

Sorting Algorithm – Selection Sort

Selection sort first finds the largest value and places it at the top of the list, swapping it with the item that was originally in this position. In subsequent passes, it finds the largest value in the remaining list and places it at the top of that list. It continues until the entire list is examined and sorted.

Note that in selection sort, unlike insertion sort, once an item has been placed in its position in the partially sorted list, it is never moved again.

Suppose the following list is to be sorted in ascending order. The algorithm finds the largest element, 42, and swaps it with 26, the element at the top of the list.

25	9	11	31	23	2	42	15	26
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After the first pass, the top one item is in the correct position (a sorted list of size 1).

25	9	23	31	11	2	26	15	42
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Next, the algorithm finds the largest element in the remaining unsorted list, 31, and swaps it with 15, the element at the top of the unsorted list.

25	9	23	31	11	2	26	15	42
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After the second pass, the top two items are in the correct position (a sorted list of size 2).

25	9	23	15	11	2	26	31	42
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In subsequent passes, the largest value of the remaining unsorted list is identified and swapped with the item in the top of that list.

25	9	23	15	11	2	26	31	42
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2	9	23	15	11	25	26	31	42
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2	9	11	15	23	25	26	31	42
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2	9	11	15	23	25	26	31	42
2	9	11	15	23	25	26	31	42
2	9	11	15	23	25	26	31	42

Implementation

The implementation of selection sort successively find the largest item in a list of size starting `L.length`, then sublists of sizes `list.length-1`, `list.length-2`, etc, The outer loop loops through the upper bound of the sublists and the inner loop finds the maximum (or minimum) value of the sublist.

```
selectionSort(List L)
  for upperbound equals L.length-1 down to 1
    set maxIndex to item at 0
    for each item x in the list from index 0 to upperbound
      if x is greater than item at index maxIndex
        set maxIndex to index of x
    swap item at maxIndex with item at upperbound
```