

# Rajalakshmi Engineering College

Name: Pavithra S  
Email: 241001162@rajalakshmi.edu.in  
Roll no: 241001162  
Phone: 8122081287  
Branch: REC  
Department: IT - Section 2  
Batch: 2028  
Degree: B.E - IT

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 5\_CY

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : Coding

##### 1. Problem Statement

Anjali is now working as a developer for the City Marathon Association, which wants to build a system to track and find the fastest runner among marathon participants.

Each runner's record has:

Runner ID (integer) Runner Name (string) An array of times (in minutes) taken in 5 marathon events (integers)

The system must calculate:

The average time of each runner (sum of all times / 5). Identify the fastest runner (the one with the lowest average time). If two or more runners have the same average time, the one with the lower Runner ID is considered the

fastest runner.

Anjali has been asked to implement this system using:

A class with attributes for runner details. A constructor to initialize runner details. Getter and Setter methods to retrieve and update runner details if required. A method to calculate the average time. Objects of the class to represent runners.

Finally, display each runner's details and announce the Fastest Runner.

### ***Input Format***

The first line of input contains an integer N (number of runners).

For each runner:

- The next line contains the Runner ID (integer).
- The following line contains the Runner Name (string).
- The next line contains 5 integers separated by spaces (times in minutes for 5 marathon events).

### ***Output Format***

For each runner the output prints the following details:

- Runner ID: <runner\_id>
- Runner Name: <runner\_name>
- Average Time: <average\_time>

Finally, print "Fastest Runner: <runner\_name> with <average\_time> minutes"

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 1

1001

Ravi Kumar

240 250 245 255 260

Output: Runner ID: 1001

Runner Name: Ravi Kumar

Average Time: 250

Fastest Runner: Ravi Kumar with 250 minutes

### **Answer**

// You are using Java

import java.io.\*;

import java.util.Scanner;

class Marathon{

int id;

String name;

int[] arr;

int avg;

public Marathon(int id, String name, int[] arr){

this.id=id;

this.name=name;

this.arr=arr;

calcAvg();

}

public void setId(int id){

this.id=id;

}

public void setName(String name){

this.name=name;

}

public void setArr(int[] arr){

this.arr=arr;

}

public int getId(){

return id;

}

public String getName(){

return name;

}

public int getAvg(){

return avg;

```

    }
    public void calcAvg(){
        int sum=0;
        for(int i=0;i<5;i++)
            sum+=arr[i];

        avg=sum/5;
    }
    public void display(){
        System.out.println("Runner ID: "+getId());
        System.out.println("Runner Name: "+getName());
        System.out.println("Average Time: "+getAvg());
    }
}

```

```

class Main{
    public static void main(String[] args){
        Scanner sc=new Scanner(System.in);

        int n=Integer.parseInt(sc.nextLine());

        Marathon fast=null;

        for(int i=0;i<n;i++){

            int id=Integer.parseInt(sc.nextLine());
            String name=sc.nextLine();

            String[] time=sc.nextLine().split(" ");

            int[] arr=new int[5];

            for(int j=0;j<5;j++)
                arr[j]=Integer.parseInt(time[j]);

            Marathon p=new Marathon( id, name, arr);

            if(fast==null || p.getAvg()<fast.getAvg() || (p.getAvg()==fast.getAvg() &&
p.getId()<fast.getId()))

```

```
        fast=p;
        p.display();
    }

    System.out.println("Fastest Runner: "+fast.getName()+" with
    "+fast.getAvg()+" minutes");
    }
}
```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Arjun is working as a developer for CityWater Supply Board, which wants to build a household water billing system.

Each household's water account has:

A Customer ID (integer) A Customer Name (string) Liters Consumed (double)

The water bill is calculated based on these rules:

For the first 500 liters 2 per liter For the next 500 liters (501–1000) 3 per liter For liters above 1000 5 per liter If the total bill exceeds 3000, a 10% discount is applied on the final bill.

