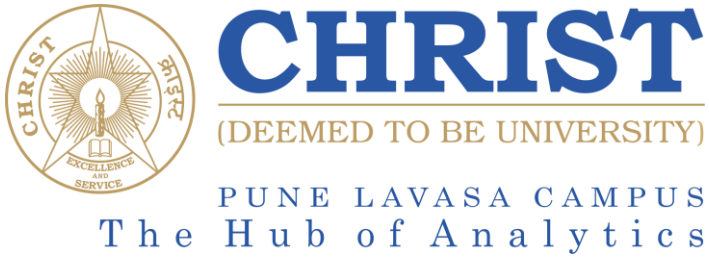

CHRIST (Deemed to be University) Pune Lavasa Campus

School of Sciences

Department of Data Science

MDS273 Java Programming

Lab Record

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22122104

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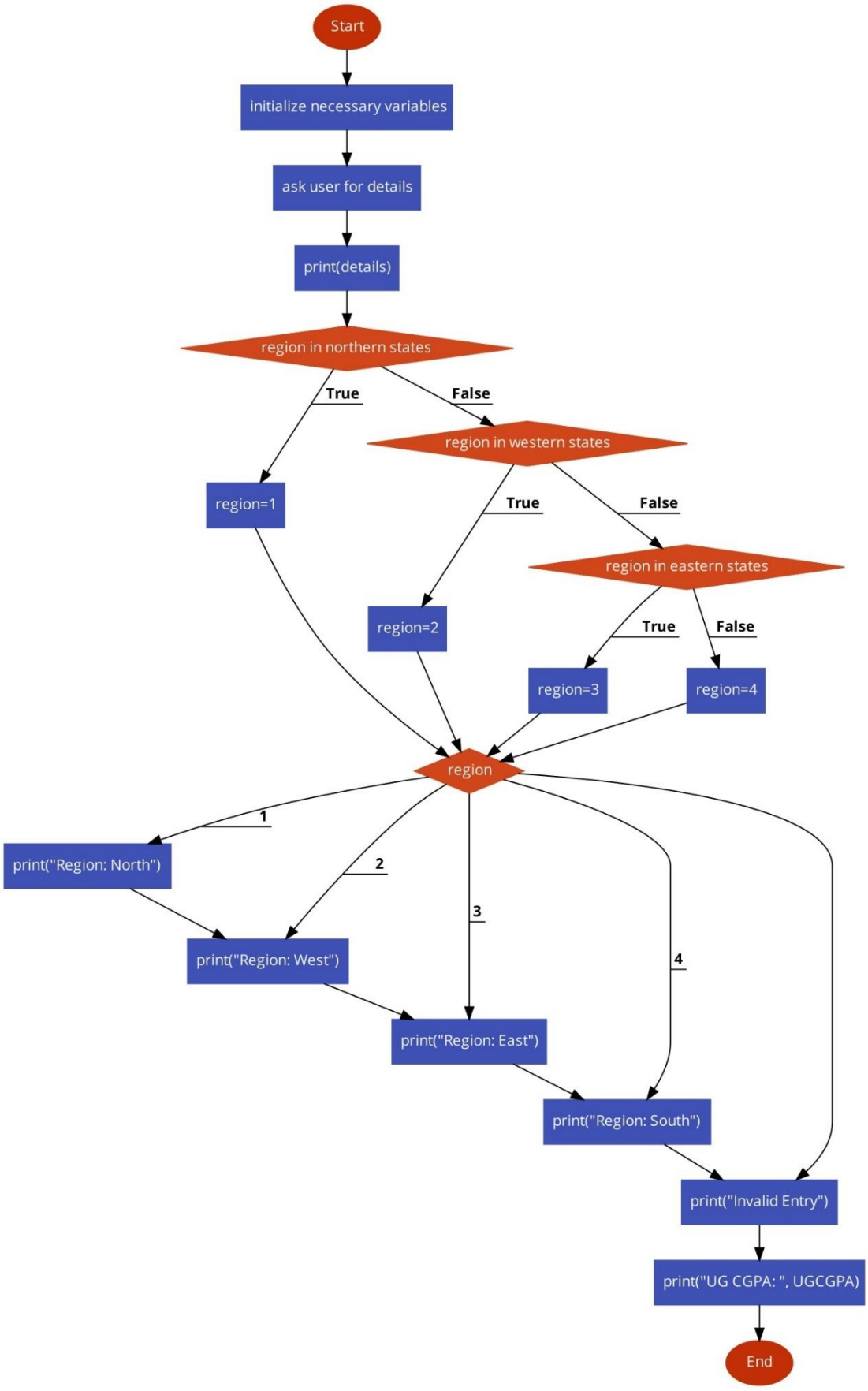
CONTENTS

Question 1:

Write a Java Program that will collect your basic details that fall into different data types and displays them. After the details have been displayed, with the help of conditional statements, check if the gender of the user is 'm' or 'f'. It should print "MALE" for 'm' and "FEMALE" for 'f'. Assume that you can divide the states among India into four different regions (North, South, East, and West). If you are from the southern part of India; with the help of a switch statement, it should display The Student is from the southern states of India", along with the basic details.

Flow Chart:


Start
initialize necessary variables
ask user for details
print(details)
region in northern states
True
False
region in western states
region=1
True
False
region in eastern states
region=2
True
False
region=3
region=4
region
1
2
3
4
print("Region: North")
print("Region: West")
print("Region: East")
print("Region: South")
print("Invalid Entry")
print("UG CGPA: ", UGCGPA)
End

Solution :

```
import java.util.Scanner;
import java.util.*;

public class Lab01{
    public static void main(String[] args) {
    /*
     Write a Java Program that will collect your basic details that fall into
different data types
     and displays them. After the details have been displayed, with the help
of conditional statements,
     check if the gender of the user is 'm' or 'f'. It should print "MALE" for
'm' and "FEMALE" for 'f'.
     Assume that you can divide the states among India into four different
regions (North, South, East,
     and West). If you are from the southern part of India; with the help of a
switch statement, it
     should display The Student is from the southern states of India", along
with the basic details.
     */
    int regno, age, region;
    String name, univclass, state;
    char gender;
    float UG_CGPA;
    Scanner sc=new Scanner(System.in);
    System.out.println("\n               WELCOME TO JAVA LAB-01
PROGRAM               ");
    System.out.println("_____________________________________________________
___________");
    System.out.println("\n                Christ University Pune
Lavasa              ");
    System.out.println("\n---------------------Student Details----------------
--------");
    System.out.println("\nInput Section---------------------------------------
--------");
    System.out.println("\nEnter your details below: ");
    System.out.print("\nName: ");
    name=sc.nextLine();
    System.out.print("Register Number: ");
    regno=sc.nextInt();
    sc.nextLine();
    System.out.print("Class: ");
    univclass=sc.nextLine();
```

```
    System.out.print("Age: ");
    age=sc.nextInt();
    sc.nextLine();
    System.out.print("Gender (m/f): ");
    gender=sc.nextLine().charAt(0);
    System.out.print("State: ");
    state=sc.nextLine();
    System.out.print("UG CGPA: ");
    UG_CGPA=sc.nextFloat();
    System.out.println("\nOutput Section-------------------------------------
---------");
    System.out.print("\nName: "+name);
    System.out.print("\nRegister Number: "+regno);
    System.out.print("\nClass: "+univclass);
    System.out.print("\nAge: "+age);
    if(gender=='m'){
        System.out.print("\nGender: MALE");
    }else if(gender=='f'){
        System.out.print("\nGender: FEMALE");
    }else{
        System.out.print("\nInvalid Entry");
    }

    System.out.print("\nState: "+state);

    if(state=="Jammu n Kashmir" | state=="Himachal Pradesh" | state=="Punjab"
| state=="Uttarakhand" | state=="UP" | state=="Harayana" | state=="Delhi" |
state=="Bihar" | state=="Jharkhand" | state=="Madhya Pradesh"){
        region=1;
    }else if(state=="Rajasthan" | state=="Gujarat"){
        region=2;
    }else if(state=="Arunachal Pradesh" | state=="Assam"| state=="Mizoram" |
state=="Tripura" | state=="Meghalaya" | state=="Sikkim" | state=="West Bengal"
| state=="Nagaland" | state=="Manipur"){
        region=3;
    }else{
        region=4;
    }

    switch (region) {
        case 1:
        System.out.print("\nRegion: North\nThe student is from the northern
states of India.");
            break;
        case 2:
```

```
        System.out.print("\nRegion: West\nThe student is from the western
states of India.");
            break;
        case 3:
        System.out.print("\nRegion: East\nThe student is from the eastern
states of India.");
            break;
        case 4:
        System.out.print("\nRegion: South\nThe student is from the southern
states of India.");
            break;
        default:
        System.out.print("\nInvalid State Entry");
            break;
    }

    System.out.print("\nUG CGPA: "+UG_CGPA+"\n");
    System.out.println("\n************THANKYOU FOR USING THE
PROGRAM**************");

    }
}
```

