RECITATION 9

Q1. Write a program with functions.

- In the main function, an array of 10 integers is declared.
- A first function reads the 10 integers and stores them in the array.
- A second function swaps the first integer with the minimum value present in the array. Swapping must be done in the same array, without using a second array. Using an extra auxiliary variable is allowed. All other numbers need to stay in their original places.
- A third function prints the array after swapping.

Hint: The type of searching used in the second function to find the minimum value in the array can be Linear Search. Linear Search involves traversing through each element of the array one by one, comparing each element with the current minimum (or maximum, depending on the search goal). In this case, the algorithm loops through the array to find the index of the minimum value, making it a linear search for the smallest value.

Q2. Bubble sort is another method used to order arrays. It is an algorithm that repeatedly steps through the list to be sorted. In each pass, each pair of adjacent items is compared and swapped if they are in the wrong order. If, for instance, ordering from smallest to largest is needed, the biggest element will end up at the end of the list after the first pass. The algorithm, is named for the way bigger elements "bubble" to the end of the list. The next pass can stop a bit sooner (the last element is already in place). How many passes are needed? Can you stop sooner? Write a program, with functions, that orders a list of numbers using the bubble sort method.

Hint: The Bubble Sort algorithm requires at most n - 1 passes to sort an array of size n. However, if no elements were swapped during a pass, the algorithm can stop early, as the array is already sorted. This is an optimization called the early termination of Bubble Sort.

Q3. Use bubble sort to order a list of names.

Q4. Write a sorting program that

- reads an integer.
- reads a next integer and put it in the correct place in the list.
- repeats step 2 until all numbers are read.
- prints the final list.

This method is called insertion sort. The idea behind this sorting method is to take one element at a time from the unsorted part of the list and insert it into the correct position in the sorted part.