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| **Experiment No.** | **4** |

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| **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:** | |
| **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:** | |
| **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:** | |
| **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. |