Output :

```
                WELCOME TO JAVA LAB-01 PROGRAM
_____________________________________________________________________

                 Christ University Pune Lavasa

---------------------Student Details-----------------------

Input Section-------------------------------------------------

Enter your details below:

Name: John Smith
Register Number: 1234
Class: First Year
Age: 18
Gender (m/f): m
State: Uttar Pradesh
```

```
UG CGPA: 8.5

Output Section-----------------------------------------------

Name: John Smith
Register Number: 1234
Class: First Year
Age: 18
Gender: MALE
State: Uttar Pradesh
Region: North
The student is from the northern states of India.
UG CGPA: 8.5

***********THANKYOU FOR USING THE PROGRAM*************
```

Question 2:

You are supposed to create a menu-driven program that has the following menu options:

1. Enter a name
2. Search for a name
3. Remove a name
4. Show all names

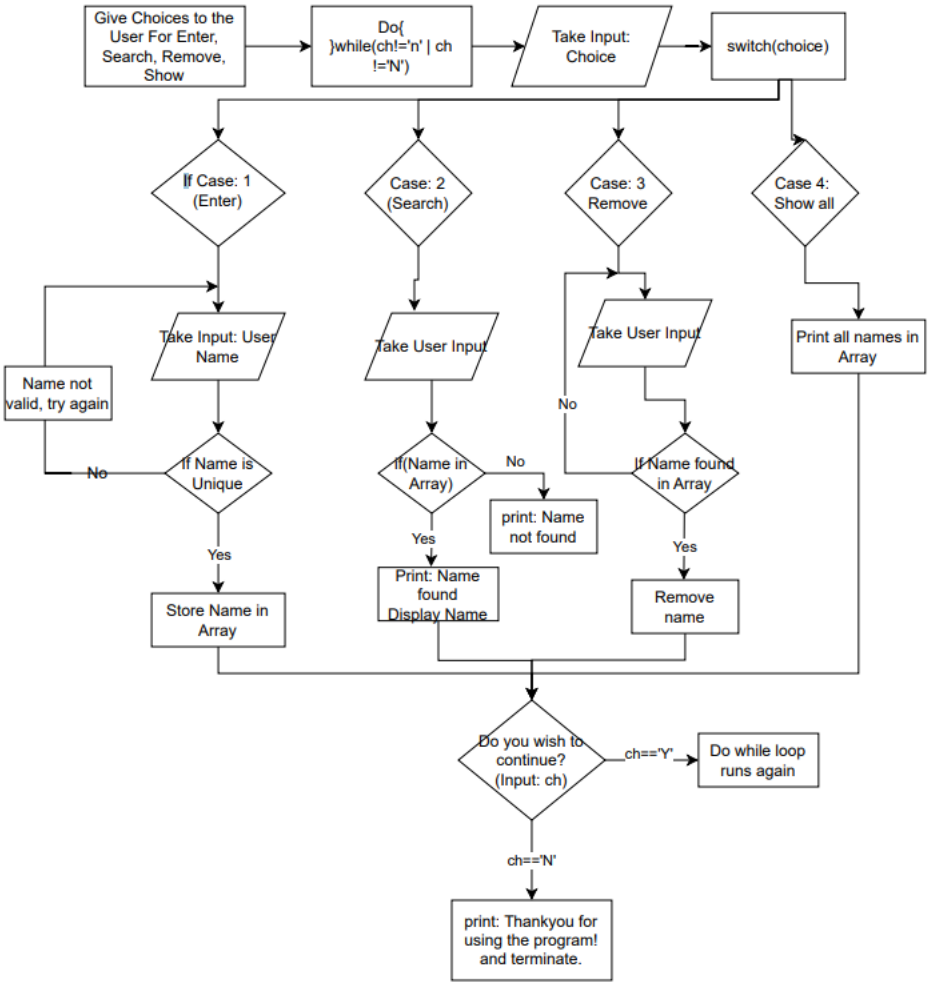
Note:

The menu-driven program has to be made with the help of a do-while loop and switch-case statements.

Constraints:

1. The names collected must be stored in an array with a max length of 1024.
2. The names in the array should be UNIQUE; no duplicate entries are expected!
3. Provide necessary validations that the user enters only valid names that are not going to be repeated.
4. Removing a name should not create empty space inside the array!
5. Format your results properly!!

Flowchart:



Solution:

```
import java.util.Scanner;

public class Lab02{
    public static void main(String[] args) {
        int ch, ch2;
        int choice,i=0;
        String name;
        Scanner sc = new Scanner(System.in);
        System.out.println("\n***************WELCOME TO LAB02
PROGRAM**************\n");
        System.out.println("\n                    Name Search
Window              \n");
        System.out.println("Following are your choices: ");
```

```
        System.out.println("1. Enter a name");
        System.out.println("2. Search for a name");
        System.out.println("3. Remove a name");
        System.out.println("4. Show all names");
        String[] array=new String[1024];
        do{
            System.out.print("\nEnter your choice of operation: ");
            choice=Integer.parseInt(sc.next());
            switch (choice) {
                case 1:
                System.out.println("\n***************Name Entry
Window***************");
                do{
                        System.out.println("Enter a name: ");
                        name=sc.next();
                        for(int j=0; j<array.length; j++){
                            if(name.equals(array[j])){
                                System.out.println("Name already stored. Try
again.");
                                break;
                            }
                            if(array[j]==null){
                                array[j]=name;
                                break;
                            }
                        }

                        System.out.println("Do you wish to enter another name?
(1/0): ");
                        ch2=Integer.parseInt(sc.next());
                    }while(ch2!=0);
                break;

                case 2:
                System.out.println("\n***************Name Search
Window***************");
                do{
                    System.out.println("Enter a name for searching: ");
                    int found = 0;
                    String name2;
                    name2=sc.next();
                    for(int j=0; j<array.length; j++){
                        if(name2.equals(array[j])){
                            System.out.println("Name "+name2+" found in the
list!");
```

```
                            found = 1;
                            break;
                        }
                    }
                    if(found == 0){
                        System.out.println("Name "+name2+" not found in the
list!");
                        break;
                    }

                    System.out.print("Do you wish to search another name?
(1/0): ");
                    ch2=Integer.parseInt(sc.next());
                }while(ch2!=0);
                break;

                case 3:
                System.out.println("\n***************Name Removal
Window***************");
                    do{
                        int k=0;
                        System.out.println("Enter a name for removing: ");
                        name=sc.next();
                        for(int j=0; j<array.length; j++){
                            if(array[j]==null){
                                break;
                            }
                            if(array[j].equals(name)){
                                k=1;
                                System.out.println(name+" successfully removed
from the list!");
                            }
                            array[j]=array[j+k];
                        }

                        System.out.print("Do you wish to remove another name?
(1/0): ");
                        ch2=Integer.parseInt(sc.next());
                    }while(ch2!=0);
                    break;

                case 4:
                System.out.println("\n***************Name List
Window***************");
```

```
                System.out.println("Following are all the names in the list:
");
                for(i=0; i<array.length; i++){
                    if(array[i]!=null){
                        System.out.print(array[i]+" ");
                    }
                }
                System.out.println();
                break;

                default:
                System.out.println("Invalid Input! Try Again.");
                break;
            }

            System.out.println("Do you wish to run another operation from the
menu? (1/0): ");
            ch=Integer.parseInt(sc.next());
        }while(ch!=0);
        sc.close();
    }

}
```

