Software Development 3
1 hour 50 mins
Continuous Assessment (26%)

Create a folder called CA1X000??? (Use your ID number). In NetBeans, create a new Project using this folder. At the end of the CA you must compress this folder and upload to Moodle.

Note: Marks will lost for incorrect upload.

In this exercise you are required to write a set of classes to store details about athletics races and athletes that take part. Make sure to read this test sheet fully before you start coding your solution.

You are required to write for a class called Race and an inner class called Athlete. To test your program you will need to write the code for a class called TestRace.

The requirements for each of the classes you need to create are documented below.

Race class (outer class)

The class has 3 member variables.
- distance (int)
- competition e.g. Olympics (String)
- a list of athletes (ArrayList)

Create a suitable constructor to initialize the 1st two member variables using a parameter list. The array list should also be initialized. The array list will be filled by a call to a method addRunner().

Create a addRunner() method that takes the athlete details in from a text file called data.txt. Create athlete objects and adds them to the array list. Create a file data.txt with the following data:

    Usain Bolt,Jamaica,9.2,9.3,9.4
    Maurice Green,USA,10.1,10.4,10.5
    Tyson Gay,USA,10.9,10.8,9.8

Create a calculateFavourite() method that returns a string containing the name, country and average race time for the athlete who is favourite to win the race. The athlete with the lowest average race time is the favourite. The average race time is calculated in a method in the inner class.

Create a toString() method to display appropriate details for the class along with the average race time as shown in the sample output.

Athlete class (inner class)

You need to declare the following 3 member variables for the inner class.
- name (String)
- country (String)
- times (array of type double to hold the best 3 times the athlete has ran)

Create a suitable constructor to initialize all member variables using a parameter list.

Create a calcAverage() method that calculates and returns the average race time (double) for the athlete.

Create a toString() method to display appropriate details for the class.

TestRace class

Create and initialize just one Race object reference as follows:
    Race r = new Race(100, "Olympics 2017");

Call on the method toString() and calcFavourite() to display the output as shown below

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Sample output:

Race: Olympics 2017   Distance: 100m

Athlete Name: Usain Bolt
Country: Jamaica
Time1: 9.2   Time2: 9.3   Time3: 9.4
Average race Time: 9.30

Athlete Name: Maurice Greene
Country: USA
Time1: 10.1   Time2: 10.4   Time3: 10.5
Average race Time: 10.33

Athlete Name: Tyson Gay
Country: USA
Time1: 10.9   Time2: 10.8   Time3: 9.8
Average race Time: 10.50

The favourite for race is: Usain Bolt from Jamaica. Average Time: 9.30