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Experiment No.	**4**

AIM:	Program on 1D Arrays,2D Arrays and Object Arrays in Java
Program 1	
PROBLEM STATEMENT:	Write a program called GradesStatistics, which reads in n grades (of int between 0 and 100, inclusive) and displays the average, minimum, maximum, median and standard deviation. Display the floating-point values upto 2 decimal places.

PROGRAM:	import *java.util.*;*
	import *java.lang.Math;*
	class GradeStatistics {
	Scanner sc = new Scanner(System.*in*);
	double avg=0,min=0,max=0,med=0,std=0;
	void input() {
	System.*out*.print("Enter no. of Students: ");
	int n = sc.nextInt();
	int grade[] = new int[n];
	for(int i=0;i<n;i++) {
	System.*out*.printf("Enter grade for student %d: ",i+1);
	grade[i] = sc.nextInt();
	}
	System.*out*.println(Arrays.toString(grade));
	display(n,grade);
	}
	void display(int n,int [] grade) {
	Arrays.sort(grade);
	for(int i=0;i<n;i++) {
	avg += grade[i];
	}

```
        avg = avg/n;
        for(int i=0;i<n;i++) {
            std += (grade[i] - avg)*(grade[i] - avg);
        }
        std = std/n;
        std = Math.sqrt(std);
        min = grade[0];
        max = grade[n-1];
        if(n%2!=0) {
            med = grade[(n+1)/2];
        }
        else {
            med = (grade[n/2] + grade[(n/2)+1])/2;
        }
        System.out.printf("The Average = %.2f\n",avg);
        System.out.printf("The Minimum = %.0f\n",min);
        System.out.printf("The Maximum = %.0f\n",max);
        System.out.printf("The Median = %.2f\n",med);
        System.out.printf("The Standard Deviation = %.2f",std);
    }
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        GradeStatistics g1 = new GradeStatistics();
        int flag,n;
        while(true) {
            g1.input();
            System.out.println("\nDo you want to continue?(yes=1/0=no)");
            flag = sc.nextInt();
            if(flag==0) {
                break;
            }
        }
    }
}
```

RESULT:

```
PS D:\Java Practicals\Experiment_4> cd
adeStatistics }
Enter no. of Students: 4
Enter grade for student 1: 36
Enter grade for student 2: 78
Enter grade for student 3: 65
Enter grade for student 4: 53
[36, 78, 65, 53]
The Average = 58.00
The Minimum = 36
The Maximum = 78
The Median = 71.00
The Standard Deviation = 15.48
Do you want to continue?(yes=1/0=no)
0
PS D:\Java Practicals\Experiment_4>
```

Program 2

PROBLEM STATEMENT:	Book Ratings: Write a program to find the most popular book. Create a 2D array named bookRating which should hold ratings(1 to 5) of a few books. You may consider the first constant reader's rating (or Scan and next time as - how many readers have given the rating ?) Collect ratings of four such books. a)Find the average rating of each book. b) Display the most popular book. ie a Book with highest average rating.

PROGRAM:	import *java.util.*;*
	class BookRating {
	Scanner sc = new Scanner(System.*in*);
	void input() {
	System.*out*.print("Enter the number of readers: ");
	int n = sc.nextInt();
	double [][] books = new double[4][n];
	for(int i=0;i<4;i++) {
	System.*out*.printf("Enter %d ratings for book %d: \n",n,i+1);
	for(int j=0;j<n;j++) {
	books[i][j] = sc.nextDouble();
	}

```
        }
        average(n, books);
    }
    void average(int n,double [][] book) {
        double[] avg = new double[4];
        double popular=0;
        int c=0;
        for(int i=0;i<4;i++) {
            for(int j=0;j<n;j++) {
                avg[i] += book[i][j];
            }
            avg[i] = avg[i]/n;
            if(avg[i]>popular) {
                popular = avg[i];
                c = i;
            }
            System.out.printf("Book %d Rating: %.2f\n",i+1,avg[i]);
        }
        System.out.printf("\nThe Most popular Book:\nBook %d with
Rating: %.2f\n",c,popular);
    }
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int flag;
        BookRating br1 = new BookRating();
        while(true) {
            br1.input();
            System.out.println("\nDo you want to continue?(yes=1/0=no)");
            flag = sc.nextInt();
            if(flag==0) {
                break;
            }
        }
    }
}
```

RESULT:

```
Enter the number of readers: 4
Enter 4 ratings for book 1:
3.2 3.3 2.8 4.1
Enter 4 ratings for book 2:
2.3 2.2 1.8 3.2
Enter 4 ratings for book 3:
3.3 3.4 3.2 3.8
Enter 4 ratings for book 4:
4.3 3.9 4.6 4.5
Book 1 Rating: 3.35
Book 2 Rating: 2.38
Book 3 Rating: 3.43
Book 4 Rating: 4.32

The Most popular Book:
Book 3 with Rating: 4.32

Do you want to continue?(yes=1/0=no)
0
PS D:\Java Practicals\Experiment_4>
```

