K.J Somaiya College of Engineering, Mumbai -77

Batch: A3 Roll No.: 16010121045

Experiment / assignment / tutorial No. 03

Grade: AA / AB / BB / BC / CC / CD /DD

Signature of the Staff In-charge with date

TITLE :Multi-dimensional Arrays (Jagged Array)

AIM: Write a program which stores information about n players in a two dimensional array. The array should contain the number of rows equal to the number of players. Each row will have a number of columns equal to the number of matches played by that player which may vary from player to player. The program should display player number (index +1), runs scored in all matches and its batting average as output. (It is expected to assign columns to each row dynamically after getting value from the user.

Expected OUTCOME of Experiment:

CO2: Explore arrays, vectors, classes and objects in C++ and Java.

Books/ Journals/ Websites referred:

1. E. Balagurusamy, "Programming with Java" McGraw-Hill.

2. Sachin Malhotra, Saurabh Choudhary, "Programming in Java", Oxford Publications.

Pre Lab/ Prior Concepts:

Arrays

Multi-Dimensional Array:

 10
 12
 43
 11
 22

 20
 45
 56
 1
 33

 30
 67
 32
 14
 44

 40
 12
 87
 14
 55

 50
 86
 66
 13
 66

 60
 53
 44
 12
 11

A multi-dimensional array is one that can hold all the values above. You set them up like this:

int[][] **numbers** = **new int**[6][5];

The first set of square brackets is for the rows and the second set of square brackets is for the columns. In the above line of code, we're telling Java to set up an array with 6 rows and 5 columns.

aryNumbers[0][0] = 10; aryNumbers[0][1] = 12; aryNumbers[0][2] = 43; aryNumbers[0][3] = 11; aryNumbers[0][4] = 22; So the first row is row 0. The columns then go from 0 to 4, which is 5 items.

Class Diagram:

| Class name | Exp3 |
|------------|--------|
| Variables | - |
| Functions | main() |

<u>Algorithm:</u>

- 1. Start
- 2. Take n Input
- 3. Initialize 2D array row
- 4. Loop n times
 - Take number of matches as input
 - Initialize column as number of matches +1
 - Store first element of every row as jersey number
 - Loop m times
 - Take number of runs as input
 - Store in 2D array
- 5. Print Player Stats
 - Print Player Number
 - Print number of matches
 - Calculate total runs and print
 - Print Batting Average i.e Total runs/ Number of matches

Implementation details:

```
import java.util.Scanner;
class exp3 {
    public static void main(String[] args) {
        Scanner sc=new Scanner(System.in);
        System.out.print("Enter the value of n: ");
        int n=sc.nextInt();
        int team[][]=new int[n][];
        for(int i=0;i<n;i++){</pre>
            System.out.print("\nEnter the number of matches
for Player "+(i+1)+" : ");
            int m=sc.nextInt();
            team[i]=new int[m+1];
            team[i][0]=i+1;
            for(int j=0;j<m;j++){</pre>
                System.out.print("Enter runs in match
"+(j+1)+" : ");
                team[i][i+1]=sc.nextInt();
            }
        }
        System.out.println();
        for(int i=0;i<n;i++){</pre>
            System.out.println("Player "+(i+1)+" Stats");
            System.out.println("-----
\nNumber of Matches Played : "+(team[i].length-1));
            double totalRuns=0;
            for(int j=1;j<team[i].length;j++){</pre>
                System.out.println("Runs in Match "+(j)+" :
"+team[i][j]);
                totalRuns+=team[i][j];
            }
            System.out.println("Total Runs : "+totalRuns);
            System.out.println("Batting Average :
"+totalRuns/(team[i].length-1));
            System.out.println();
        }
    }
```

Output:

```
cd "/Users/pargat/Documents/COLLEGE/00PS/Progr
pargat@Router Programs % cd "/Users/pargat/Doc
ava exp3
Enter the value of n: 2
Enter the number of matches for Player 1 : 3
Enter runs in match 1 : 2
Enter runs in match 2 : 3
Enter runs in match 3 : 4
Enter the number of matches for Player 2 : 1
Enter runs in match 1 : 10
Player 1 Stats
Number of Matches Played : 3
Runs in Match 1 : 2
Runs in Match 2 : 3
Runs in Match 3 : 4
Total Runs : 9.0
Batting Average : 3.0
Player 2 Stats
Number of Matches Played : 1
Runs in Match 1 : 10
Total Runs : 10.0
Batting Average : 10.0
pargat@Router Exp3 %
```

Conclusion:

This experiment involved studying of multidimensional and jagged arrays. The latter was used for implementing the given problem statement and achieving desired results.

Date:

Signature of faculty in-charge

Post Lab Descriptive Questions

Q.1 Create a jagged array of integers. This array should consist of two 2-D arrays. First 2-D array should contain 3 rows having length of 4,3,and 2 respectively. Second 2-D array should contain 2 rows with length 3 and 4 respectively.



Output:

| pargat@Router Programs % | cd " |
|--------------------------|-------|
| OLLEGE/00PS/Programs/" & | & jav |
| ost3q1 | |
| Array 1 | |
| 0 0 0 0 | |
| 0 0 0 | |
| 0 0 | |
| | |
| Array 2 | |
| 000 | |
| 0000 | |
| pargat@Router Programs % | |

Department of Computer Engineering

Q.2 Consider the following code

int number[] = new int[5]; After execution of this statement, which of the following are true? (A) number[0] is undefined (B) number[5] is undefined (C) number[5] is null (D) number[2] is 0 (E) number.length() is 5

(i) (C) & (E)
(ii) (A) & (E)
(iii) (E)
(iv) (B), (D) & (E)

Ans: (iv) (B), (D) & (E)

Q.3 Write a program to create an array where ith row has i columns.





Department of Computer Engineering