

Data Structures

Quiz - 1

Write a method `void bubble(PositionList<Integer> list)` that goes through every position of the given `PositionList` starting from the first, and swaps adjacent positions to ensure that the node with the smaller element appears earlier in the list. The implementation should run in linear time.

For example, given the list:

7, 6, 4, 10, 2

The swaps would proceed as follows:

- Swap 7 and 6 \rightarrow 6, 7, 4, 10, 2
- Swap 7 and 4 \rightarrow 6, 4, 7, 10, 2
- Don't swap 7 and 10 \rightarrow 6, 4, 7, 10, 2
- Swap 10 and 2 \rightarrow 6, 4, 7, 2, 10

Solution:

```
1 // Bubble Sort for a PositionList of integers
2 public void bubble(PositionList<Integer> list) {
3     if (list.size() > 1) {
4         Position<Integer> currentPos = list.first();
5
6         while (list.after(currentPos) != null) {
7             Position<Integer> nextPos = list.after(currentPos);
8             if (currentPos.getElement() > nextPos.getElement()) {
9                 Integer temp = nextPos.getElement();
10                list.set(nextPos, currentPos.getElement());
11                list.set(currentPos, temp);
12            }
13            currentPos = nextPos;
14        }
15    }
16 }
```