**Data Structure Lab**

**ODD 2022**

**Lab Test-1**

**Time: 40 min**

**Marks: 20**

**Instructions**:

1. Submit a pdf file having code and output screenshots
2. Filename should be RollNo\_Name\_LabTest1\_DS.pdf
3. Output should be at least 3 unique test cases
4. Output Screenshot should NOT be cropped at all

**Set 1 (ODD System No)**

Given an integer array, sort the array by performing a series of **flips**.

In one flip we

* Choose an integer, i where 1 <= i<= array.length.
* Reverse the sub-array array[0...i-1] (**0-indexed**).

If array = [3,2,1,4] and we performed a flip when i = 3, the sub-array [3,2,1], is reversed to form the  array = [1,2,3,4] .

Return *an array of the*k*-values corresponding to a sequence of flips that sort*array.

Any valid answer that sorts the array within 10\*array.length flips will be judged as correct.

**Test cases:**

**Input:** array = [3,2,4,1]

**Output:** [4,2,4,3]

**Explanation:**

We perform 4 pancake flips, with k values 4, 2, 4, and 3.

Starting state: arr = [3, 2, 4, 1]

After 1st flip (k = 4):[1, 4, 2, 3]

After 2nd flip (k = 2): [4, 1, 2, 3]

After 3rd flip (k = 4): [3, 2, 1, 4]

After 4th flip (k = 3): [1, 2, 3, 4], which is sorted.

**Input:** array = [1,2,3] **Output:** []

**Explanation:** The input is already sorted, so there is no need to flip anything.

Note that other answers, such as [3, 3], would also be accepted.

**Set 2 (Even System No)**

There is an integer array sorted in ascending order (with **distinct** values).

Prior to being passed to your function, the array is **possibly rotated** at an unknown rotation point ‘k’ (1 <= k <array.length) such that the resulting array is [array[k], array k+1], ..., array [n-1], array [0], array [1], ..., array [k-1]] (**0-indexed**). For example, [0,1,2,4,5,6,7] might be rotated at rotation point 3 and become [4,5,6,7,0,1,2].

Given the array **after** the possible rotation and an integer searchkey, return *the* index of searchkey,  if it is in array, or -1 if it is not in array in O(log n) runtime complexity.

**Test cases:**

**Input:**

**array** = [4,5,6,7,0,1,2], searchkey = 0

**Output:** 4

**Input:**

array = [4,5,6,7,0,1,2], searchkey = 3

**Output:** -1

**Input:**

array = [1], searchkey = 0

**Output:** -1