Output:

```
***************WELCOME TO LAB02 PROGRAM*************


                Name Search Window
Following are your choices:
1. Enter a name
2. Search for a name
3. Remove a name
4. Show all names

Enter your choice of operation: 1
***************Name Entry Window***************
Enter a name:
Amrita
Do you wish to enter another name? (1/0):
1
Enter a name:
```

```
Atharva
Do you wish to enter another name? (1/0):
1
Enter a name:
Rahil
Do you wish to enter another name? (1/0):
1
Enter a name:
Keegan
Do you wish to enter another name? (1/0):
0
Do you wish to run another operation from the menu? (1/0):
1

Enter your choice of operation: 2
****************Name Search Window***************
Enter a name for searching:
Keegan
Name Keegan found in the list!
Do you wish to search another name? (1/0): 0
Do you wish to run another operation from the menu? (1/0):
1

Enter your choice of operation: 3
****************Name Removal Window***************
Enter a name for removing:
Keegan
Keegan successfully removed from the list!
Do you wish to remove another name? (1/0): 0
Do you wish to run another operation from the menu? (1/0):
1

Enter your choice of operation: 4
****************Name List Window***************
Following are all the names in the list:
Amrita Atharva Rahil
Do you wish to run another operation from the menu? (1/0):
0
```

Question 3:

Create a java program that performs the following operation:

The program should collect an integer array from the user. After the array is entered, you need to create a menu of items:

1. Find the Mean Value

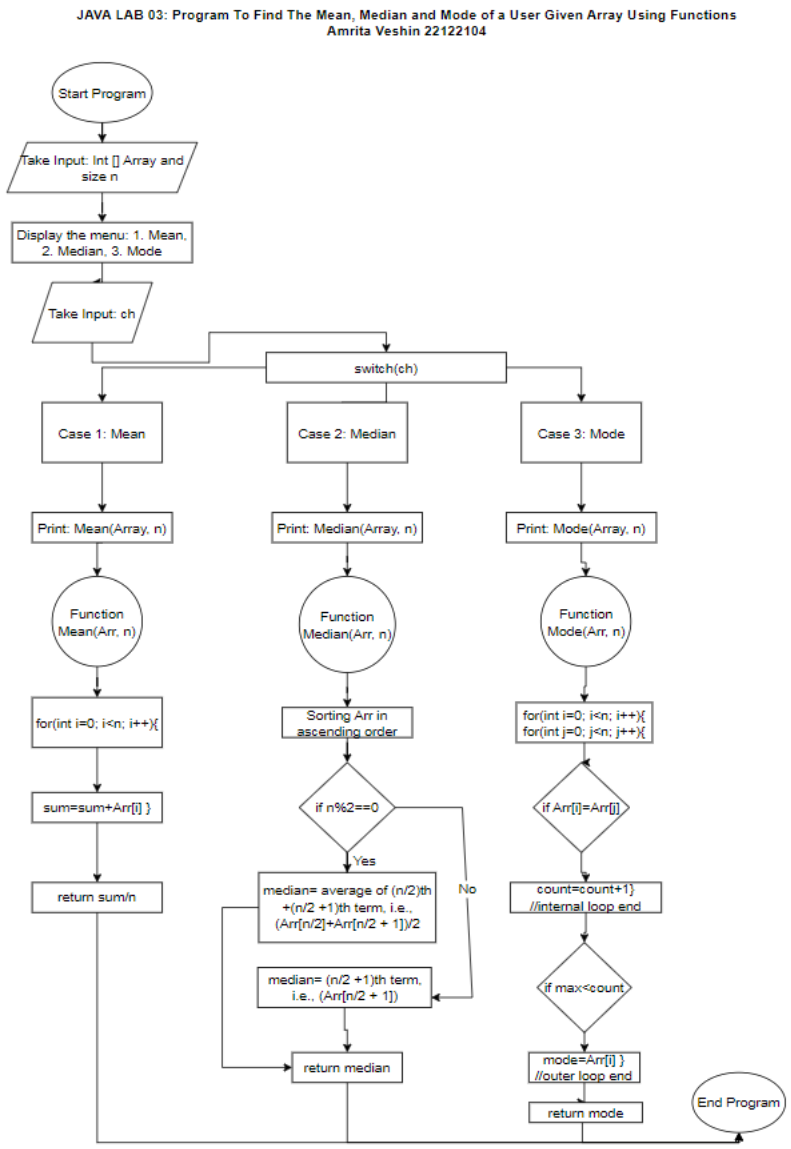
2. Find the Median Value

3. Find the Mode Value

From the user-given array.

The program should have a minimum of 3 functions apart from the main function; each of the functions implements the Mean, Median, and Mode computation by accepting the array user has entered as a parameter and returning the value as a result. From the main method, you will display the result.

Flowchart:



Solution:

```
import java.util.Scanner;

public class Lab03 {
    public static void main(String[] args) {
        System.out.println("\n**********************************************
**********");
        System.out.println("                MEAN MEDIAN MODE
CALCULATOR                  ");
        System.out.println("**********************************************
********");
```

```
        /*
        This program collects an integer array from the user and returns the
mean, median or mode
        of the array, as per the user's choice of operation. In this program,
3 user-defined functions
        have been used for the implementation of the computation of mean,
median and mode. For displaying
        the results, switch case has been used within the main function.

        Do give the program a try !

        Happy coding !
         */

        System.out.println("\n**********************INPUT
WINDOW**********************");
        int n, ch, ch2;
        //Taking inputs for array size n and the array elements
        Scanner sc=new Scanner(System.in);
        System.out.print("Enter the size of the array: ");
        n=sc.nextInt();
        int[] arr=new int[n];
        System.out.println("Enter the elements of the array: ");
        for(int i=0; i<n; i++){
            arr[i]=sc.nextInt();
        }
        //Printing the array
        System.out.println("\nArray saved successfully as follows: ");
        for(int i=0; i<n; i++){
            System.out.print(arr[i]+" ");
        }

        do{
        //Displaying the operations menu to the user and taking the
choice
        System.out.println("\n\n**********************OPERATIONS
MENU**********************");
        System.out.println("1. Mean \n2. Median \n3. Mode ");
        System.out.print("\nEnter your choice of operation: ");
        ch=sc.nextInt();
        //Displaying output using switch case and user-defined functions
        System.out.println("\n**********************OUTPUT
WINDOW**********************");
        switch(ch){
            case 1:
```

```
                System.out.println("The mean of the given array is:
"+mean(arr, n));
                break;
            case 2:
                System.out.println("The median of the given array is:
"+median(arr, n));
                break;
            case 3:
                System.out.println("The mode of the given array is:
"+mode(arr, n));
                break;
            default:
                System.out.println("Invalid choice! Please refer the menu. ");
        }
        System.out.print("\nDo you wish to perform another operation on the
array (1/0)?: ");
        ch2=sc.nextInt();
        }while(ch2!=0);

        System.out.println("\n*************THANKYOU FOR USING THE
PROGRAM*************");

    }

    //function for mean
    static float mean(int [] arr, int n){
        int sum=0;
        for(int i=0; i<n; i++){
            sum=sum+arr[i];
        }
        return sum/n;

    }
    //function for median
    static float median(int [] arr, int n){
        int temp;
        float median;
        //sorting the array using bubble sort
        for(int i=0; i<n-1; i++){
            for(int j=0; j<n-i-1; j++){
                if(arr[j]>arr[j+1]){
                    temp=arr[j+1];
                    arr[j+1]=arr[j];
                    arr[j]=temp;
                }
```

```
            }
        }
        if(n%2==0){
            median=(arr[n/2]+arr[(1+n)/2])/2; //value of median if the size of
the array is even
        }else{
            median=arr[(1+n)/2]; //value of median if the size of the array is
odd
        }
        return median;
    }

    //function for mode
    static int mode(int [] arr, int n){
        int max=0;
        int arrmode=0;
        for(int i=0; i<n; i++){
            int count=0;
            for(int j=0; j<n; j++){
                if(arr[i]==arr[j]){
                    count+=1;   //counting the no. of times each element
occurs in array
                }
            }
            if(max<count){
                max=count;
                arrmode=arr[i];    //getting the element which has the maximum
frequency in the array
            }
        }
        return arrmode;
    }

}
```

