

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()
```