Task 3.2P Answer Sheet

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1. In 2.2P, how many Counter objects were created?
   There are 2 Counter objects: myCounters[0] and myCounters[1] with 1 reference which is myCounters[2].

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?
   By using new in initialising variable, we are creating a new object, and for the variable initialised without using new keyword, we are simply referring it to created variables.

3. In 2.2P, explain why resetting the counter in myCounters[2] also changed the value of the counter in myCounters[0].
   Because both myCounters[2] and myCounters[0] are referring to the same object in the Counter object. Any changes made through one reference will also affected the other one.

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.
   Heap holds dynamically allocated memory meaning that it allocates memory for data and variables at runtime when the program requests it, the memory size can be changed unlike static memory allocation – which is Stack memory allocation type. Heap has no fixed size, meaning it can store unlimited amount of data and the object is not depended on any particular function so it can live as long as it needs. Stack is limited in size, meaning it can only store a fixed amount of data and the variables lifetime depends on the functions in which the variable is created.

5. Are objects allocated on the heap or the stack? What about local variables?
   Objects should be stored in heap because by using heap, the object is globally accessible and it can store a larger, more long-lived objects.
   Local variables are stored in stack because this particular type of variables depend on the respective functions, can only be accessed by its own functions or functions called by that function, which is more short-lived, has a fixed size.

6. What does the new() method do when called for a particular class, and what does it return?
   When the new() method is called, it will create a new instance for that particular class, allocates the memory on the heap, evokes the constructor of the class, then

initialises the new object. This method does not return anything, instead it returns the reference for the object's location.

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?

   If we wrote the code Counter myCounter only, it would return a null value. When the object is only declared and not initialised, the variable will be assigned the default value of its type. In this case, it's null.

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.