COMP 5112. Lab 5: Sorting

Question 1. Quicksort

Please **fill** in the following missing parts in the file `Quicksort.java`, then **run** the program.

```
// 1.  _____
// 2.  _____
// 3.  _____
```

The correct output when running the program output should contain:
```
*** Input:  10 7 1 6 9 3 2 4 8 5
*** Output: 1 2 3 4 5 6 7 8 9 10
```

Question 2. The running time of Quicksort

In `Quicksort.java`, we can generate the worst case input and the average case input by calling `generateWorstCaseInput` and `generateAverageCaseInput`, respectively.

Please **modify** the line for generating the array A in main, **run** the program, and then **fill** in the following table.

Input size	Average case input: running time (steps)	Worst case input: running time (steps)
10		
100		
1000		

What are your observations on the above results?

Question 3.

Show the running steps of the merge-sort algorithm on the following array:

	0	1	2	3	4	5	6
A	58	33	41	15	28	80	6

Question 4.

Find the worst-case input at $n=5$
for the following Insertion-Sort algorithm:

```
Insertion-Sort ( Array A[0..n-1] )
1. i ← 1
2. while i < n
3.     j ← i
4.     while j > 0 and A[j-1] > A[j]
5.         swap A[j] and A[j-1]
6.         j ← j-1
7.     i ← i + 1
```