

# CSE 202 Final

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## I. QUESTION (SORTING) (15 POINTS)

Suppose you are given two sorted arrays A and B. Write a function that finds the union of those arrays in  $\mathcal{O}(N)$  time.

```
int[] union(int[] A, int[] B)
```

## II. QUESTION (SORTING) (20 POINTS)

Suppose you are given an array of  $N$  integers. Write an  $\mathcal{O}(N)$  algorithm to sort these integers with respect to their last digits.

```
void sortOnlyLastDigit(int[] A)
```

## III. QUESTION (SORTING) (15 POINTS)

Suppose you are given an array of  $N$  integers. Write an  $\mathcal{O}(N^2)$  algorithm to find the number of misplaced pairs. A pair of integers  $(i, j)$  is misplaced, if  $i > j$  and  $i$  comes before  $j$  in the array. Given the array  $A = [1\ 4\ 3\ 6\ 2\ 5]$ , the misplaced pairs are  $(4, 3)$ ,  $(4, 2)$ ,  $(3, 2)$ ,  $(6, 2)$ ,  $(6, 5)$ .

```
int misplacedPairs(int[] A)
```

## IV. QUESTION (LINK LIST) (15 POINTS)

Write the method

```
void removeEvenIndexedElements()
```

which removes the even indexed elements of a link list. The even indexed elements are the second, fourth, sixth, ... elements.

## V. QUESTION (SEARCH TREES) (20 POINTS)

Write the method

```
int numberOfMeanNodes()
```

which returns the number of mean nodes. A node is a mean node if its value is the mean of its left and right children's values. For example, if a node has a value of 7, its left child has a value of 4 and its right child has a value of 10, this node is a mean node ( $7 = (4 + 10) / 2$ ). If the node has one or no child, it can not be a mean node.

## VI. QUESTION (GRAPH) (15 POINTS)

Write a method to convert the edges in the adjacency matrix representation to the edges in the adjacency list representation.

```
LinkedList[] convertToAdjacencyList()
```