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1 Short Assessed Exercise

2 Level 7

2.1 Jatinkumar Patel

2.2 24/11/2020

2.3 Version 1

2.4 Summary of the Question

Write a program that gives information about paralympic swimming relay teams. The program should take information from the user and use that information to check and tell the user if the team is legal to participate in the competition or not.

2.5 The literate program development

2.5.1 inputString

What it does *An input method that we can call whenever we need to get some information from the user. It makes our code more efficient by allowing us to not have to create a scanner in every method that we need input from.*

Implementation (how it works) *A string argument message is passed in the method definition. This will be the output that will prompt the user to answer the question. We declare and initialise a scanner, and declare a string variable to store the input from the user in. We then print the input prompt to the user. The answer that they type in is stored in the variable that we declared. Finally, this value is returned to the program for use outside of the method.*

[2]:
```
public static String inputString(String message){ // String input method for␣
↪use instead of multiple scanners.
    Scanner scanner = new Scanner(System.in);
    String textinput;

    System.out.println(message);
    textinput = scanner.nextLine();

    return textinput;
}
```

Testing

[2]:
```
inputString("Say something: ");
```

```
Say something:
Okay
```

[2]:
```
Okay
```

2.5.2 inputInt

What it does *inputInt is a method which allows us to get input from any method without having to initialise a scanner for each method we have in the program.*

Implementation (how it works) *inputInt works like a normal input sequence; a scanner is initialised, the user is prompted to answer a question and their answer is saved to an integer variable and returned to the program.*

[3]:
```
public static int inputInt(String message){ // Integer input method to allow␣
↪for cleaner code.
    Scanner scanner = new Scanner(System.in);
    int intInput;

    System.out.println(message);
    intInput = scanner.nextInt();

    return intInput;
}
```

Testing

[4]:
```
inputInt("Please enter a number: ");
```

```
Please enter a number:
38
```

[4]:
```
38
```

2.5.3 Record: paraRelayTeams

What it does *This is an abstract data type with two fields, a String variable and an integer array. The paralympic team's information will be storing using this record.*

Implementation (how it works) *We create a new type called paraRelayTeams, and inside the definition we declare two variables, a String variable for storing the country and an integer array for storing the points score of each team member.*

[4]:
```
class paraRelayTeams {
    String country;
```

```
    int[] points;
}
```

Testing

[5]:
```
paraRelayTeams teamA = new paraRelayTeams();
```

2.5.4 getCountry

What it does *This is an accessor method to return the country of a certain team to the program.*

Implementation (how it works) *We take the team name as a parameter, and simply return the country that is stored under that team's name using team.country.*

[6]:
```
public static String getCountry(paraRelayTeams team) { // Accessor method for␣
 ↪getting a country value
    return team.country;
}
```

Testing

[32]:
```
teamA.country = "ABCD";
getCountry(teamA);
```

[32]:
```
ABCD
```

2.5.5 setCountry

What it does *This is an accessor method to set the country of a certain team to the program.*

Implementation (how it works) *To set the country of a certain team, we need two pieces of information. Firstly, the name of the team we are setting new information for, and secondly, the country that we need to set the team's country to. These are taken as parameters in the method, and inside the method we set the team's country value to equal the country value we were given when the method was called. We then return the value to the program.*

[7]:
```
public static String setCountry(paraRelayTeams team, String country){ //␣
 ↪Accessor method for setting country value.
    team.country = country;
    return team.country;
}
```

Testing

[8]:
```
setCountry(teamA, "EFGH");
```

[8]:
```
EFGH
```

2.5.6 setPoints

What it does *This is an accessor method to set the points values of each member of a certain team to the program.*

Implementation (how it works) *To set the points of a certain team, we need two pieces of information. Firstly, the name of the team we are setting new information for, and secondly, the points of each member to set each field in the array to a value. These are taken as parameters in the method, and inside the method we set the team's points array to equal the array we were given when the method was called. We then return the array to the program.*

[9]:
```
public static int[] setPoints(paraRelayTeams team, int[] points){ // Accessor␣
↪method for setting points values.
    team.points = points;
    return team.points;
}
```

Testing

[11]:
```
int[] points = {2, 3, 5, 7};
setPoints(teamA, points);
```

[11]:
```
[I@2026319e
```

2.5.7 getPoints

What it does *This is an accessor method to get the points values of each member of a certain team to the program.*

Implementation (how it works) *To get the points values of every team member, we simply take the team name as an argument and return the points array stored under that team name to the program.*

[37]:
```
public static int[] getPoints(paraRelayTeams team){ // Accessor method for␣
↪getting points values.
    return team.points;
}
```

Testing

[38]:
```
getPoints(teamA);
```

[38]:
```
[I@6c6d3df3
```

2.5.8 questionLoop

What it does *This is part of the core of the program. The system will ask the user to enter the country that the team represents, and also to enter the points of each member of the team. It will then set the team's country and points values to the information given by the user.*

Implementation (how it works) *An integer array with 4 fields is initialised. The system prompts the user to enter the country, which it will store in a String for use later on. After this, a for loop is initialised to ask the user to enter the disability category of each swimmer. Each time the user gives an answer, the system will take the answer and store it into the next field of the points array. In total the user will give 4 values. We then call the accessor methods to set the country and points values of the team using the values we were just given.*

[39]:
```
public static void questionLoop(paraRelayTeams team){ // Method that takes all␣
↪the information that the user needs to enter
    int[] points = new int[4];
    String country = inputString("What country is the team representing? ");

    for(int i = 0; i < 4; i++){
        points[i] = inputInt("What is the disability category of Swimmer " +␣
↪(i+1) + "? ");
    }

    setCountry(team, country);
    setPoints(team, points);
}
```

