Mounir Salam

ID: 201903183

Sorting Algorithm User Manual:

Main Screen:

Contains 5 sorting algorithms and an extra useless button, each algorithm will take the user to the sorting screen.

Sorting Screen:

Includes:

* Array of six integers (top).
* Explanation panel (middle left).
* The code of the algorithm being visualized (middle right).
* Navigation panel, with “next” and “Exit” buttons (bottom).

Each algorithm has its own way of visualizing the sorting process (See next section).

Selection Sort:

* Starts with a brief explanation on how the algorithm works.
* During the sorting process:
  + Explanation is provided with every step.
  + A white border around a value in the array is the value being examined. (Current Index)
  + A red colored value is the minimum value among all numbers between the current index (inclusive) and the sorted sub-array (exclusive).
  + Sorted sub-array: characterized by the green region of the array (untouched).
* Ends with a sorted array, and the time complexities of this algorithm.

Insertion Sort:

* Starts with a brief explanation on how the algorithm works.
* During the sorting process:
  + Explanation is provided with every step.
  + A white border around a value in the array is the value being examined. (Current Index)
  + A red colored value indicates that this value is not in the correct position and needs to be swapped with the green value.
* Ends with a sorted array, and the time complexities of this algorithm.

Bubble Sort:

* Starts with a brief explanation on how the algorithm works.
* During the sorting process:
  + Explanation is provided with every step.
  + Two adjacent white borders are the values being compared with one another.
  + If the values are red, indicates that they are not in the correct position and need to be swapped.
  + Sorted sub-array: characterized by the green region of the array (untouched).
* Ends with a sorted array, and the time complexities of this algorithm.

Shell Sort:

* Starts with a brief explanation on how the algorithm works.
* During the sorting process:
  + Explanation is provided with every step.
  + An index highlighted by a thick red line is the gap by which every value to the left of this gap should be made smaller than the value at that gap, and every value to the right should be made greater.
  + An empty index refers to the value stored in the temp variable for comparison with the rest of the array.
  + A red value, indicates that it is not in the correct position and need to be placed at the empty index. Unlike a green value which indicates that the value does not need to change its position.
* Ends with a sorted array, and the time complexities of this algorithm.

Quick Sort: (Note this algorithm is recursive, so an old pivot will reappear)

* Starts with a brief explanation on how the algorithm works.
* During the sorting process:
  + Explanation is provided with every step.
  + The yellow value is the current pivot, where everything to its left and right will be quick sorted.
  + Indices with red borders are swapped (note that one red value may be compared to itself based on “I” and “j”).
  + Index with green border indicate that this value is greater than the pivot and no action is made.
  + A blue range of numbers is the array/subarray being sorted.
* Ends with a sorted array, and the time complexities of this algorithm.