Output:

```
*********************************************************
                MEAN MEDIAN MODE CALCULATOR
*********************************************************
```

```
**********INPUT WINDOW**********
Enter the size of the array: 10
Enter the elements of the array:
1
1
1
2
2
3
5
6
7
7

Array saved successfully as follows:
1 1 1 2 2 3 5 6 7 7

**********OPERATIONS MENU**********
1. Mean
2. Median
3. Mode

Enter your choice of operation: 1

**********OUTPUT WINDOW**********
The mean of the given array is: 3.0

Do you wish to perform another operation on the array (1/0)?: 1


**********OPERATIONS MENU**********
1. Mean
2. Median
3. Mode

Enter your choice of operation: 2

**********OUTPUT WINDOW**********
The median of the given array is: 3.0

Do you wish to perform another operation on the array (1/0)?: 1


**********OPERATIONS MENU**********
1. Mean
```

```
2. Median
3. Mode

Enter your choice of operation: 3

**********************OUTPUT WINDOW**********************
The mode of the given array is: 1

Do you wish to perform another operation on the array (1/0)?: 0

*************THANKYOU FOR USING THE PROGRAM*************
```

Question 4:

Write a JAVA Menu driven program that does the following:

You can ONLY have the below variables as global variables

- Account Number
- Account Holder Name
- Account Balance

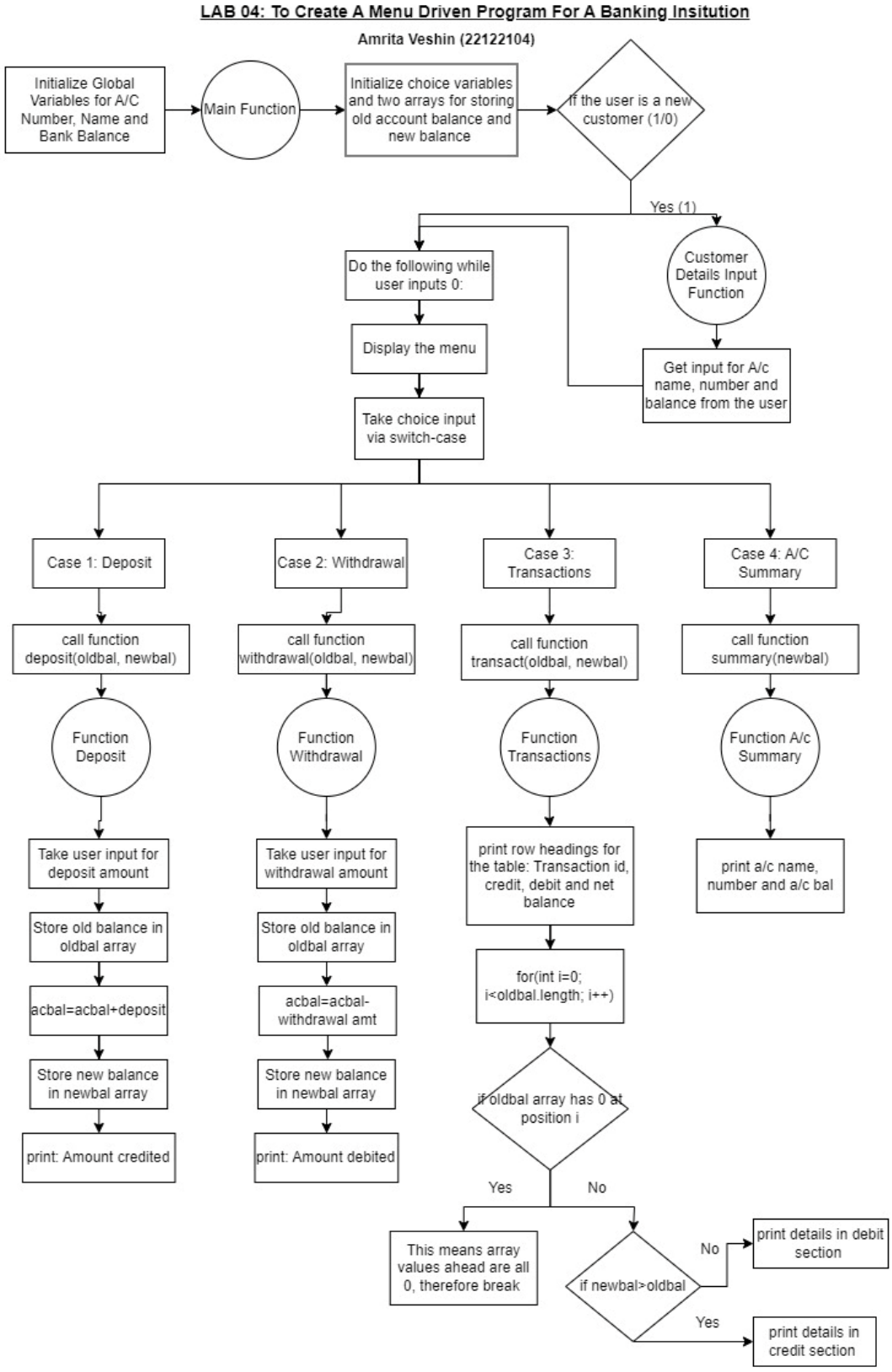
You MUST have the below as functions

- To initialize the customer
- To deposit money
- To withdraw money
- To print the transactions
- To print account summary

Your menu will have the following operations once the customer is created

- To deposit money
- To withdraw money
- To print the transactions
- To print account summary

Flowchart:


LAB 04: To Create A Menu Driven Program For A Banking Insitution
Amrita Veshin (22122104)
Initialize Global Variables for A/C Number, Name and Bank Balance
Main Function
Initialize choice variables and two arrays for storing old account balance and new balance
If the user is a new customer (1/0)
Yes (1)
Customer Details Input Function
Get input for A/c name, number and balance from the user
Do the following while user inputs 0:
Display the menu
Take choice input via switch-case
Case 1: Deposit
Case 2: Withdrawal
Case 3: Transactions
Case 4: A/C Summary
call function deposit(oldbal, newbal)
call function withdrawal(oldbal, newbal)
call function transact(oldbal, newbal)
call function summary(newbal)
Function Deposit
Function Withdrawal
Function Transactions
Function A/c Summary
Take user input for deposit amount
Take user input for withdrawal amount
print row headings for the table: Transaction id, credit, debit and net balance
print a/c name, number and a/c bal
Store old balance in oldbal array
Store old balance in oldbal array
acbal=acbal+deposit
acbal=acbal-withdrawal amt
for(int i=0; i<oldbal.length; i++)
Store new balance in newbal array
Store new balance in newbal array
if oldbal array has 0 at position i
print: Amount credited
print: Amount debited
Yes
No
This means array values ahead are all 0, therefore break
if newbal>oldbal
No
print details in debit section
Yes
print details in credit section

