

OOP Home Assignment - 2

Focus of the assignment:

1. To test your ability to come up with most appropriate class(regular, abstract, enum, interfaces) structure.
2. To test your ability to identify the task definition to be run by Java thread.
3. To test your ability to create and run Independent threads.
4. To test your ability to provide task definition to a thread in appropriate way.
5. To test your ability to collate the results of task finished by different threads.

Background:

1. A **triathlon** is a multiple-stage competition involving the completion of three continuous and sequential endurance disciplines. Its most popular form, involves swimming, cycling and running in immediate succession over various distances.
2. The track for triathlon system has three sub systems:
 - a. RunningSection that considers each participant as Runner and has its length as property
 - b. SwimmingSection that considers each participant as Swimmer and has its length as property
 - c. CyclingSection that considers each participants as Cyclist and has its length as property
3. Every athlete participating has these capabilities:
 - a. When he is runner:
 - i. he should be able to tell his
 - LeapCoverage: Ability to cover X amount of distance in one leap.
 - LeapFrequency: Ability to put X number of leaps per minute.
 - ii. He would cover running section of the track.
 - b. When he is cyclist
 - i. he should be able to tell his
 - PedalFrequency: Ability to apply X number of pedal revolutions per minute.
 - ii. He would cover cycling section of the track
 - c. When he is swimmer:
 - i. he should be able to tell his
 - StrokeFrequency: Ability to put X number of swimming strokes per minute.
 - StrokeCoverage: Ability to cover X amount of distance in one stroke.
 - ii. He would cover swimming section of the track
4. Every participant should cover each of the three sections as per his ability.
 - Running section: Length x
Runner would keep running till summation of each LeapCoverage becomes greater than or equal to the length of running section. Then time taken by runner to complete this section is calculated by number of leaps divided by LeapFrequency.
 - Swimming section: Length x
Swimmer would keep swimming till summation of each StrokeCoverage becomes greater than or equal to the length of swimming section. Then time taken by swimmer to complete this section is calculated by number of strokes divided by the StrokeFrequency.

- Cycling section: Length x
Cyclist would keep cycling till summation of the distance covered by the bicycle in each pedal becomes greater than or equal to the length of cycling section. Then time taken by cyclist to complete this section is calculated by number of pedals divided by the PedalFrequency. Cycle would have property to cover distance in one pedal, you can hard code this for every participant. It is like giving same kind of cycle to every participant.

Problem

In this assignment you have to simulate a triathlon race with:

1. Create 10 racers and one track with three sections. Every racer would have name and contestant Id as properties. same track would be passed to every racer.
2. Every track section would have a random length value between any assumed min and max limit. eg (any random between 1000 to 4000 fts).
3. Print Track Details:
Ex: SectionType Section Length
 Running 10000 ft.
 .
 .
4. Print racer details
Ex: name, id, Leap Coverage, Leap Frequency , Stroke Coverage, Stroke Frequency, Pedal Frequency. Bicycle coverage(in one pedal)
5. During the preparation phase of the race:
 - a. Every participant would receive the track object .
 - b. One thread for each participant would be created. Such thread would get its task definition from the participant.
6. At the start of the race, all thread would start. Each thread would cover every section of the track as per rules given in Point 4 of Background.
7. Once all threads are finished, each track section would call every participant in the format described in Point 2 of Background to calculate time taken to cover it. Time calculation is explained in Point 4 of the Background.
8. In the end performance of the participant would be displayed in tabular fashion sorted with respect to total time ascending order.
Ex.
Name, Cont. Id, Total time, Running Time, Swimming time, Cycling time.