Exercises: Sorting - solutions

Exercise 1

a. Sort the sequence 3, 1, 4, 1, 5, 9, 2, 6, 5 using insertion sort. Note, you must be able to account for any state of the sorting algorithm.

For solutions, go to this website and insert the array.

b. What is the running time of insertion sort if all elements are equal? Explain.

O(N), because the while loop terminates immediately.

Exercise 2

Sort 3, 1, 4, 1, 5, 9, 2, 6, 5, 3, 5 using mergesort. Note, you must be able to account for any state of the sorting algorithm.

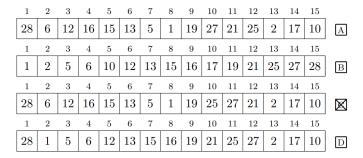
For solutions, go to this website and insert the array.

Exercise 3

Do exercises 1a and 2 for Bubble Sort, i.e. do Bubble Sort using those arrays. For solutions, go to this website and insert the array.

Exercise 4

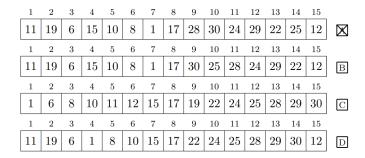
State the result of using Partition(A, 2, 12) on the array above.



Exercise 5



State the result of using Partition(A, 4, 14) on the array above.

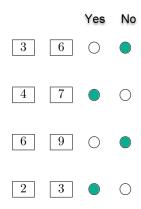


Exercise 6

Assume we are using ${\tt MERGE-SORT}$ to sort the following array:

1	2	3	4	5	6	7	8
3	7	1	2	8	9	4	6

For each of the pair of elements, determine whether MERGE-SORT applied to the above array will compare the two elements when executing.



Exercise 7

Sort 3, 1, 4, 1, 5, 9, 2, 6, 5, 3, 5 using quicksort.

We only track changes here in the solution:

3	1	4	1	5	9	2	6	5	3	5
3	1	4	1	5	2	9	6	5	3	5
3	1	4	1	5	2	5	6	9	3	5
3	1	4	1	5	2	5	3	9	6	5
3	1	4	1	5	2	5	3	5	6	9
3	1	1	4	5	2	5	3			
3	1	1	2	5	4	5	3			
3	1	1	2	3	4	5	5			
1	3	1	2							
1	1	3	2							
1	1	2	3							
1	1	2	3	3	4	5	5	5	6	9