Solution:

```
import java.util.*;

public class Lab04 {
    static String acname;
    static int acno, acbal;
    public static void main(String[] args) {
        int[] oldbal=new int[100];
        int[] newbal=new int[100];
        int ch, ch2, ch3;
        Scanner sc=new Scanner(System.in);
        System.out.println("\n**********************************************
**********");
        System.out.println("                    WELCOME TO CITIZEN
BANK               ");
        System.out.println("**********************************************
*********");
        System.out.println("Press 1 for if you are a new customer or press 2
if you are an existing customer.");
        ch=sc.nextInt();
        if(ch==1){
            custdetails();
            ch=2;
        }
        if(ch==2){
            do{
                System.out.println("\n**************************************
******************");
                System.out.println("                       OPERATIONS
WINDOW                  ");
                System.out.println("**************************************
*****************");
                System.out.println("\nWhich operation do you wish to perform
from the following: ");
                System.out.println("1. Deposit Money \n2. Withdraw Money \n3.
Print Transactions \n4. Print Account Summary");
                System.out.print("Enter your choice: ");
                ch2=sc.nextInt();
                switch(ch2){
                    case 1:
                        deposit(oldbal,newbal);
                        break;
                    case 2:
```

```
                        withdrawal(oldbal,newbal);
                        break;
                    case 3:
                        printtrans(oldbal,newbal);
                        break;
                    case 4:
                        printacsumm(newbal);
                        break;
                    default:
                        System.out.println("Invalid Input! Please Try
Again.");
                }
                System.out.print("\nDo you wish to perform another operation?
(1/0) : ");
                ch3=sc.nextInt();
            }while(ch3!=0);

        }

    }

    static void custdetails() {
        Scanner sc=new Scanner(System.in);
        System.out.println("\n**********************************************
***********");
        System.out.println("                CUSTOMER DETAILS INPUT
WINDOW             ");
        System.out.println("**********************************************
*********");
        System.out.println("Welcome New Customer! Please enter your
corresponding details below:");
        System.out.print("Customer Name: ");
        acname=sc.nextLine();
        System.out.print("Customer Account Number: ");
        acno=sc.nextInt();
        System.out.print("Customer Account Balance: ");
        acbal=sc.nextInt();
        System.out.println("\n**********************************************
***************");
        System.out.println("* Congratulations! Your account has been created
successfully! *");
        System.out.println("**********************************************
**************");
    }
```

```
    static void deposit(int[] oldbal,int[] newbal){
        int dep;
        Scanner sc=new Scanner(System.in);
        System.out.println("\n**********************************************
***********");
        System.out.println("                       DEPOSIT
WINDOW                       ");
        System.out.println("**********************************************
*********");
        System.out.println("Enter the amount you wish to deposit: ");
        dep=sc.nextInt();
        for(int i=0; i<100; i++){
           if(oldbal[i]==0){
                oldbal[i]=acbal;
                break;
           }else{
                continue;
           }
        }
        acbal=acbal+dep;
        for(int i=0; i<100; i++){
            if(newbal[i]==0){
                 newbal[i]=acbal;
                 break;
            }else{
                 continue;
            }
         }

         System.out.println("\n**********************************************
*****************");
         System.out.println("*  The amount has been credited successfully into
your account! *");
         System.out.println("**********************************************
***************");


    }

    static void withdrawal(int[] oldbal,int[] newbal){
        int withamt;
        Scanner sc=new Scanner(System.in);
        System.out.println("\n**********************************************
***********");
```

```
        System.out.println("                    WITHDRAWAL
WINDOW                    ");
        System.out.println("*************************************************
*********");
        System.out.println("Enter the amount you wish to withdraw: ");
        withamt=sc.nextInt();
        for(int i=0; i<100; i++){
           if(oldbal[i]==0){
                oldbal[i]=acbal;
                break;
           }else{
                continue;
           }
        }
        acbal=acbal-withamt;
        for(int i=0; i<100; i++){
            if(newbal[i]==0){
                 newbal[i]=acbal;
                 break;
            }else{
                 continue;
            }
         }

         System.out.println("\n*********************************************
******************");
         System.out.println("* The amount has been withdrawn successfully from
your account! *");
         System.out.println("*********************************************
****************");

    }

    static void printtrans(int[] oldbal,int[] newbal){
        System.out.println("\n*********************************************
**************");
        System.out.println("                      TRANSACTIONS
WINDOW                    ");
        System.out.println("*************************************************
*************");
        System.out.println("Transaction ID \t|Credit Amount \t|Debit Amount
\t|Net Balance");
        System.out.println("*************************************************
*************");
        for(int i=0; i<100; i++){
```

```
            if(oldbal[i]==0){
                break;
            }else{
                if(newbal[i]-oldbal[i]>0){
                    System.out.println((i+1)+"\t\t|"+(newbal[i]-
oldbal[i])+"\t\t|\t-\t|"+newbal[i]);
                }else {
                    System.out.println((i+1)+"\t\t|\t-\t|"+(oldbal[i]-
newbal[i])+"\t\t|"+newbal[i]);
                }
            }
        }
        System.out.println("************************************************
************");
    }

    static void printacsumm(int[] newbal){
        System.out.println("\n************************************************
***********");
        System.out.println("                      ACCOUNT
SUMMARY                      ");
        System.out.println("************************************************
*********");
        System.out.println("Customer Name: "+acname);
        System.out.println("Customer Account Number: "+acno);
        System.out.println("Current Account Balance: "+acbal);
        System.out.println("************************************************
*********");
    }
}
```

Output:

```
*********************************************************
                    WELCOME TO CITIZEN BANK
*********************************************************
Press 1 for if you are a new customer or press 2 if you are an existing
customer.
1

*********************************************************
                CUSTOMER DETAILS INPUT WINDOW
```

```
************************************************************
Welcome New Customer! Please enter your corresponding details below:
Customer Name: Amrita Veshin
Customer Account Number: 123456
Customer Account Balance: 12000

************************************************************
* Congratulations! Your account has been created successfully! *
************************************************************

************************************************************
                       OPERATIONS WINDOW
************************************************************

Which operation do you wish to perform from the following:
1. Deposit Money
2. Withdraw Money
3. Print Transactions
4. Print Account Summary
Enter your choice: 1

************************************************************
                       DEPOSIT WINDOW
************************************************************
Enter the amount you wish to deposit:
2000

************************************************************
*  The amount has been credited successfully into your account! *
************************************************************

Do you wish to perform another operation? (1/0) : 1

t************************************************************
                       OPERATIONS WINDOW
************************************************************

Which operation do you wish to perform from the following:
1. Deposit Money
2. Withdraw Money
3. Print Transactions
4. Print Account Summary
Enter your choice: 2

************************************************************
```

```
                    WITHDRAWAL WINDOW
************************************************************
Enter the amount you wish to withdraw:
500

*****************************************************************
* The amount has been withdrawn successfully from your account! *
*****************************************************************

Do you wish to perform another operation? (1/0) : 1

************************************************************
                      OPERATIONS WINDOW
************************************************************

Which operation do you wish to perform from the following:
1. Deposit Money
2. Withdraw Money
3. Print Transactions
4. Print Account Summary
Enter your choice: 3

************************************************************
                      TRANSACTIONS WINDOW
************************************************************
Transaction ID  |Credit Amount  |Debit Amount   |Net Balance
************************************************************
1               |2000           |       -       |14000
2               |       -       |500            |13500
************************************************************

Do you wish to perform another operation? (1/0) : 1

************************************************************
                      OPERATIONS WINDOW
************************************************************

Which operation do you wish to perform from the following:
1. Deposit Money
2. Withdraw Money
3. Print Transactions
4. Print Account Summary
Enter your choice: 4

************************************************************
```

```
                        ACCOUNT SUMMARY
**********************************************************
Customer Name: Amrita Veshin
Customer Account Number: 123456
Current Account Balance: 13500
**********************************************************

Do you wish to perform another operation? (1/0) : 0
```

Question 5:

Create a student class, that will store the details of the Student:

- Reg. No.
- Name
- Email
- Phone
- Class
- Department

The class will have a constructor to initialize the values of the Student and a method to print the Details of the Student.

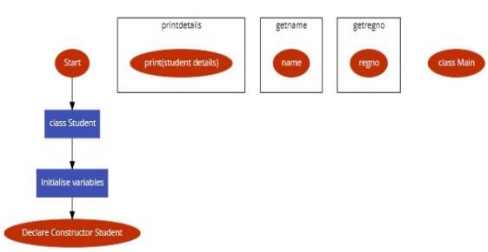
In the main-method class, create an array of Student Class to hold maximum details of 100 Students.

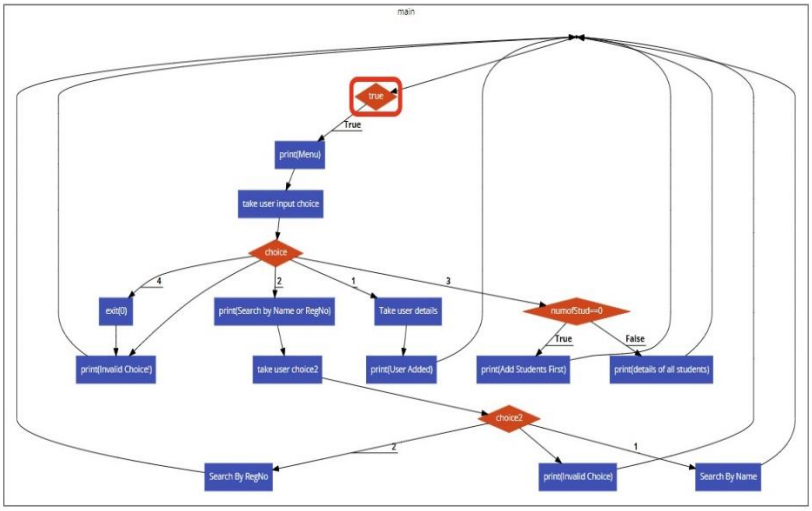
In the menu-driven program, the menu options will have

