Worksheet # 12 Algorithms CIS2500

Question 1: You are given the following array of 9 integers:

```
 0  1 2 3 4  5 6  7  8
20, 4, 5, 8, 90, -8, 6, 17, 39
```

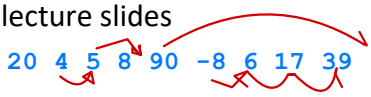
a. What is the state of this array after pass number 3 of Insertion sort using the algorithm given in the lecture slides

```
Pass 1: 20, 4, 5, 8, 90, -8, 6, 17, 39

Pass 2: 4, 20, | 5, 8, 90, -8, 6, 17, 39   current = 5;

Pass 3: 4, 20, 5, | 8, 90, -8, 6, 17, 39
```

b. What is the state of this array after 2 calls of Quicksort using the algorithm given in the lecture slides




```
pindex
pivot:39
swap(value[pindex], pivot)
              39       90
```

```
call 1: 20 4 5 8 -8 6 17 39 90
call 2: 4 5 8 -8 6 17 20 39 90    pivot: 20
```

d. What is the value of pivotIndex after the first call to quicksort, assuming low = 0 and high = 8.

```
call 1: 20 4 5 8 -8 6 17 39 90
                        ↑
                  pivot index: 7
```

Question 2: How many comparisons does merge of mergesort make if the input array is:

4, 5, 8, 20, -8, 6, 17, 39

```
-8, 4, 5, 6, 8, 17, 20, 39
Number of comparisons: 7
```

Question 3: How many comparisons does merge of mergesort make if the input array is:

1, 2, 3, 4, 5, 6, 7, 8

```
1, 2, 3, 4, 5, 6, 7, 8
Number of comparisons: 4
```