Swinburne University of Technology

COS20007 Object Oriented Programming

3.2P - The Stack and Heap

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Task 3.2P Answer Sheet

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

2 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?

New keyword creates a new instance of the Counter class the variables initialised without the new keyword

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

This is because we declared that myCounters[2] = myCounters[0]. By Resetting myCounters[2] we are also resetting myCounter[0] as they hold the same value.

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.

Dynamically allocated memory means that memory is allocated at runtime of the programmed and the size of the allocations can vary since it presumed that the amount of memory for the program to run is unknown and can be changed.

Memory on the stack is allocated before the program has begun or compile time when the a function is called a set amount of memory is allocated to a variable and when the variable is no longer or out of scope in use it is popped off the stack.

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

Objects are allocated heap.
Local variables are located on the stack.

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

The new method creates an instance of a particular class it returns a reference to the new object that was created and can then be assigned a variable.

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?

myCounter would have a null value until you assign it a value since this instruction only allocates memory to the new object.

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.