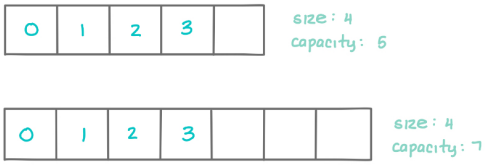
1. Explain the difference between an array size and capacity [0.2 pts]

   Array size is the number of elements stored in an array, while array capacity is the largest number of elements an array can hold without needing to allocate more space in memory.

2. What happens when an array needs to grow beyond its current capacity? Explain and produce a diagram showing the memory layout before and after expansion

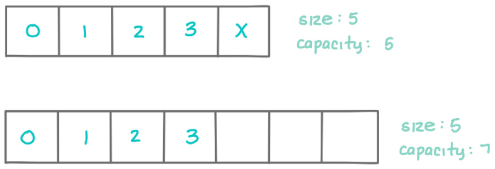
   a. First, consider the case where there is space in memory after the end of the array [0.3 pts]

      If there is space at the end of an array and the array is to be resized, the array can simply be expanded in place to accommodate more elements.



   b. Then, consider the case where the memory after the end of the array is occupied by another variable. What happens in that case? [0.3 pts]

      If an array is to be resized and the end of the array is occupied by another variable, the array is copied into a larger block in memory so more space can be allocated. Then, the new array is expanded, and the old array is deallocated from memory.



3. Discuss one or more techniques real-world array implementations use to amortize the cost of array expansion [0.2 pts]

   One technique that is used by some implementations is to allocate more space than what is required during every expansion. This way, the number of reallocations and deallocations of old arrays is reduced.