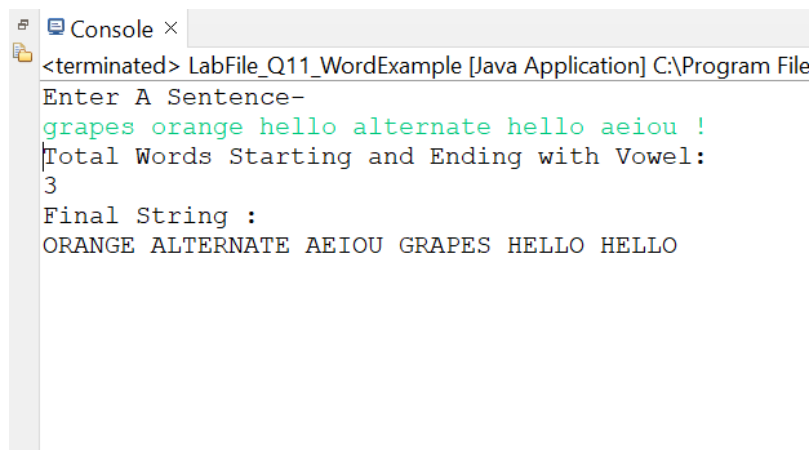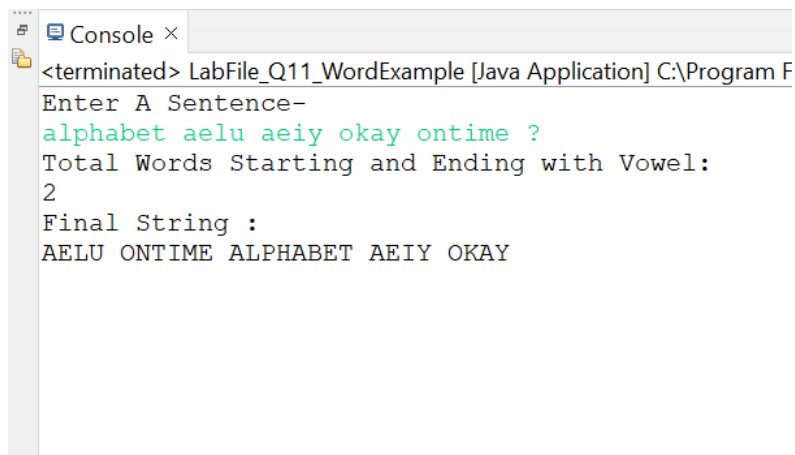
```java
}
public class LabFile_Q11_WordExample {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter A Sentence- ");
        WordExample obj = new WordExample(sc.nextLine());
        obj.countWord();
        obj.placeWord();
    }


}
```

Output:

```
Console ×
<terminated> LabFile_Q11_WordExample [Java Application] C:\Program File
Enter A Sentence-
grapes orange hello alternate hello aeiou !
Total Words Starting and Ending with Vowel:
3
Final String :
ORANGE ALTERNATE AEIOU GRAPES HELLO HELLO
```

```
Console ×
<terminated> LabFile_Q11_WordExample [Java Application] C:\Program F
Enter A Sentence-
alphabet aelu aeiy okay ontime ?
Total Words Starting and Ending with Vowel:
2
Final String :
AELU ONTIME ALPHABET AEIY OKAY
```

Q12. Write a Java program to create a class called ArrayDemo and overload arrayFunc() function.

void arrayFunc(int [], int) To find all pairs of elements in an Array whose sum is equal to a

given number :

Array numbers= [4, 6, 5, -10, 8, 5, 20], target=10

Output :

Pairs of elements whose sum is 10 are :

4 + 6 = 10

5 + 5 = 10

-10 + 20 = 10

void arrayFunc(int A[], int p, int B[], int q) Given two sorted arrays A and B of size p and q,

Overload method arrayFunc() to merge elements of A with B by maintaining the sorted order i.e.

fill A with first p smallest elements and fill B with remaining elements.

