Task 3.2P Answer Sheet

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1. In 2.2P, how many Counter objects were created?
   There were 2 counter objects.

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?
   Variables that were declared using the new keyword guarantees that a new object will be created and a new memory location will be allocated in the heap memory. In contrary, variables that aren't declared using the new keyword will use an existing object in the heap.

3. In 2.2P, explain why resetting the counter in myCounters[2] also changed the value of the counter in myCounters[0].
   Because both of them are referring to the same object, which is myCounter[0].

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.
   The stack is generally smaller in size than the heap because it is used for storing small temporary variables and data, while the heap is used for storing larger objects. Whenever a function is called, it's variables get memory allocated on the stack. And whenever the function call is over, the memory for the variables is de-allocated.

5. Are objects allocated on the heap or the stack? What about local variables?
   Objects of reference type variables always live on the heap, while local variables (those that are declared inside methods) are stored on the stack.

6. What does the new() method do when called for a particular class, and what does it return?
   It creates a new object using the blueprint of that particular class and allocates a memory for it on the heap. Returning the references to the 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?
   It would be null, because the variable hasn't been assigned any value yet and it's only been initialized with the type "Counter".

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.