Testing

[40]:
```
questionLoop(teamA);
```

```
What country is the team representing?
GB
What is the disability category of Swimmer 1?
10
What is the disability category of Swimmer 2?
8
What is the disability category of Swimmer 3?
8
What is the disability category of Swimmer 4?
8
```

2.5.9 finalOutput

What it does *This is the next part of the core of the program. The system will take all the information entered by the user and stored so far, and will first add up the points of all team members to check if the team is legal to participate. It will then output a final statement that includes the name of the team, the total points and whether they are legal or not.*

Implementation (how it works) *A string variable is initialised to inform if the team is legal, along with an integer to store the total points of the team. We use accessor methods to set the country and points values of the team to the ones given as parameters. A for loop is initialised to add up all the points from the array and store them in the totalPoints variable. This variable is then checked against the maxPoints variable. If it exceeds maxPoints, then the team will not be*

legal and the string "not legal." will be stored in our string variable from earlier in the method. If totalPoints is less than or equal to maxPoints, then the team will be legal. A final output statement is printed to inform the user if the team is legal to participate.

[41]:
```
public static void finalOutput(paraRelayTeams team, String country, int[]␣
↪points, int maxPoints){ // Method to produce the final output after some␣
↪checks.
    String legalOrNot = "";
    int totalPoints = 0;

    setCountry(team, country);
    setPoints(team, points);

    for (int i = 0; i < points.length; i++) {
        totalPoints += points[i];
    }
    if (totalPoints <= maxPoints){
        legalOrNot = "legal.";
    } else {
        legalOrNot = "not legal.";
    }

    System.out.println("That " + country + " team has " + totalPoints + "␣
↪points so is " + legalOrNot);

}
```

Testing

[42]:
```
finalOutput(teamA, "GB", points, 34);
```

```
That GB team has 17 points so is legal.
```

2.5.10 Running the program

Run the following call to simulate running the complete program.

[43]:
```
paraRelayTeams swimTeam = new paraRelayTeams();
int maxPoints = inputInt("What is the classification (maximum points) of this␣
↪relay event? ");

questionLoop(swimTeam);
int[] points = getPoints(swimTeam);
String country = getCountry(swimTeam);

finalOutput(swimTeam, country, points, maxPoints);
```

```
What is the classification (maximum points) of this relay event?
34
```

```
What country is the team representing?
GB
What is the disability category of Swimmer 1?
10
What is the disability category of Swimmer 2?
8
What is the disability category of Swimmer 3?
8
What is the disability category of Swimmer 4?
8
That GB team has 34 points so is legal.
```

2.6 The complete program

This version will only compile here. To run it copy it into a file called initials.java on your local computer and compile and run it there.

[ ]:
```java
/* Jatinkumar Patel
 * 24/11/2020
 * Version 1
 * Program to inform the user whether a paralympic relay team is legal.
 */

import java.util.Scanner;

public class paraTeamChecker {
    public static void main(String[] args){
        paraRelayTeams swimTeam = new paraRelayTeams();
        int maxPoints = inputInt("What is the classification (maximum points)␣
↪of this relay event? ");

        questionLoop(swimTeam);
        int[] points = getPoints(swimTeam);
        String country = getCountry(swimTeam);

        finalOutput(swimTeam, country, points, maxPoints);
    }

    public static String inputString(String message){ // String input method to␣
↪allow for cleaner code.
        Scanner scanner = new Scanner(System.in);
        String textInput;

        System.out.println(message);
        textInput = scanner.nextLine();

        return textInput;
    }
```

```
   public static int inputInt(String message){ // Integer input method to␣
↪allow for cleaner code.
       Scanner scanner = new Scanner(System.in);
       int intInput;

       System.out.println(message);
       intInput = scanner.nextInt();

       return intInput;
   }

   public static String getCountry(paraRelayTeams team) { // Accessor method␣
↪for getting a country value
       return team.country;
   }

   public static String setCountry(paraRelayTeams team, String country){ //␣
↪Accessor method for setting country value.
       team.country = country;
       return team.country;
   }

   public static int[] getPoints(paraRelayTeams team){ // Accessor method for␣
↪getting points values.
       return team.points;
   }

   public static int[] setPoints(paraRelayTeams team, int[] points){ //␣
↪Accessor method for setting points values.
       team.points = points;
       return team.points;
   }

   public static void questionLoop(paraRelayTeams team){ // Method that takes␣
↪all the information that the user needs to enter
       int[] points = new int[4];
       String country = inputString("What country is the team representing? ");

       for(int i = 0; i < 4; i++){
           points[i] = inputInt("What is the disability category of Swimmer "␣
↪+ (i+1) + "? ");
       }

       setCountry(team, country);
       setPoints(team, points);
```

```
    }

    // Method to produce the final output after some checks.
    public static void finalOutput(paraRelayTeams team, String country, int[]␣
↪points, int maxPoints){
        String legalOrNot = "";
        int totalPoints = 0;

        setCountry(team, country);
        setPoints(team, points);

        for (int i = 0; i < points.length; i++) {
            totalPoints += points[i];
        }
        if (totalPoints <= maxPoints){
            legalOrNot = "legal.";
        } else {
            legalOrNot = "not legal.";
        }

        System.out.println("That " + country + " team has " + totalPoints + "␣
↪points so is " + legalOrNot);
    }
}

class paraRelayTeams {
    String country;
    int[] points;
}
```

END OF LITERATE DOCUMENT