- Add a student: Adds the details of 1 student to the array of Student
- Search for a student:
    - Search for the details of a student from the array of Student
    - (Optional) Searching can be done with Name & Register Number
- Display all students: Displays the details of all students

Note: Make use of functions to implement the menu options

Flowchart:





Solution:

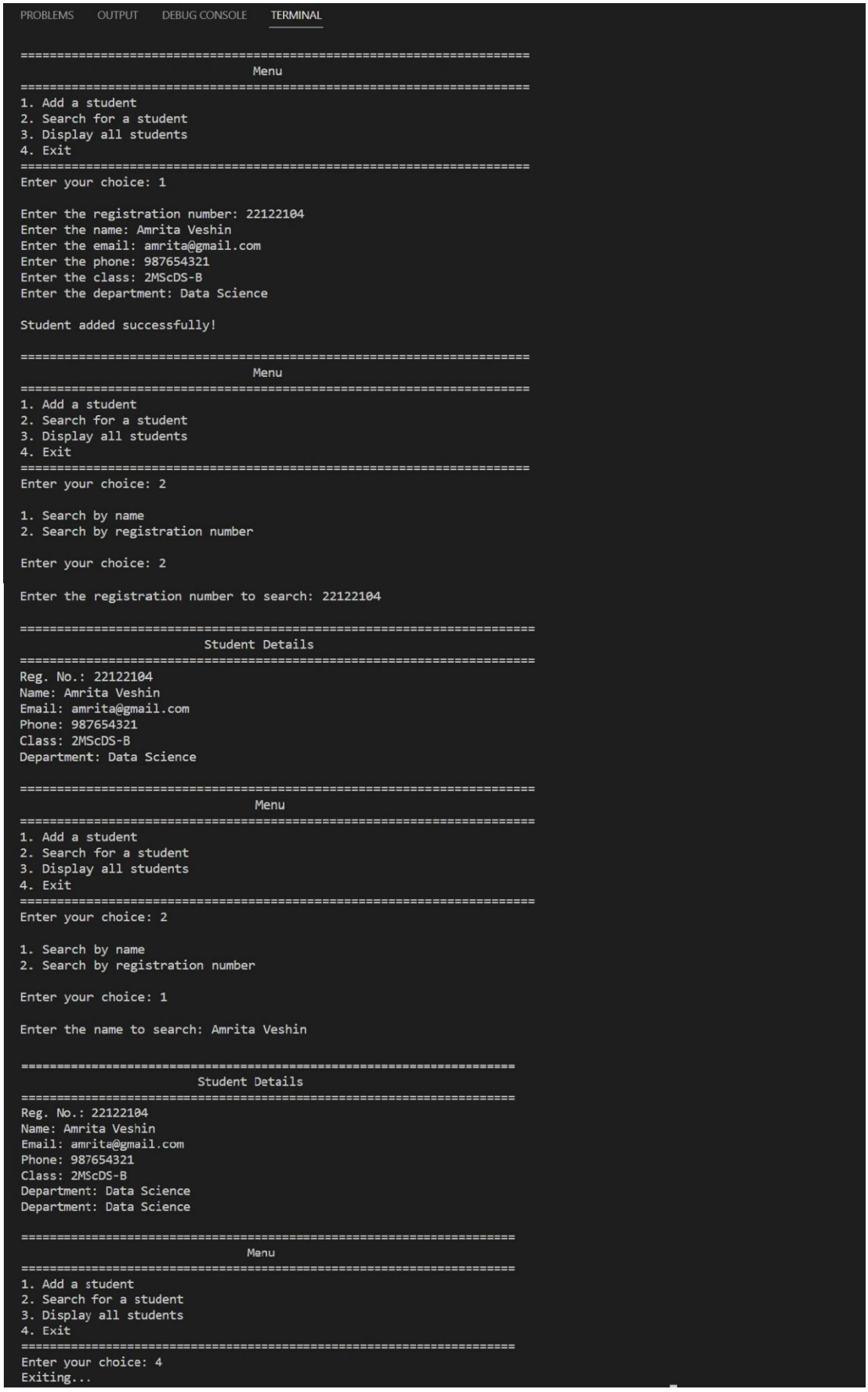
```
import java.util.Scanner;

class Student {
    private int regNo;
    private String name;
    private String email;
    private String phone;
    private String className;
    private String department;

    public Student(int regNo, String name, String email, String phone, String
className, String department) {
        this.regNo = regNo;
        this.name = name;
        this.email = email;
        this.phone = phone;
        this.className = className;
        this.department = department;
    }

    public void printDetails() {
        System.out.println("\n==============================================
======================");
        System.out.println("                          Student
Details                              ");
```

```
        System.out.println("================================================
==================");
        System.out.println("Reg. No.: " + regNo);
        System.out.println("Name: " + name);
        System.out.println("Email: " + email);
        System.out.println("Phone: " + phone);
        System.out.println("Class: " + className);
        System.out.println("Department: " + department);
    }

    public String getName() {
        return name;
    }

    public int getRegNo() {
        return regNo;
    }
}

public class Lab05{
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        Student[] students = new Student[100];
        int numOfStudents = 0;
        while (true) {
            System.out.println("\n============================================
=========================");
            System.out.println("                                  Menu
                        ");
            System.out.println("============================================
========================");
            System.out.println("1. Add a student");
            System.out.println("2. Search for a student");
            System.out.println("3. Display all students");
            System.out.println("4. Exit");
            System.out.println("============================================
========================");
            System.out.print("Enter your choice: ");
            int choice = scanner.nextInt();
            switch (choice) {
                case 1:
                    System.out.print("\nEnter the registration number: ");
                    int regNo = scanner.nextInt();
                    scanner.nextLine();
                    System.out.print("Enter the name: ");
```

```
                    String name = scanner.nextLine();
                    System.out.print("Enter the email: ");
                    String email = scanner.nextLine();
                    System.out.print("Enter the phone: ");
                    String phone = scanner.nextLine();
                    System.out.print("Enter the class: ");
                    String className = scanner.nextLine();
                    System.out.print("Enter the department: ");
                    String department = scanner.nextLine();
                    students[numOfStudents] = new Student(regNo, name, email,
phone, className, department);
                    numOfStudents++;
                    System.out.println("\nStudent added successfully!");
                    break;
                case 2:
                    System.out.println("\n1. Search by name");
                    System.out.println("2. Search by registration number");
                    System.out.print("\nEnter your choice: ");
                    int searchChoice = scanner.nextInt();
                    scanner.nextLine();
                    boolean found = false;
                    switch (searchChoice) {
                        case 1:
                            System.out.print("\nEnter the name to search: ");
                            String searchName = scanner.nextLine();
                            for (int i = 0; i < numOfStudents; i++) {
                                if
(students[i].getName().equalsIgnoreCase(searchName)) {
                                    students[i].printDetails();
                                    found = true;
                                }
                            }
                            break;
                        case 2:
                            System.out.print("\nEnter the registration number
to search: ");
                            int searchRegNo = scanner.nextInt();
                            for (int i = 0; i < numOfStudents; i++) {
                                if (students[i].getRegNo() == searchRegNo) {
                                    students[i].printDetails();
                                    found = true;
                                }
                            }
                            break;
                        default:
```

```
                            System.out.println("Invalid choice!");
                            break;
                    }
                    if (!found) {
                        System.out.println("No student found!");
                    }
                    break;
                case 3:
                    if (numOfStudents == 0) {
                        System.out.println("No students found, please add a
student first!");
                    } else {
                    for (int i = 0; i < numOfStudents; i++) {
                    students[i].printDetails();
                    }
                    }
                    break;
                case 4:
                    System.out.println("Exiting...");
                    System.exit(0);
                default:
                    System.out.println("Invalid choice!");
                    break;
            }
        }
    }
}
```

Output:


PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
Menu
1. Add a student
2. Search for a student
3. Display all students
4. Exit
Enter your choice: 1
Enter the registration number: 22122104
Enter the name: Amrita Veshin
Enter the email: amrita@gmail.com
Enter the phone: 987654321
Enter the class: 2MScDS-B
Enter the department: Data Science
Student added successfully!
Menu
1. Add a student
2. Search for a student
3. Display all students
4. Exit
Enter your choice: 2
1. Search by name
2. Search by registration number
Enter your choice: 2
Enter the registration number to search: 22122104
Student Details
Reg. No.: 22122104
Name: Amrita Veshin
Email: amrita@gmail.com
Phone: 987654321
Class: 2MScDS-B
Department: Data Science
Menu
1. Add a student
2. Search for a student
3. Display all students
4. Exit
Enter your choice: 2
1. Search by name
2. Search by registration number
Enter your choice: 1
Enter the name to search: Amrita Veshin
Student Details
Reg. No.: 22122104
Name: Amrita Veshin
Email: amrita@gmail.com
Phone: 987654321
Class: 2MScDS-B
Department: Data Science
Department: Data Science
Menu
1. Add a student
2. Search for a student
3. Display all students
4. Exit
Enter your choice: 4
Exiting...

