Hands on 2

② Argue correctness of selection sort

```
SELECTION-SORT(A,n)
for i=0 to n-2 :
    min = i
    for j= i+1 to n-1 :
        if A[j] < A[min] :
            min = j
    swap(A[i], A[min])
```

At the start of each iteration, the first i elements of the array are the smallest i elements in sorted order.

Base case(i=0), initially the sorted portion is empty. The algorithm finds the smallest element in the array and places it at index 0.

Assuming that after i iterations, the first i elements are correctly sorted.

At the (i+1)th iteration, the algorithm finds the smallest element in the unsorted portion element placed at A[i] (A[i] to A[n-1])

this holds for all i,
means the selection sort correctly sorts the array.

After the n-2 iterations, the outer loop terminates, the array is fully sorted, and the algorithm terminates.

Hence, Selection sort is correct.