Arjun has been asked to implement this system using:

A class with attributes for customer details. A constructor to initialize customer details. Setter methods to update details if needed. Getter methods to retrieve details. Objects of the class to represent customers.

Finally, display each customer's details and final bill amount.

### ***Input Format***

The first line of input contains an integer N, representing the number of customers.

For each customer:

- The next line contains the Customer ID (integer).
- The following line contains the Customer Name (string).
- The next line contains the Liters Consumed (double).

### ***Output Format***

For each customer, print the details in the following format:

Customer ID: <customer\_id>

Customer Name: <customer\_name>

Final Bill: <final\_bill> (rounded to one decimal place)

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 1

1001

Ravi Kumar

300

Output: Customer ID: 1001

Customer Name: Ravi Kumar

Final Bill: 600.0

### **Answer**

// You are using Java

import java.io.\*;

import java.util.Scanner;

class CityWater{

int id;

String name;

double liters;

public CityWater(int id, String name, double liters){

this.id=id;

this.name=name;

this.liters=liters;

}

public void setId(int id){

this.id=id;

}

public void setName(String name){

this.name=name;

}

public void setLiters(double liters){

this.liters=liters;

}

public int getId(){

return id;

}

public String getName(){

return name;

}

public double getLiters(){

return liters;

```

    }

    public double calcBill(){
        double bill=0;

        if(liters<=500)
            bill=liters*2;
        else if(liters>500 && liters<=1000)
            bill = (500*2) + (liters-500)*3;
        else
            bill = (500*2) + (500*3) + (liters-1000)*5;

        if(bill>3000)
            bill=bill-bill*0.1;
        return bill;
    }
}

```

```

class Main{
    public static void main(String[] args){
        Scanner sc=new Scanner(System.in);
        int n=Integer.parseInt(sc.nextLine());

        for(int i=1;i<=n;i++){
            int id=Integer.parseInt(sc.nextLine());
            String name=sc.nextLine();
            double liters=Double.parseDouble(sc.nextLine());

            CityWater bill = new CityWater( id, name, liters);

            System.out.println("Customer ID: "+bill.getId());
            System.out.println("Customer Name: "+bill.getName());
            System.out.printf("Final Bill: %.1f\n", bill.calcBill());
        }
    }
}

```



**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

Meera is working as a developer for CityGas Supply Board, which wants to build a household gas billing system.

Each household's gas account has:

A Customer ID (integer) A Customer Name (string) Units Consumed in cubic meters (double)

The gas bill is calculated based on these rules:

For the first 50 units    4 per unit For the next 100 units (51–150)    6 per unit  
For units above 150    8 per unit If the total bill exceeds 2000, a 15% discount is applied on the final bill.

Meera has been asked to implement this system using:

A class with attributes for customer details. A constructor to initialize customer details. Setter methods to update details if needed. Getter

methods to retrieve details. Objects of the class to represent customers.  
Finally, display each customer's details and final bill amount.

### ***Input Format***

The first line of input contains an integer N, representing the number of customers.

For each customer:

- The next line contains the Customer ID (integer).
- The following line contains the Customer Name (string).
- The next line contains the Units Consumed (double).

### ***Output Format***

For each customer, print the details in the following format:

Customer ID: <customer\_id>

Customer Name: <customer\_name>

Final Bill: <final\_bill> (The final bill must be rounded to one decimal place.)

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 1

1001

Ravi Kumar

30

Output: Customer ID: 1001

Customer Name: Ravi Kumar

Final Bill: 120.0

### ***Answer***

// You are using Java

import java.io.\*;