Program 3	
PROBLEM STATEMENT:	Write a program in Java to maintain the information of Movies, including the name of the movie, type of movie(action, thriller, comedy, drama), Hero name, Heroine, budget in Rs. a) To accept the information of movies from user and sort them according to the budget of the film. b) To print all movies whose names start with S/A c) Print all movies with the name largest in all movies

PROGRAM:	import *java.util.*;*
	class Movie {
	String name,type,hero,heroine;
	long budget;
	Scanner sc = new Scanner(System.*in*);
	Movie(String name,String type,String hero,String heroine,long budget) {
	this.*name* = name;

```
        this.type = type;
        this.hero = hero;
        this.heroine = heroine;
        this.budget = budget;
    }
    //sort movies according to budget
    void sortb(Movie [] movies) {
        for(int i=0;i<movies.length-1;i++) {
            for(int j=i+1;j<movies.length;j++) {
                if(movies[i].budget<movies[j].budget) {
                    Movie temp = movies[i];
                    movies[i] = movies[j];
                    movies[j] = temp;
                }
            }
        }
        System.out.println("\nMovies sorted by
budget:\nMovie\tBudget(in Rs)");
        for(int i=0;i<movies.length;i++) {
            System.out.println(movies[i].name+"\t"+movies[i].budget);
        }
    }
    //List movies starting with S/A
    void list_sa(Movie [] movies) {
        System.out.println("\nMovies starting with S/A:");
        for(int i=0;i<movies.length;i++) {
            if(movies[i].name.toUpperCase().charAt(0)=='S' ||
movies[i].name.toUpperCase().charAt(0)=='A') {
                System.out.println(movies[i].name);
            }
        }
    }
    //List movies with the largest name
    void sortn(Movie [] movies) {
        String largest = movies[0].name;
        for(int i=1;i<movies.length;i++) {
```

```
            if(movies[i].name.compareTo(largest)>0) {
                largest = movies[i].name;
            }
        }
        System.out.println("\nMovie(s) with largest name:");
        for(int i=0;i<movies.length;i++) {
            if(movies[i].name.length()==largest.length()) {
                System.out.println(movies[i].name);
            }
        }
    }
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int choice,flag;
        long budget;
        String name,type,hero,heroine;
        System.out.print("Number of movies: ");
        int n = sc.nextInt();
        Movie[] movies = new Movie[n];
        for(int i=0;i<n;i++) {
            System.out.println("\nDetails of movie "+(i+1)+":");
            System.out.print("Enter name of the movie: ");
            name = sc.next();
            System.out.print("Enter type of the movie: ");
            type = sc.next();
            System.out.print("Enter name of the hero: ");
            hero = sc.next();
            System.out.print("Enter name of the heroine: ");
            heroine = sc.next();
            System.out.print("Enter budget of the movie: ");
            budget = sc.nextInt();
            movies[i] = new Movie(name,type,hero,heroine,budget);
        }
        while(true) {
            System.out.println("Select 1 Option:\n1 -> Sort by budget\n2 ->
List movies starting with S/A\n3 -> List movies with largest name");
```

```
            choice = sc.nextInt();
            switch(choice) {
               case 1:
                  movies[0].sortb(movies);
                  break;
               case 2:
                  movies[0].list_sa(movies);
                  break;
               case 3:
                  movies[0].sortn(movies);
                  break;
               case 4:
                  System.exit(0);
               default:
                  System.out.println("\nInvalid choice!");
            }
            System.out.println("\nDo you want to continue?(yes=1/0=no)");
            flag = sc.nextInt();
            if(flag==0) {
               break;
            }
         }
      }
}
```

RESULT:

```
PS D:\Java Practicals\Experiment_4> c
Number of movies: 3

Details of movie 1:
Enter name of the movie: Conjuring
Enter type of the movie: Horror
Enter name of the hero: Patrick
Enter name of the heroine: Vera
Enter budget of the movie: 20000000

Details of movie 2:
Enter name of the movie: Bahubali
Enter type of the movie: Action
Enter name of the hero: Prabhas
Enter name of the heroine: Anushka
Enter budget of the movie: 56000000

Details of movie 3:
Enter name of the movie: Avengers
Enter type of the movie: Fiction
Enter name of the hero: Robert
Enter name of the heroine: Scarlett
Enter budget of the movie: 22000000
```

```
Select 1 Option:
1 -> Sort by budget
2 -> List movies starting with S/A
3 -> List movies with largest name
1

Movies sorted by budget:
Movie   Budget(in Rs)
Bahubali        56000000
Avengers        22000000
Conjuring       20000000

Do you want to continue?(yes=1/0=no)
1
Select 1 Option:
1 -> Sort by budget
2 -> List movies starting with S/A
3 -> List movies with largest name
2

Movies starting with S/A:
Avengers

Do you want to continue?(yes=1/0=no)
1
Select 1 Option:
1 -> Sort by budget
2 -> List movies starting with S/A
3 -> List movies with largest name
3

Movie(s) with largest name:
Conjuring

Do you want to continue?(yes=1/0=no)
0
```

CONCLUSION:	In this experiment, we learned, how to declare 1D and multidimensional arrays in java. We also learnt how to declare an object array ad use it to sort objects by specific properties.