Task 3.2P Answer Sheet

Name:
Student ID:

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

The new keyword initialize a new object into the heap, where the location is initialized. Meanwhile variables declared without the new method, are having the same location copied.

3. In 2.2P, explain why resetting the counter in myCounters[2] also changed the value of the counter in myCounters[0].
   myCounter[2] is initialized with “= myCounters[0]” implying that it has the same location on the heap as myCounters[0]. Therefore when myCounter[0] was reset, it also reset myCounter[2].

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.

Stack memory size is very less when compared to Heap memory. Heap memory is accessible or exists as long as the whole application(or java program) runs unlike stack memory which is limited to the scope of individual functions or blocks. It is also worth noting that, the drawback of this is that Heap memory not as threaded-safe as Stack memory because data stored in Heap-memory are visible to all threads. In summary, dynamically allocated memory on the heap allows for flexible allocation and deallocation of memory at runtime, with variable sizes and lifetimes that are not tied to the scope of a function or block.

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

Objects are a reference type, therefore it is located on the heap. Local variable are value type therefore it exist on the stack.

6. What does the new() method do when called for a particular class, and what does it return?
   When the new keyword is used with a class name followed by parentheses, it invokes the class's constructor.

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?

It would be null since it was initialized but not assigned a value

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.