import java.util.Scanner;

```
class CityGas{
    int id;
    String name;
    double units;

    public CityGas(int id, String name, double units){
        this.id=id;
        this.name=name;
        this.units=units;
    }

    public void setId(int id){
        this.id=id;
    }
    public void setName(String name){
        this.name=name;
    }
    public void setUnits(double units){
        this.units=units;
    }

    public int getId(){
        return id;
    }
    public String getName(){
        return name;
    }

    public double calcBill(){
        double bill=0;
        if(units<=50)
            bill=units*4;
        else if(units>50 && units<=150)
            bill=(50*4)+(units-50)*6;
        else
            bill=(50*4)+(100*6)+(units-150)*8;

        if(bill>2000)
            bill = bill - bill*0.15;

        return bill;
    }
}
```

```
}  
}  
}  
  
class Main{  
    public static void main(String[] args){  
        Scanner sc=new Scanner(System.in);  
        int n=Integer.parseInt(sc.nextLine());  
  
        for(int i=1;i<=n;i++){  
            int id=Integer.parseInt(sc.nextLine());  
            String name=sc.nextLine();  
            double units=Double.parseDouble(sc.nextLine());  
  
            CityGas bill=new CityGas( id, name, units);  
  
            System.out.println("Customer ID: "+bill.getId());  
            System.out.println("Customer Name: "+bill.getName());  
            System.out.printf("Final Bill: %.1f\n",bill.calcBill());  
        }  
    }  
}
```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

Anjali is working as a developer for the City Basketball Association, which wants to build a system to track and find the top scorer among basketball players.

Each player's record has:

Player ID (integer) Player Name (string) An array of points scored in 5 matches (integers)

The system must calculate:

The total score of each player (sum of all match points). Identify the highest scorer among all players. If two or more players have the same total score, the one with the lower Player ID is considered the top scorer.

Anjali has been asked to implement this system using:

A class with attributes for player details. A constructor to initialize player details. Getter and Setter methods to retrieve and update player details if required. A method to calculate the total score. Objects of the class to represent players.

Finally, display each player's details and announce the Top Scorer.

#### ***Input Format***

The first line of input contains an integer N (number of players).

For each player:

- The next line contains the Player ID (integer).
- The following line contains the Player Name (string).
- The next line contains 5 integers separated by spaces (points scored in 5 matches).

### **Output Format**

For each player the output prints the following details:

- Player ID: <player\_id>
- Player Name: <player\_name>
- Total Score: <total\_score>

Finally, print "Top Scorer: <player\_name> with <total\_score> points"

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 1

1001

Ravi Kumar

10 20 30 40 50

Output: Player ID: 1001

Player Name: Ravi Kumar

Total Score: 150

Top Scorer: Ravi Kumar with 150 points

### **Answer**

```
// You are using Java
import java.io.*;
import java.util.Scanner;
```

```
class Basketball{
    int id;
    String name;
    int[] arr;
    int total;
```

```
    public Basketball(int id, String name, int[] arr){
        this.id=id;
        this.name=name;
```

```
        this.arr=arr;
        calcScore();
    }

    public void setId(int id){
        this.id=id;
    }
    public void setName(String name){
        this.name=name;
    }
    public void setArr(int[] arr){
        this.arr=arr;
    }

    public int getId(){
        return id;
    }
    public String getName(){
        return name;
    }
    public int getTotal(){
        return total;
    }

    public void calcScore(){
        int total=0;
        for(int i=0;i<5;i++){
            total+=arr[i];
            this.total=total;
        }

    public void display(){
        System.out.println("Player ID: "+getId());
        System.out.println("Player Name: "+getName());
        System.out.println("Total Score: "+getTotal());
    }
}

class Main{
    public static void main(String[] args){
        Scanner sc=new Scanner(System.in);
        int n=Integer.parseInt(sc.nextLine());
```

```
Basketball top=null;

for(int i=1;i<=n;i++){
    int id=Integer.parseInt(sc.nextLine());
    String name=sc.nextLine();

    String[] scores=sc.nextLine().split(" ");
    int[] arr=new int[5];

    for(int j=0;j<5;j++)
        arr[j]=Integer.parseInt(scores[j]);

    Basketball p=new Basketball( id, name, arr);

    if(top==null || p.getTotal()>top.getTotal() || (p.getTotal()==top.getTotal()
    && p.getId()<top.getId()))
        top=p;
    p.display();
}

System.out.println("Top Scorer: "+top.getName()+" with "+top.getTotal()+"
points");
}
}
```



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**Status :** Correct

**Marks :** 10/10

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