Course Name:	**Object Oriented Programming Methodology**	**Semester:**	**III**
Date of Performance:	**18 / 08 / 2023**	**Batch No:**	**B2**
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Experiment No: 3

Aim and Objective of the Experiment:

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.

COs to be achieved:

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

Title: Multi-dimensional Arrays (Jagged Array)

Tools used:

JDK, VScode / Eclipse

Theory:

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**];**

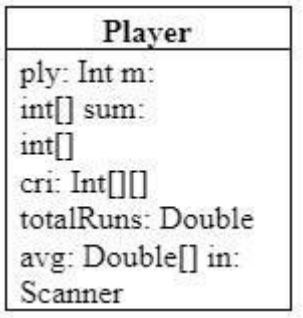
The first set of square brackets is for the rows and the second set of square brackets is for the columns. In the above line of code, we're telling Java to set up an array with 6 rows and 5 columns.

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:



Algorithm:

1. Start
2. Create a class named Players with a main method.
3. Input the number of players.
4. Create a jagged array to store player statistics (matches played and runs scored) based on the number of players.
5. Use a for loop to iterate over each player:-

- Input the number of matches played by the player.
- Initialize an array for the player with the number of matches played.
- Use another for loop to input the runs scored in each match for the player.
- Calculate the total runs scored by the player by summing up runs in all matches.
- Calculate the average run rate by dividing the total runs scored by the number of matches played.
- Print the total runs scored and average run rate for the player.

6. End

Code:

```java
import java.util.Scanner;

public class CricketPlayerStatistics {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the number of players in the match: ");
        int n = scanner.nextInt();

        int[][] playerInfo = new int[n][];
        double[] battingAvg = new double[n];

        for (int i = 0; i < n; i++) {
            System.out.print("Enter the number of matches played by Player " + (i + 1) + ": ");
            int playedMatches = scanner.nextInt();
            playerInfo[i] = new int[playedMatches];
            int totalScore = 0;

            for (int j = 0; j < playedMatches; j++) {
                System.out.print("Please enter the number of runs scored by Player " + (i + 1) + " in match " + (j + 1) + ": ");
                playerInfo[i][j] = scanner.nextInt();
                totalScore += playerInfo[i][j];
            }

            battingAvg[i] = (double) totalScore / playedMatches;
        }
        int bestAvgPlayerIndex = 0;
        double bestAvg = battingAvg[0];

        for (int i = 1; i < n; i++) {
            if (battingAvg[i] > bestAvg) {
                bestAvg = battingAvg[i];
                bestAvgPlayerIndex = i;
            }
        }

        System.out.println("\nPlayer Information:");
        for (int i = 0; i < n; i++) {
            System.out.println("Player " + (i + 1) + ":");
            System.out.print("Runs scored: ");

            for (int runs : playerInfo[i]) {
                System.out.print(runs + " ");
            }

            System.out.println("\nBatting Average: " + String.format("%.2f", battingAvg[i]) + "\n");
        }

        System.out.println("Player with the best batting average: Player " + (bestAvgPlayerIndex + 1) + " with an average of " + String.format("%.2f", bestAvg));

        scanner.close();
    }
```

Output:

```
Enter the number of players in the match: 3
Enter the number of matches played by Player 1: 2
Please enter the number of runs scored by Player 1 in match 1: 34
Please enter the number of runs scored by Player 1 in match 2: 23
Enter the number of matches played by Player 2: 3
Please enter the number of runs scored by Player 2 in match 1: 56
Please enter the number of runs scored by Player 2 in match 2: 34
Please enter the number of runs scored by Player 2 in match 3: 12
Enter the number of matches played by Player 3: 2
Please enter the number of runs scored by Player 3 in match 1: 44
Please enter the number of runs scored by Player 3 in match 2: 79

Player Information:
Player 1:
Runs scored: 34 23
Batting Average: 28.50

Player 2:
Runs scored: 56 34 12
Batting Average: 34.00

Player 3:
Runs scored: 44 79
Batting Average: 61.50

Player with the best batting average: Player 3 with an average of 61.50
```

Post Lab Subjective/Objective type Questions:

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.

```
public class jaggedpostlab {     public
static void main(String[] args)
    {
        int j1[][] = new int[3][];
j1[0] = new int[4];          j1[1]
= new int[3];          j1[2] = new
int[2];

        int j2[][] = new int[2 ][];
j2[0] = new int[3];          j2[1] =
new int[4];
    }
}
```

2. Consider the following code

```
int number[] = new int[5];

After the execution of this statement, which
of the following is true?

                        A. number[0] is undefined
                        B. number[5] is undefined
                           C. number[4] 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)

```
import java.util.*;
public class Jagged {

    static int players[][];
    public static void main(String args[])
    {
        Scanner s = new Scanner(System.in);
        System.out.println("Enter the number of
rows");         int n = s.nextInt();         int
jagged[][] = new int[n][];         int m;
        for(int i = 0; i < n; i++)
        {
            jagged[i] = new int[i + 1];
        }
    }
}
```

3. Write a program to create an array where i^{th} row has i columns.

Conclusion:

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

Signature of faculty in-charge with Date: