Task 3.2P Answer Sheet

Name:
Student ID:

1. In 2.2P, how many Counter objects were created?

Two were created.

2. Variables declared without the “new” keyword are different to the objects created when we call “new”. Referring to the main method in task 2.2P, what is the relationship between the variables initialised with and without the “new” keyword?

Instances of objects are generated when variables are initialized using the "new" keyword. These variables maintain connections to distinct instances, each with its individual state. In contrast, variables initialized without the "new" keyword merely grasp references to pre-existing objects. They don't instigate the creation of fresh instances; rather, they indicate the same instance as another variable.

3. In 2.2P, explain why resetting the counter in myCounters[2] also changed the value of the counter in myCounters[0].

Both myCounters[0] and myCounters[2] are indicative of a singular instance of the Counter object. Invoking the reset() method on myCounters[2] leads to an alteration in the state of this shared instance, thereby impacting the counter value for both variables.

4. The key difference between memory on the heap and memory on the stack is that the heap holds “dynamically allocated memory”. What does this mean? In your answer, focus on the size and lifetime of the allocations.

Memory allocated in a dynamic manner pertains to memory that is reserved during runtime, as exemplified by the utilization of the new keyword. Heap-based memory allocation serves the purpose of accommodating objects whose dimensions and duration of existence remain flexible (as opposed to basic entities like integers or booleans). This approach facilitates the dynamic administration of memory, enabling the creation and removal of objects in accordance with requirements. This stands in juxtaposition to stack memory, which is allocated statically with a predetermined size established during compilation.

5. Are objects allocated on the heap or the stack? What about local variables?

Objects are generally larger and longer lived pieces of data and therefore live on the Heap, while local variables are previously mentioned live in the Stack.

6. What does the new() method do when called for a particular class, and what does it return?

   The new() function (or the new keyword) serves the purpose of instating a fresh occurrence of a class. This operation involves designating memory space for the object on the heap, initializing its attributes, and furnishing a reference to the recently formed object.

7. Assuming the class Counter exists in my project, if I wrote the code "Counter myCounter;" (note there is no "="), what value would myCounter have? Why?

C# allows the user to declare variables without giving them an express value, with it defaulting automatically to equalling null. This makes the language easier to use and more predictable to users.

8. Based on the code you wrote in task 2.2P, draw a diagram showing the locations of the variables and objects in main and their relationships to one another.