

Sorting Olympics Quiz

ANSWER KEY

1. Use Selection Sort to sort the following numbers in ascending order:

10 8 1 3 9 6 5

Write the array contents on individual lines after each iteration of the algorithm (like in class). Use a bar marker, like |, to keep track of the sorted portion of the array. Note any changes that occurred during the iteration.

```
| 10 8 1 3 9 6 5
1 | 8 10 3 9 6 5 (swap indices 1 and 3)
1 3 | 10 8 9 6 5 (swap indices 2 and 4)
1 3 5 | 8 9 6 10 (swap indices 3 and 7)
1 3 5 6 | 9 8 10 (swap indices 4 and 6)
1 3 5 6 8 | 9 10 (swap indices 5 and 6)
1 3 5 6 8 9 | 10
1 3 5 6 8 9 10 |
```

2. Use Insertion Sort to sort the following letters in alphabetical order:

i n s e r t i o n

Write the array contents on individual lines after each iteration of the algorithm (like in class). Use a bar marker, like |, to keep track of the sorted portion of the array. Note any insertions that occurred during the iteration.

```
| i n s e r t i o n
i | n s e r t i o n (insert i at index 1)
i n | s e r t i o n (insert n at index 2)
i n s | e r t i o n (insert s at index 3)
e i n s | r t i o n (insert e at index 1)
e i n r s | t i o n (insert r at index 4)
e i n r s t | i o n (insert t at index 6)
e i i n r s t | o n (insert i at index 1)
e i i n o r s t | n (insert o at index 5)
e i i n n o r s t | (insert n at index 4)
```

3. Use Merge Sort to sort the following numbers in ascending order:

-1 4 2 3 -3 0

Show the merges and splits by inserting and removing bar markers, like |, to denote array partitions. Each merge and partition should be shown individually and markers should be numbered in the order they are added. Don't show the individual steps inside a merge, just what was merged and the result (as we did in class). Remember to only merge the number of things the algorithm would do (don't skip steps). Odd sized arrays should be partitioned with the odd element in the left partition.

```

-1 4 2 3 -3 0
-1 4 2 |1 3 -3 0      (split |1)
-1 4 |2 2 |1 3 -3 0  (split |2)
-1 |3 4 |2 2 |1 3 -3 0 (split |3)
-1 4 |2 2 |1 3 -3 0  (merged |3)
-1 2 4 |1 3 -3 0      (merged |2)
-1 2 4 |1 3 -3 |4 0  (split |4)
-1 2 4 |1 3 |5 -3 |4 0 (split |5)
-1 2 4 |1 -3 3 |4 0  (merged |5)
-1 2 4 |1 -3 0 3      (merged |4)
-3 -1 0 2 3 4          (merged |1)

```