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 **NAVIGATE COURSES**  
(PG Diploma in Software Development)  
Feb 2019

## Problem Statement

In this course, you have learnt about various Algorithms for searching and sorting. You learnt how to use divide and conquer technique to improve the efficiency of the algorithms.

You will now learn to apply your knowledge of search algorithms on a simple scenario described by the problem statement below.

### Part A:

You are given an array of integers that represents the IDs of the users that have registered in “UpgradBook,” a private social network created for all the students who have graduated from Upgrads’ programs.

The array of integers has the following properties:

- With a known length  $N$

- The array is sorted in an ascending order

- The array holds distinct integers (i.e. there are no repeating numbers)

- The array is 1-indexed, i.e. the first element is stored in  $A[1]$  (not  $A[0]$ )

Find the first positive integer  $M$  (where  $1 \leq M \leq N$ ) such that when  $M$  is used as the array index, the result from the array is the the integer  $M$  itself. i.e.  $A[M] = M$

In other words, find the first positive integer  $M$  where  $M$  is both a user’s ID and its index in the array of user ids.

Write a program to find  $M$ , if it exists, in  $O(\log N)$  time. If  $M$  does not exist, please return `NOT_FOUND`

Please note that the code takes two inputs:

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Second one being the elements inside the array

So, to input an array having 5 elements, the first input will be 5 and the next 5 inputs will be the elements of the array.

Test Cases

**Part B:**

You are given an array of integers that represents the IDs of the users that have registered in “UpgradBook.”

The array of integers have the following properties:

The array is sorted in an ascending order

The array holds distinct integers (i.e. there are no repeating numbers)

The array is 1-indexed, i.e. the first element is stored in A[1] (not A[0])

However the length of the array, N, is unknown (i.e. you don't know how long the array is and arrayName.length is not available to you). In short, you can not use the length of the array to apply binary search

Since the length of the array is unknown, an error

“ArrayIndexOutOfBoundsException” is returned if you try to index into the array with an integer greater than N.

Find a function to find positive integer M in the array A and write a program to find M (if M exists) in  $O(\log N)$  time.

If M exists, please print the index of M using System.out.println().

If M does not exist, please print the String "NOT\_FOUND" using System.out.println().

**Please refer to the next segment where we discuss the test cases for the problem. It will help you understand the problem better.**

**Report an error**

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