Question 6:

Write a JAVA program that reads a file (text file) and finds the following details.

1. Vowels and their count. Eg: [a:100, e:45, I:55, ..]
2. Digits and their count. Eg: [0:1000, 1:10, 2:40, ...]
3. Top Five repeated words and their count.
4. Least Five repeated words and their count.
5. Top Five repeated characters and their count.
6. Least FIve repeated characters and their count.

Note:

- Use the file attached.
- Use functions to implement the six functions asked.
- Pass the file content to the functions and return the values accordingly.
- No Global variables are allowed to be used.

Flowchart:

Solution:

Output:

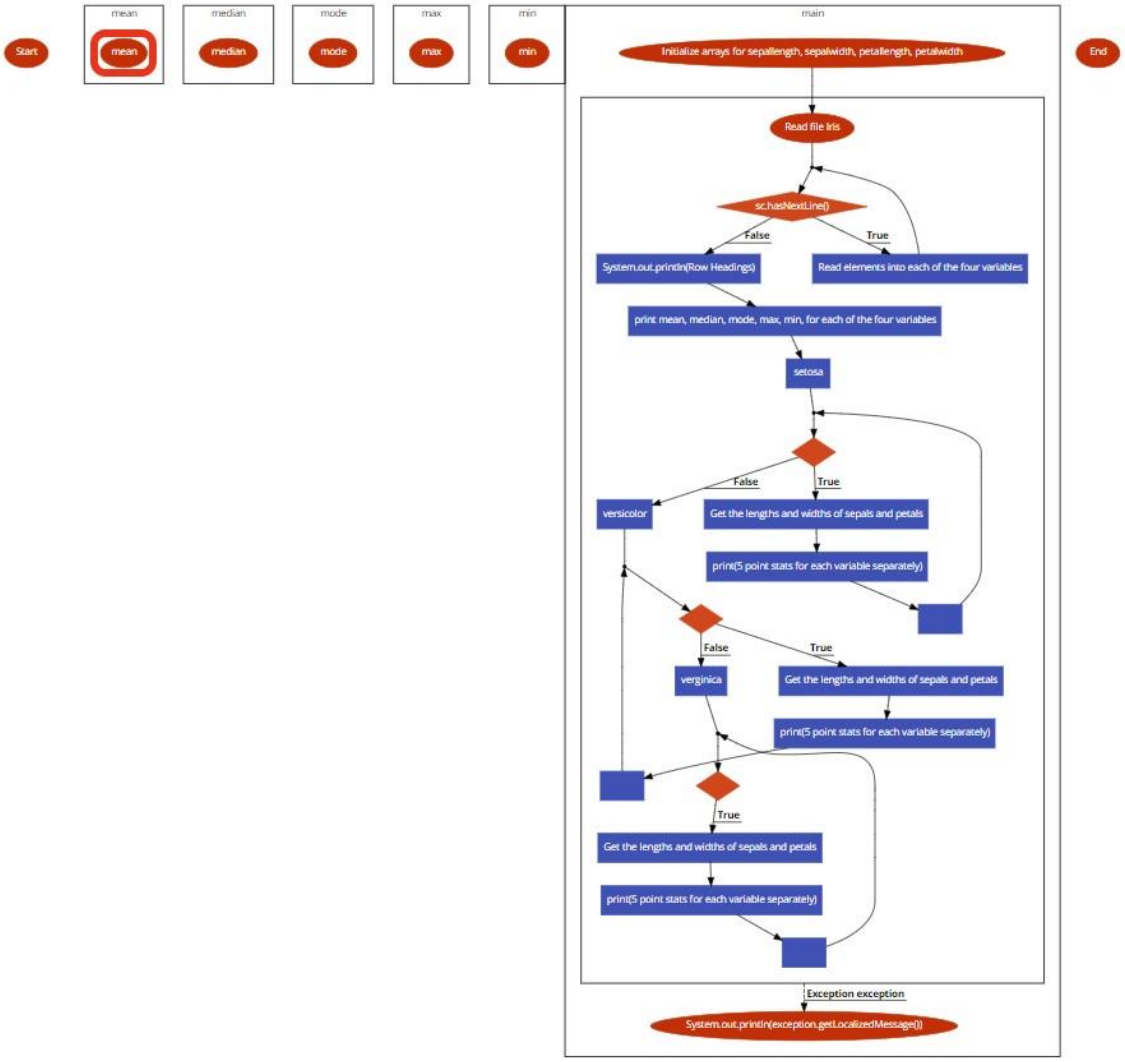
Question 7:

Given the famous iris dataset, find the 5-point summary [Mean, Median, Mode, Min, Max] for the attributes: SepalLengthCm, SepalWidthCm, PetalLengthCm, PetalWidthCm.

Once the overall summary statistics have been calculated, identify the summary statistics for each Species of iris flower [Iris-setosa, Iris-versicolor, Iris-virginica].

Present your results in the appropriate format and write the results in a file.

Flowchart:



