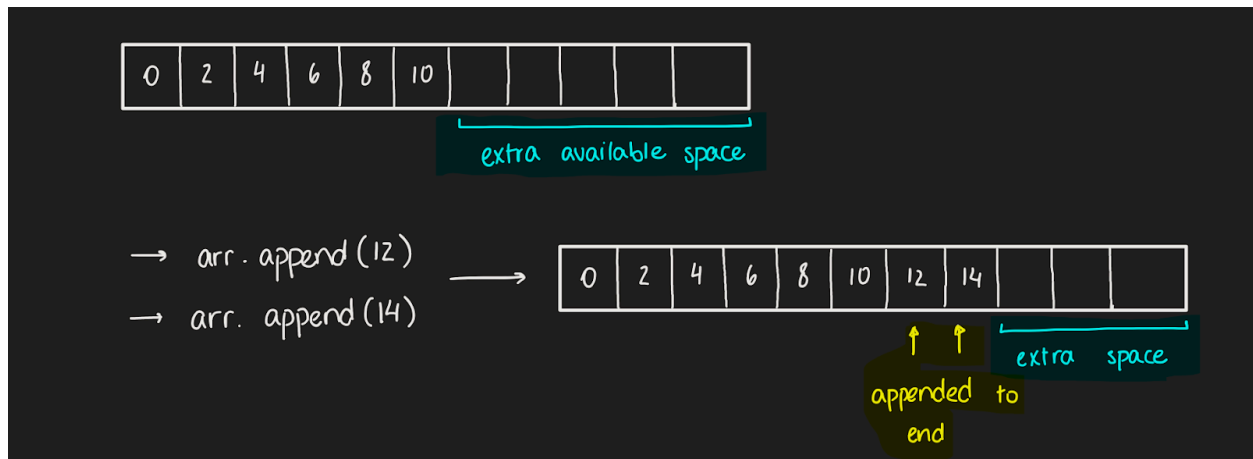
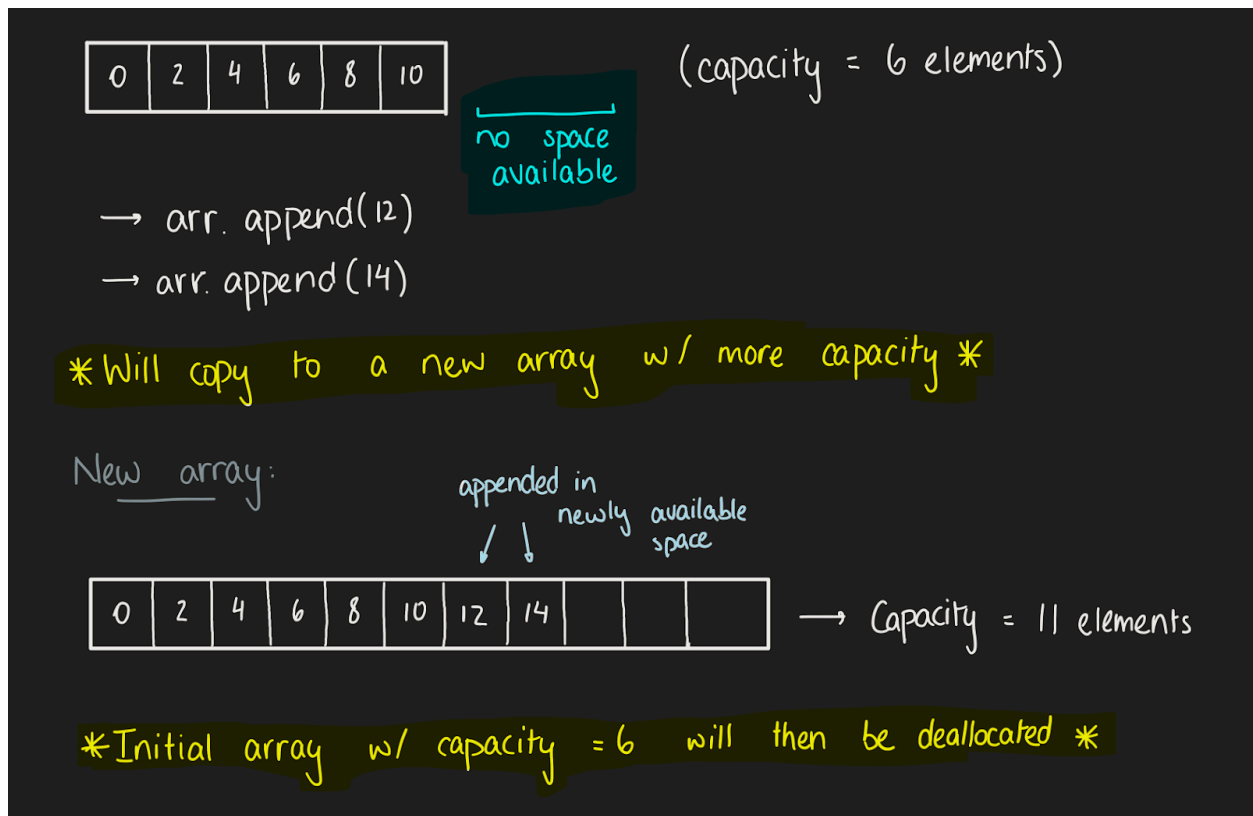


1. The difference between array size and capacity is that array size is the amount of space allocated in memory for the array, while array capacity is the max number of elements that can be held by the array.
2. When growing an array, the memory layout will appear different depending on whether or not there is space available beyond the current end of the array.
  - a. When the array has available capacity, the interpreter will simply append the additional elements to the end of the array in the appropriate space:



- b. When there is no available space in memory beyond the current end of the array, the interpreter will copy the elements into an array with greater capacity, then deallocate the memory taken by the initial array:



3. One method used by various languages is to use a “growth factor” when growing arrays in order to account for the potential of future growth. This method grows the array a certain amount past what is needed in order to avoid the performance cost of repeatedly copying and deallocating the array if/when more elements are added. For example, Java vectors have a growth factor of 2, which will double the size of a full array when new elements are appended and new memory must be allocated. This will reduce the cost of any future appends, but does have the potential to waste memory if no new elements are added.