Task 3.2P Answer Sheet

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

Two counter objects were created, and an array was created to contain references to these counter objects.

6. 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?

Objects that are instantiated and initialized using the "new" keyword are provided with values chosen by the programmer, whereas variables defined without the "new" keyword are initialized without a default value. When the "new" keyword is utilized, the program reserves a portion of memory on the heap in order to allocate storage for the variable that will contain the object or array.

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

The reason for the simultaneous change in values of both indexes in an array is due to the fact that the index of the array only serves as a reference to the value stored in the heap. Consequently, when the value in the heap is modified, this change is reflected in both indexes.

8. 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 memory in the C# programming language is allocated dynamically during runtime and its lifespan is governed by the garbage collector. On the contrary, stack memory is assigned during the compilation phase, possesses a predetermined size, and its lifespan is dictated by the scope of the function or block in which the allocation was executed.

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

Objects are consistently allocated on the heap, irrespective of their creation. The "New()" keyword can be utilized either alone or as a component of an array.Local variables, in contrast, are assigned. In computer programming, a stack is a data structure that may hold either a value type or a reference to an item located in the heap.The user's text should be rewritten to adhere to academic standards.

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

The "New()" method refers to a constructor that does not require any parameters and is used to instantiate a new object of a certain class. Upon invocation, the process of memory allocation for the object on the heap, initialization of its fields with their respective default values, and subsequent return of a reference to the newly created instance takes place. Subsequently, the newly created instance may be utilized to invoke methods and get its attributes.The user's text should be rewritten to adhere to academic standards.

11. 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?

In the C# programming language, it is a common practice to provide a default value of null to a variable of a reference type, such as classes, when it is declared without being initialized or assigned a specific value. Given that "Counter" is a class, the object "myCounter" will be instantiated with a null reference until it is assigned a real instance of the "Counter" class.

12. 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.