Solution:

```
import java.util.*;
import java.io.*;
import java.util.Arrays;

public class Lab07{

    public static float mean(float[] data){
        float sum = 0;
        for(int i = 0; i<data.length; i++){
            sum = sum+data[i];
        }
        float mean = sum/(data.length);
        return mean;
    }
    public static float median(float[] data){
        float[] newdata = data;
        Arrays.sort(newdata);
        int n = newdata.length;
        float median;
        if (n % 2 == 0) {
            median = (newdata[n/2-1] + newdata[n/2]) / 2.0f;
        } else {
            median = newdata[n/2];
        }
        return median;
    }


    static float mode(float data[]) {
        float maxValue = 0;
        int maxCount = 0, i, j;

        for (i = 0; i < data.length; ++i) {
           int count = 0;
           for (j = 0; j < data.length; ++j) {
              if (data[j] == data[i])
              ++count;
           }

           if (count > maxCount) {
              maxCount = count;
              maxValue = data[i];
           }
        }
        return maxValue;
```

```
     }


    static float maximum(float[] data){
        float max = 0;
        for(int i = 0; i<data.length;i++){
            if(data[i]>max){
                max = data[i];
            }
        }
        return max;
    }

    static float minimum(float[] data){
        float min = data[0];
        for(int i = 0; i<data.length; i++){
            if(data[i]<min){
                min = data[i];
            }
        }
        return min;
    }

    public static void main(String[] args){
        float[] sepallength = new float[150];
        float[] sepalwidth = new float[150];
        float[] petallength = new float[150];
        float[] petalwidth = new float[150];

        try{
            File file = new File("Iris.csv");
            Scanner sc = new Scanner(file);
            int i = 0;
            while(sc.hasNextLine()){
                String temp = sc.nextLine();
                String[] arr = temp.split(",");
                sepallength[i] =Float.parseFloat(arr[1]);
                sepalwidth[i] =Float.parseFloat(arr[2]);
                petallength[i] =Float.parseFloat(arr[3]);
                petalwidth[i] =Float.parseFloat(arr[4]);
                i++;
            }
            System.out.println("==========================================
========================");
```

```
            System.out.println("                        FIVE POINT
SUMMARY                         ");
            System.out.println("=============================================
========================");
            System.out.println("ITEM            MEAN       MEDIAN       MODE
   MINIMUM      MAXIMUM  ");
            System.out.println("_____________________________________________
_________________________");
            System.out.println("Sepal
Length  "+mean(sepallength)+"      "+median(sepallength)+"        "+mode(sepal
length)+"         "+minimum(sepallength)+"           "+maximum(sepallength));
            System.out.println("Sepal
Width   "+mean(sepalwidth)+"          "+median(sepalwidth)+"        "+mode(sep
alwidth)+"         "+minimum(sepalwidth)+"           "+maximum(sepalwidth));
            System.out.println("Petal
Length  "+mean(petallength)+"      "+median(petallength)+"        "+mode(petal
length)+"         "+minimum(petallength)+"           "+maximum(petallength));
            System.out.println("Petal
Width   "+mean(petalwidth)+"      "+median(petalwidth)+"        "+mode(petalwi
dth)+"         "+minimum(petalwidth)+"           "+maximum(petalwidth));
            System.out.println("_____________________________________________
_________________________");
            float[] setosa_s_length = new float[50];
            float[] setosa_s_width = new float[50];
            float[] setosa_p_length = new float[50];
            float[] setosa_p_width = new float[50];

            for(int k = 0;k<50;k++){
                setosa_s_length[k] = sepallength[k];
                setosa_s_width[k] = sepalwidth[k];
                setosa_p_length[k] = petallength[k];
                setosa_p_width[k] = petalwidth[k];
            }

            System.out.println(setosa_p_length[2]);

            System.out.println("=============================================
========================");
            System.out.println("                        FIVE POINT
SUMMARY(SETOSA)                        ");
            System.out.println("=============================================
========================");
            System.out.println("ITEM            MEAN       MEDIAN       MODE
   MINIMUM      MAXIMUM  ");
```

```
            System.out.println("_____________________________________________
_____________________");
            System.out.println("Sepal
Length  "+mean(setosa_s_length)+"      "+median(setosa_s_length)+"        "+mo
de(setosa_s_length)+"         "+minimum(setosa_s_length)+"           "+maximum
(setosa_s_length));
            System.out.println("Sepal
Width   "+mean(setosa_s_width)+"     "+median(setosa_s_width)+"        "+mode(
setosa_s_width)+"         "+minimum(setosa_s_width)+"           "+maximum(seto
sa_s_width));
            System.out.println("Petal
Length  "+mean(setosa_p_length)+"     "+median(setosa_p_length)+"        "+mod
e(setosa_p_length)+"         "+minimum(setosa_p_length)+"           "+maximum(
setosa_p_length));
            System.out.println("Petal
Width   "+mean(setosa_p_width)+"    "+median(setosa_p_width)+"        "+mode(s
etosa_p_width)+"         "+minimum(setosa_p_width)+"           "+maximum(setos
a_p_width));
            System.out.println("_____________________________________________
_____________________");

            float[] versi_s_length = new float[50];
            float[] versi_s_width = new float[50];
            float[] versi_p_length = new float[50];
            float[] versi_p_width = new float[50];

            for(int k = 0;k<50;k++){
                versi_s_length[k] = sepallength[k+50];
                versi_s_width[k] = sepalwidth[k+50];
                versi_p_length[k] = petallength[k+50];
                versi_p_width[k] = petalwidth[k+50];
            }

            System.out.println("=============================================
=======================");
            System.out.println("                    FIVE POINT
SUMMARY(VERSICOLOR)                        ");
            System.out.println("=============================================
=======================");
            System.out.println("ITEM            MEAN       MEDIAN       MODE
   MINIMUM      MAXIMUM  ");
            System.out.println("_____________________________________________
_____________________");
            System.out.println("Sepal
Length  "+mean(versi_s_length)+"      "+median(versi_s_length)+"        "+mode
```

```
(versi_s_length)+"         "+minimum(versi_s_length)+"           "+maximum(ver
si_s_length));
            System.out.println("Sepal
Width   "+mean(versi_s_width)+"       "+median(versi_s_width)+"        "+mode(
versi_s_width)+"         "+minimum(versi_s_width)+"           "+maximum(versi_
s_width));
            System.out.println("Petal
Length  "+mean(versi_p_length)+"          "+median(versi_p_length)+"        "+
mode(versi_p_length)+"         "+minimum(versi_p_length)+"           "+maximum
(versi_p_length));
            System.out.println("Petal
Width   "+mean(versi_p_width)+"     "+median(versi_p_width)+"        "+mode(ve
rsi_p_width)+"         "+minimum(versi_p_width)+"           "+maximum(versi_p_
width));
            System.out.println("_____________________________________________
_____________________");

            float[] virgi_s_length = new float[50];
            float[] virgi_s_width = new float[50];
            float[] virgi_p_length = new float[50];
            float[] virgi_p_width = new float[50];

            for(int k = 0;k<50;k++){
                virgi_s_length[k] = sepallength[k+100];
                virgi_s_width[k] = sepalwidth[k+100];
                virgi_p_length[k] = petallength[k+100];
                virgi_p_width[k] = petalwidth[k+100];
            }

            System.out.println("=============================================
=======================");
            System.out.println("                    FIVE POINT
SUMMARY(VIRGINICA)                         ");
            System.out.println("=============================================
=======================");
            System.out.println("ITEM            MEAN       MEDIAN       MODE
   MINIMUM      MAXIMUM  ");
            System.out.println("_____________________________________________
_____________________");
            System.out.println("Sepal
Length  "+mean(virgi_s_length)+"      "+median(virgi_s_length)+"        "+mode
(virgi_s_length)+"         "+minimum(virgi_s_length)+"           "+maximum(vir
gi_s_length));
            System.out.println("Sepal
Width   "+mean(virgi_s_width)+"         "+median(virgi_s_width)+"       "+mode
```

```
(virgi_s_width)+"         "+minimum(virgi_s_width)+"           "+maximum(virgi
_s_width));
            System.out.println("Petal
Length  "+mean(virgi_p_length)+"     "+median(virgi_p_length)+"        "+mode(
virgi_p_length)+"         "+minimum(virgi_p_length)+"           "+maximum(virg
i_p_length));
            System.out.println("Petal
Width   "+mean(virgi_p_width)+"     "+median(virgi_p_width)+"        "+mode(vi
rgi_p_width)+"         "+minimum(virgi_p_width)+"           "+maximum(virgi_p_
width));
            System.out.println("_____________________________________________
_____________________");
        }catch(Exception exception){
            System.out.println(exception.getLocalizedMessage());
        }

    }
}
```

Output:

```
======================================================================
                      FIVE POINT SUMMARY
======================================================================
ITEM            MEAN       MEDIAN       MODE      MINIMUM      MAXIMUM
______________________________________________________________________
Sepal Length  5.843334      5.8        5.0         4.3           7.9
Sepal Width   3.0540004     3.0        3.0         2.0           4.4
Petal Length  3.7586675     4.35       1.4         1.0           6.9
Petal Width   1.198667      1.3        0.2         0.1           2.5
______________________________________________________________________
1.4
======================================================================
                      FIVE POINT SUMMARY(SETOSA)
======================================================================
ITEM            MEAN       MEDIAN       MODE      MINIMUM      MAXIMUM
______________________________________________________________________
Sepal Length  5.006           5.0        5.0         4.3           5.8
Sepal Width   3.4180005       3.4        3.4         2.3           4.4
Petal Length  1.464           1.5        1.5         1.0           1.9
Petal Width   0.24399999      0.2        0.2         0.1           0.6
```

```
_____________________________________________________________________


======================================================================
                    FIVE POINT SUMMARY(VERSICOLOR)
======================================================================
ITEM            MEAN       MEDIAN       MODE      MINIMUM      MAXIMUM
_____________________________________________________________________
Sepal Length    5.936       5.9         5.0         4.9          7.0
Sepal Width     2.77        2.8         3.0         2.0          3.4
Petal Length    4.26        4.35        4.5         3.0          5.1
Petal Width     1.326       1.3         1.5         1.0          1.8
_____________________________________________________________________
======================================================================
                    FIVE POINT SUMMARY(VIRGINICA)
======================================================================
ITEM            MEAN       MEDIAN       MODE      MINIMUM      MAXIMUM
_____________________________________________________________________
Sepal Length  6.5879993      6.5         6.3         4.9          7.9
Sepal Width   2.9739997      3.0         3.0         2.2          3.8
Petal Length  5.552          5.55        5.1         4.5          6.9
Petal Width   2.026          2.0         1.8         1.4          2.5
_____________________________________________________________________
```
