CSC108H Worksheet: Sorting Algorithms

For each of the following functions, indicate the runtime with respect to the given quantity.

1. The list [4, 2, 5, 6, 7, 3, 1] is shown below after each pass of a sorting algorithm:

```
[1, 2, 5, 6, 7, 3, 4]
[1, 2, 5, 6, 7, 3, 4]
[1, 2, 3, 6, 7, 5, 4]
[1, 2, 3, 4, 7, 5, 6]
[1, 2, 3, 4, 5, 7, 6]
[1, 2, 3, 4, 5, 6, 7]
[1, 2, 3, 4, 5, 6, 7]
```

Which sorting algorithm is being executed?

(a) bubble sort
(b) selection sort
(c) insertion sort

2. The list [4, 2, 5, 6, 7, 3, 1] is shown below after each pass of a sorting algorithm:

```
[2, 4, 5, 6, 3, 1, 7]
[2, 4, 5, 3, 1, 6, 7]
[2, 4, 3, 1, 5, 6, 7]
[2, 3, 1, 4, 5, 6, 7]
[2, 1, 3, 4, 5, 6, 7]
[1, 2, 3, 4, 5, 6, 7]
```

Which sorting algorithm is being executed?

(a) bubble sort
(b) selection sort
(c) insertion sort

3. The list [4, 2, 5, 6, 7, 3, 1] is shown below after each pass of a sorting algorithm:

```
[4, 2, 5, 6, 7, 3, 1]
[2, 4, 5, 6, 7, 3, 1]
[2, 4, 5, 6, 7, 3, 1]
[2, 4, 5, 6, 7, 3, 1]
[2, 4, 5, 6, 7, 3, 1]
[2, 3, 4, 5, 6, 7, 1]
[1, 2, 3, 4, 5, 6, 7]
```

Which sorting algorithm is being executed?

(a) bubble sort
(b) selection sort
(c) insertion sort

4. List [8, 2, 8, 7, 3, 1, 2] is being sorted using bubble sort. Fill in the blanks to show the list after each pass.

   After the 1st pass: [2, 8, 7, 3, 1, 2, 8]

   After the 2nd pass: [2, 7, 3, 1, 2, 8, 8]

   After the 3rd pass: [2, 3, 1, 2, 7, 8, 8]

   After the 4th pass: _____

   After the 5th pass: _____

   After the 6th pass: _____

5. List [1, 5, 8, 7, 6, 1, 7] is being sorted using selection sort. Fill in the blanks to show the list after each pass.

   After the 1st pass: [1, 5, 8, 7, 6, 1, 7]

   After the 2nd pass: [1, 1, 8, 7, 6, 5, 7]

   After the 3rd pass: [1, 1, 5, 7, 6, 8, 7]

   After the 4th pass: _____

   After the 5th pass: _____

   After the 6th pass: _____

   After the 7th pass: _____

6. List [6, 8, 2, 1, 1, 9, 4] is being sorted using insertion sort. Fill in the blanks to show the list after each pass.

   After the 1st pass: [6, 8, 2, 1, 1, 9, 4]

   After the 2nd pass: [6, 8, 2, 1, 1, 9, 4]

   After the 3rd pass: [2, 6, 8, 1, 1, 9, 4]

   After the 4th pass: _____

   After the 5th pass: _____

   After the 6th pass: _____

   After the 7th pass: _____