

CSE 202 Bütünleme Exam

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I. QUESTION (SORTING) (15 POINTS)

Suppose you are given two arrays A and B. Write a function that finds elements in $A \cap B$ (the elements that are in A and B) in $\mathcal{O}(N \log N)$ time.

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

II. QUESTION (LINKED LIST) (20 POINTS)

Write a function that returns the Fibonacci numbers between A and B as a linked list. Fibonacci numbers are:

$$F_0 = 0$$

$$F_1 = 1$$

$$F_2 = 1$$

...

$$F_n = F_{n-1} + F_{n-2}$$

```
LinkedList fibonacci(int A, int B)
```

III. QUESTION (TREES) (15 POINTS)

Write a function that returns the number of odd nodes in a binary search tree. A node is odd if the difference of the keys of its children is odd. If the node has only one child, you assume that other child is 0.

```
int numberOfOddNodes()
```

IV. QUESTION (SORTING) (15 POINTS)

Suppose you are given two linked lists of sorted integers. Write an $\mathcal{O}(N)$ algorithm that merges these two linked lists such that the resulting linked list is also sorted.

```
LinkedList merge(LinkedList A, LinkedList B)
```

V. QUESTION (GRAPH) (20 POINTS)

A bipartite graph is a graph such that vertices of the graph can be partitioned into two subsets such that no edge has both its vertices in the same subset. Write the function

```
boolean isBipartite()
```

which checks if the corresponding graph is bipartite or not.

VI. QUESTION (GRAPH) (15 POINTS)

Write a method to revert the edges in the adjacency list representation.

```
void revertEdges()
```