

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 intersection of those arrays in $O(N)$ time.

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

II. QUESTION (SORTING) (20 POINTS)

Suppose you are given an array of N booleans containing only just true's and false's. Write an $O(N)$ algorithm to sort these booleans.

```
void sortBoolean(boolean[] A)
```

III. QUESTION (SORTING) (15 POINTS)

Suppose you are given a sorted list of N numbers followed by 1 unordered number. Write an $O(N)$ algorithm to sort the entire list of numbers. You can assume that the array A contains $N + 1$ numbers, whereby the first N elements are sorted.

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

IV. QUESTION (LINK LIST) (15 POINTS)

Write the method

```
LinkedList oddIndexedElements()
```

which returns the odd indexed elements of a link list as a new link list. The odd indexed elements are the first, third, fifth, ... elements.

V. QUESTION (BINARY SEARCH TREE) (20 POINTS)

One possibility to prevent collisions in a hash table is the use of a table of binary search trees instead of a table of link lists. Write HashTree class for this purpose. You should also write the code for inserting, removing and searching items in the HashTree class.

VI. QUESTION (GRAPH) (15 POINTS)

Write a method to find the in-degree of a node given its index. The indegree of a node N is the number of edges ending with N . You should write the code for adjacency list representation.

```
int inDegree(int index)
```