

Quiz-1

Algorithms section B, FALL 2016

Q-1: Given mergesort, at each level $j=0,1,2,\dots,\log n$, there are _____ subproblems each of size _____. (recall the recursion tree of merge sort)

(2)

Q-2: Give the time complexity $T(n)$ of MERGE routine in merge sort. Show how it is a linear equation. (4)

Assume that from p to r , there are n numbers.

Q-3: Below is the pseudocode of bubblesort:

(4)

```
BUBBLESORT(A)  
1  for  $i \leftarrow 1$  to  $\text{length}[A]$   
2    do for  $j \leftarrow \text{length}[A]$  downto  $i + 1$   
3      do if  $A[j] < A[j - 1]$   
4        then exchange  $A[j] \leftrightarrow A[j - 1]$ 
```

Show each iteration of the pseudocode on an input array of [4 6 1 5 2].
Clearly show the _____ pointers i and j at each iteration.
