

# Activity Sheet 4

**Manager** name:

**Recorder** name:

**Speaker** name:

## Section 3.1

1. Modify the selection sort algorithm so that it only performs a swap if it needs to.

2. Carry out the selection sort algorithm for the array 23, 12, 18, 20, 3, showing the state after every swap.

### 3. Exercise 3.1.12:

- a. Prove that if bubble sort makes no changes on any one of its passes through the list, then the list is sorted and the algorithm can be stopped. Note: a “pass through the list” does not literally look at every single element on the list, you need to be clear on why that is OK for this question.
- b. Modify the BubbleSort pseudocode to add such a check, and to stop the algorithm early if possible.
- c. What are the best-case and worst-case efficiency of this new version?