2024-02-17 - Handout – Binary Search

Q1. Find First and Last Position of Element in a Sorted Array (Leetcode #34)

Link: [Find First and Last Position of Element in Sorted Array - LeetCode]

Given an array of integers nums sorted in non-decreasing order, find the starting and ending position of a given target value.

If the target is not found in the array, return [-1, -1].

Example 1:

Input: nums = [5,7,7,8,8,10], target = 8
Output: [3,4]

Input: nums = [5,7,7,8,8,10], target = 6
Output: [-1,-1]

Q2. Search a 2D matrix (Leetcode #74)

Link: [Search a 2D Matrix - LeetCode]

You are given an m x n integer matrix matrix with the following two properties:

- Each row is sorted in non-decreasing order.
- The first integer of each row is greater than the last integer of the previous row.

Given an integer target, return true *if the target is in* matrix *or* false *otherwise*.

You must write a solution in O(log(m * n)) time complexity.

Example 1:

1	3	5	7
10	11	16	20
23	30	34	60

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Input: matrix = [[1,3,5,7],[10,11,16,20],[23,30,34,60]], target = 3
Output: true
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Q3. Find minimum in rotated sorted array (Leetcode #153)

Link: [Find Minimum in Rotated Sorted Array - LeetCode]

Suppose an array of length n sorted in ascending order is **rotated** between 1 and n times. For example, the array nums = [0,1,2,4,5,6,7] might become:

- [4,5,6,7,0,1,2] if it was rotated 4 times.
- [0,1,2,4,5,6,7] if it was rotated 7 times.

Notice that **rotating** an array [a[0], a[1], a[2], ..., a[n-1]] 1 time results in the array [a[n-1], a[0], a[1], a[2], ..., a[n-2]].

Given the sorted rotated array nums of **unique** elements, return *the minimum element of this array*.

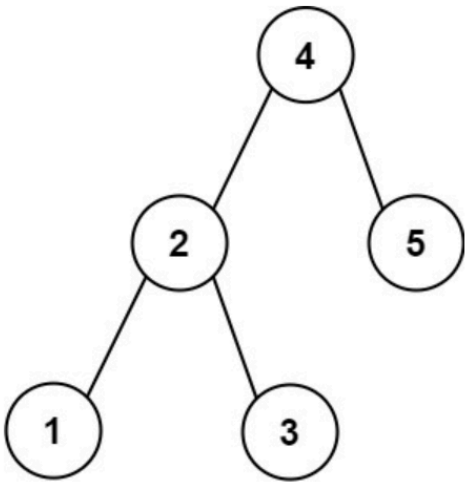
Example 1: Input: nums = [3,4,5,1,2]; **Output:** 1

Explanation: The original array was [1,2,3,4,5] rotated 3 times.

Q4. Closest Binary Search Tree Value (Leetcode #270)

Link: https://leetcode.com/problems/closest-binary-search-tree-value/description/

Given the root of a binary search tree and a target value, return *the value in the BST that is closest to the* target. If there are multiple answers, print the smallest.

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Input: root = [4,2,5,1,3], target = 3.714286
Output: 4
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