Practice: Tracing Object Creation and Method Execution

1 Problems

Imagine that you are creating a new smartphone application for helping people manage their fitness goals. You would need to track activities (running, swimming, etc), clients (people with fitness goals), and specific workouts (an activity done for a certain period of time). Among other things, your app would need to help check whether a proposed collection of workouts would meet a client's fitness goals.

In this set of exercises, we aren't asking you to write code. Instead, we are going to ask you several questions about how the program runs, which objects get created, and how those objects can be referenced and used. You may wish to work this on paper, keeping in mind the four areas of our memory map.

The classes we have designed for this make some assumptions to keep things simple (for example, that everyone would burn the same calories per hour of an activity). You can grab the classes either as a single file containing all classes (to browse or print), or as a zip of separate files (to load into Eclipse), using one of the following links:

`http://cs.brown.edu/courses/csci0180/content/practice/04ActivityAll.java`

`http://cs.brown.edu/courses/csci0180/content/practice/04tracing.zip`

Within the file, you will see several comments of the form

```
// **** THIS IS POINT X IN THE EXERCISE ****
```

The questions below will sometimes ask you about a specific numbered point based on these labels.

1. Assume Java has compiled the package, but not yet run the `main` method in `ActivityTest`. Which classes, objects, and names are in the memory map at this point?
2. Assume Java has compiled the package and executed the `new ActivityTest()` expression in the `main` method, but not yet run any of the tests. Which classes, objects, and names are in the memory map at this point?
3. When would Java reach/execute the line marked "POINT 2" in the file? (During compilation, after starting to run the `main` method, after evaluating a specific expression–if so, which one, etc)
4. Next, Java begins running the `testWorkout1` test:
   - What is the sequence (in order) of calls to `new`, calls to methods, and arithmetic computations that get performed while evaluating the first argument to `checkExpect`?
   - When execution gets to the point marked "POINT 1" (in `Client.java`), which classes, objects, and names are in the memory map?
   - When the expression finishes (and the call to `checkExpect` is about to begin, which classes, objects, and names are in the memory map?

2 Answers

`http://cs.brown.edu/courses/csci0180/content/practice/04tracing-sols.pdf`

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