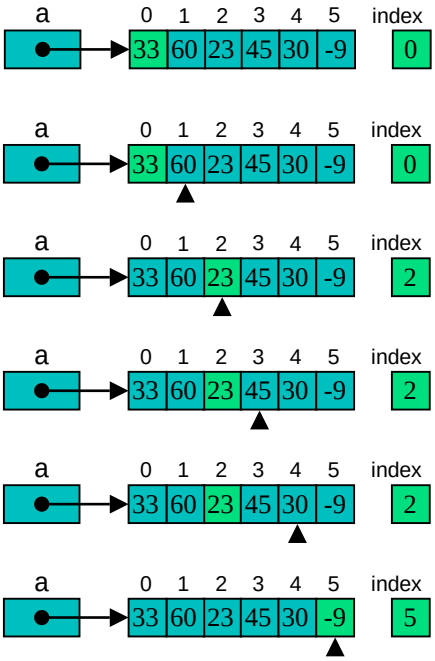
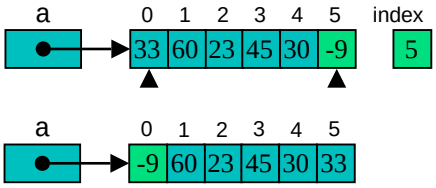
Unit 6 Document – Selection Sort

In this lesson, we learn the algorithm called *selection sort*. This document will describe the selection sort algorithm that will sort an array in ascending order, and will sort the array starting from left, moving through to the right.

The algorithm starts by saving the index of the front element of the array in an integer variable. Let us label the variable: `index`. This represents the index of the smallest element found so far. It then progresses through the rest of the elements. If an element is found that is smaller than the one at the location of `index`, we store the new index in `index`. To the right is the diagrammatic representation of the algorithm to find the smallest element of the array. The arrow represents the loop counter, and the lime green (lighter shade) represents the index of the smallest element found, and the value at that index.



At this point, if the index we saved, `index`, is not the index at the front of the array, we swap the element to the front of the array.



As you can see from the diagram to the right, if we repeat this process with the remainder of the array (without the first element), we will have the two smallest elements at the start of the array.

To complete the selection sort algorithm, the outer loop will loop from the first element until the penultimate (second-to-last) element, and within each iteration of the loop, the inner loop searches for the smallest element in the remaining array, and if it's not already the front element, we swap it with the front element. We do not require the outer loop to continue until the final element because when we perform the search for the smallest element with two elements remaining, the last two elements will be sorted appropriately.