

201x AP[®] COMPUTER SCIENCE A FREE-RESPONSE QUESTIONS

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COMPUTER SCIENCE A

SECTION II

Time—~~1 hour and 30 minutes~~

(25 minutes only!)

Directions: SHOW ALL YOUR WORK. REMEMBER THAT PROGRAM SEGMENTS ARE TO BE WRITTEN IN JAVA.

Notes:

- Assume that the classes listed in the Quick Reference found in the Appendix have been imported where appropriate.
- Unless otherwise noted in the question, assume that parameters in method calls are not null and that methods are called only when their preconditions are satisfied.
- In writing solutions for each question, you ~~may~~ **SHOULD** use any of the accessible methods that are listed in classes defined in that question. Writing ~~significant~~ **ANY** amount of code that can be replaced by a call to one of these methods ~~may not~~ **WILL NOT** receive full credit!

Mr. Lee's additional notes to think about:

*Answer in space provided below or write out answers on **UNLINED** copy paper – not notebook paper.

****Why?**

Because your AP exam will not have lined pages and you need practice indenting and writing legibly on blank paper!

*****Remember:**

Grading the free response portion of your AP exam is a “human process” so be sure to write legibly and exhibit good indentation! Teachers are grading your responses – not machines.

******Also Remember:**

- Maximize your exam results by going after “low hanging fruit” if you find difficulties answering any question.
- Circle questions that give you great difficulty and come back to them.
- Simply adding a correct “return” statement in an accessor method provides a full point even if you have no idea how to solve the rest.
- If a question has parts A, B, and C and you know you’ve blown part A, don’t get discouraged. Treat parts B and C as if part A is correct and move on.
- Always “invoke” the method available whether it exists as part of the question or as part of your previous answer. **NEVER** rewrite code that you’ve already written.
- Lastly, if you feel overwhelmed... Close your eyes. Take 3 deep breaths. Begin again. You will do just fine!

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2. This question involves the implementation of a fitness tracking system that is represented by the `StepTracker` class. A `StepTracker` object is created with a parameter that defines the minimum number of steps that must be taken for a day to be considered *active*.

The `StepTracker` class provides a constructor and the following methods.

- `addDailySteps`, which accumulates information about steps, in readings taken once per day
- `activeDays`, which returns the number of active days
- `averageSteps`, which returns the average number of steps per day, calculated by dividing the total number of steps taken by the number of days tracked

The following table contains a sample code execution sequence and the corresponding results.

Statements and Expressions	Value Returned (blank if no value)	Comment
<code>StepTracker tr = new StepTracker(10000);</code>		Days with at least 10,000 steps are considered active. Assume that the parameter is positive.
<code>tr.activeDays();</code>	0	No data have been recorded yet.
<code>tr.averageSteps();</code>	0.0	When no step data have been recorded, the <code>averageSteps</code> method returns 0.0.
<code>tr.addDailySteps(9000);</code>		This is too few steps for the day to be considered active.
<code>tr.addDailySteps(5000);</code>		This is too few steps for the day to be considered active.
<code>tr.activeDays();</code>	0	No day had at least 10,000 steps.
<code>tr.averageSteps();</code>	7000.0	The average number of steps per day is (14000 / 2).
<code>tr.addDailySteps(13000);</code>		This represents an active day.
<code>tr.activeDays();</code>	1	Of the three days for which step data were entered, one day had at least 10,000 steps.
<code>tr.averageSteps();</code>	9000.0	The average number of steps per day is (27000 / 3).
<code>tr.addDailySteps(23000);</code>		This represents an active day.
<code>tr.addDailySteps(1111);</code>		This is too few steps for the day to be considered active.
<code>tr.activeDays();</code>	2	Of the five days for which step data were entered, two days had at least 10,000 steps.
<code>tr.averageSteps();</code>	10222.2	The average number of steps per day is (51111 / 5).

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Write the complete `StepTracker` class, including the constructor and any required instance variables and methods. Your implementation must meet all specifications and conform to the example.