Example:

Input :

int[] A = { 1, 5, 6, 7, 8, 10 }

int[] B = { 2, 4, 9 }

<div align="center"><u>Source Code:</u></div>

```java
import java.util.Scanner;

class ArrayDemo{
    public void arrayFunc(int A[],int target) {
        System.out.println("Pairs of elements whose sum is 10
are :");
        for(int i=0;i<A.length;i++) {
            for(int j=i+1;j<A.length;j++) {
                if(A[i]+A[j]==target) {

    System.out.println(A[i]+"+"+A[j]+"="+target);
                }
            }
```

```java
            }
        System.out.println("");
    }
    public void arrayFunc(int[] A, int p, int[] B, int q){
        for (int i = 0; i < p; i++){
            if (A[i] > B[0]){
                int temp = A[i];
                A[i] = B[0];
                B[0] = temp;
                int start = B[0];
                int j;
                for (j = 1; j < q && B[j] < start; j++)
                    B[j – 1] = B[j];
                B[j – 1] = start;
            }
        }

        System.out.print("A: ");
        for(int i : A)
            System.out.print(i+" ");
        System.out.println("");
        System.out.print("B: ");
        for(int i : B)
            System.out.print(i+" ");
    }
}
```

```java
public class LabFile_Q12_ArrayDemo {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        ArrayDemo ad = new ArrayDemo();
        System.out.println("Enter Length of Array: ");
        int n = sc.nextInt();
        int [] Arr = new int[n];
        System.out.println("Enter Array: ");
        for(int i=0;i<n;i++)
            Arr[i] = sc.nextInt();
        System.out.println("Enter Target: ");
        int target = sc.nextInt();
        ad.arrayFunc(Arr,target);
        System.out.println("Enter Length of Array 1: ");
        int p = sc.nextInt();
        System.out.println("Enter Length of Array 2: ");
        int q = sc.nextInt();
        int [] A = new int [p];
        int [] B = new int [q];
        System.out.println("Enter Array 1: ");
        for(int i=0;i<p;i++)
            A[i] = sc.nextInt();
        System.out.println("Enter Array 2 : ");
        for(int i=0;i<q;i++)
            B[i] = sc.nextInt();
        ad.arrayFunc(A,p,B,q);
    }

}
```

Output:

```
Console ×
<terminated> LabFile_Q12_ArrayDemo [Java Application] C:\Progra
Enter Length of Array:
7
Enter Array:
4 6 5 -10 8 5 20
Enter Target:
10
Pairs of elements whose sum is 10 are :
4+6=10
5+5=10
-10+20=10

Enter Length of Array 1:
6
Enter Length of Array 2:
3
Enter Array 1:
1 5 6 7 8 10
Enter Array 2 :
2 4 9
A: 1 2 4 5 6 7
B: 8 9 10
```

Q13. Write a java program to calculate the area of a rectangle, a square and a circle. Create an abstract class 'Shape' with three abstract methods namely rectangleArea() taking two parameters, squareArea() and circleArea() taking one parameter each.

Now create another class 'Area' containing all the three methods rectangleArea(),squareArea() and circleArea() for printing the area of rectangle, square and circle respectively. Create an object of class Area and call all the three methods. (Use Runtime Polymorphism

Source Code:

```java
import java.util.Scanner;
abstract class Shape{
    Scanner sc = new Scanner(System.in);
    int l,b,s,r;
    abstract void rectangleArea();
    abstract void squareArea();

    abstract void circleArea();


    public void putDetailsRectangle() {
        System.out.println("Enter Length and Breadth of Rectangle: ");
        l = sc.nextInt();
        b = sc.nextInt();
    }
    public void putDetailsSquare() {
        System.out.println("Enter Side of Square: ");
        s = sc.nextInt();


    }
    public void putDetailsCircle() {
```

```java
                System.out.println("Enter Radius of Circle: ");
                r = sc.nextInt();


        }
}
class Area extends Shape{
    public void rectangleArea(){
            int area = l*b;
            System.out.println("Area of Rectangle: "+area);
    }
    public void squareArea(){
            int area = s*s;
            System.out.println("Area of Square: "+area);
    }
    public void circleArea(){
            float area = 3.14f * r * r ;
            System.out.println("Area of Circle: "+area);
    }
}
public class LabFile_Q13_AreaShapes {
    public static void main(String[] args) {
            Shape obj = new Area();
            obj.putDetailsRectangle();
            obj.rectangleArea();
            obj.putDetailsSquare();
            obj.squareArea();
            obj.putDetailsCircle();
            obj.circleArea();
```

```
            }


}
```

Output:

```
Console ×
<terminated> LabFile_Q13_AreaShapes [Java Application] C:\Progra
Enter Length and Breadth of Rectangle:
3
4
Area of Rectangle: 12
Enter Side of Square:
5
Area of Square: 25
Enter Radius of Circle:
10
Area of Circle: 314.0
```

```
Console ×
<terminated> LabFile_Q13_AreaShapes [Java Application] C:\Program
Enter Length and Breadth of Rectangle:
10
20
Area of Rectangle: 200
Enter Side of Square:
10
Area of Square: 100
Enter Radius of Circle:
3
Area of Circle: 28.26
```

Q14. Write a java program to implement abstract class and abstract method with following details:

Create a abstract Base Class Temperature

Data members:

double temp;

Method members:

void setTempData(double)

abstact void changeTemp()

Sub Class Fahrenheit (subclass of Temperature)

Data members:

double ctemp;

method member:

Override abstract method changeTemp() to convert Fahrenheit temperature into degree Celsius

by using formula C=5/9*(F-32) and display converted temperature

Sub Class Celsius (subclass of Temperature)

Data member:

double ftemp;

Method member:

Override abstract method changeTemp() to convert degree Celsius into Fahrenheit temperature

by using formula F=9/5*c+32 and display converted temperature)

<div align="center">

Source Code:

</div>

```
import java.util.Scanner;
abstract class Temperature{
    double temp;
    public void setTempData(double temp)     {
        this.temp = temp;
    }
    abstract void changeTemp();
}
class Fahrenheit extends Temperature{
    double ctemp;
```

```java
        public void changeTemp({

                ctemp = 5d/9d *(temp – 32) ;

                System.out.println("Temperature in Celsius: "+ctemp);

        }
}
class Celsius extends Temperature{
        double ftemp;
        public  void changeTemp(){

                ftemp = (9d/5d * temp) + 32 ;

        System.out.println("Temperature in Fahrenheit: "+ftemp);

        }
}
public class LabFile_Q14_Temperature {
        public static void main(String[] args) {
                Scanner sc = new Scanner(System.in);


                Temperature t1 = new Fahrenheit();


        System.out.println("Enter Temperature in Fahrenheit: ");
                t1.setTempData(sc.nextDouble());
                t1.changeTemp();


                Temperature t2 = new Celsius();


        System.out.println("Enter Temperature in Fahrenheit: ");
                t2.setTempData(sc.nextDouble());
                t2.changeTemp();


        }
```

}

Output:

```
Console ×
<terminated> LabFile_Q14_Temperature [Java Application] C:\Program Files\Ja
Enter Temperature in Fahrenheit:
98.888
Temperature in Celsius: 37.160000000000004
Enter Temperature in Fahrenheit:
37.16
Temperature in Fahrenheit: 98.88799999999999
```

```
Console ×
<terminated> LabFile_Q14_Temperature [Java Application] C:\Progra
Enter Temperature in Fahrenheit:
212
Temperature in Celsius: 100.0
Enter Temperature in Celsius:
100
Temperature in Fahrenheit: 212.0
```