



EAST WEST UNIVERSITY
Department of Computer Science & Engineering
B.Sc. in Computer Science and Engineering Program
Assignment 1, Summer 2023 Semester

Course: CSE246 Algorithms Lab, Section-2
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1. Given a sorted array of distinct integers and a target value, return the index if the target is found. If not, return the index where it would be if it were inserted in order.

You must **write** an algorithm with **$O(\log n)$** runtime complexity. You can **implement** the code using C or CPP or Java programming language. You can not use any built-in functions.

Example 1:

Input: nums = [1,3,5,6], target = 5

Output: 2

Example 2:

Input: nums = [1,3,5,6], target = 2

Output: 1

Example 3:

Input: nums = [1,3,5,6], target = 7

Output: 4

2. Given a positive number n and precision p , find the square root of number upto p decimal places using **binary search**. You can **implement** the code using C or CPP or Java programming language. You can not use any built-in functions.

Input : number = 50, precision = 3

Output : 7.071

Input : number = 10, precision = 4

Output : 3.1622

3. There are several consecutive houses along a street, each of which has some money inside. There is also a robber, who wants to steal money from the homes, but he refuses to steal from adjacent homes.

The capability of the robber is the maximum amount of money he steals from one house of all the houses he robbed.

You are given an integer array `nums` representing how much money is stashed in each house. More formally, the i^{th} house from the left has `nums[i]` dollars.

You are also given an integer k , representing the minimum number of houses the robber will steal from. It is always possible to steal at least k houses.

Return the minimum capability of the robber out of all the possible ways to steal at least k houses.

You can **implement** the code using C or CPP or Java programming language. You can not use any built-in functions.

Input: `nums = [2,3,5,9]`, `k = 2`

Output: 5

Explanation:

There are three ways to rob at least 2 houses:

- Rob the houses at indices 0 and 2. Capability is $\max(\text{nums}[0], \text{nums}[2]) = 5$.
- Rob the houses at indices 0 and 3. Capability is $\max(\text{nums}[0], \text{nums}[3]) = 9$.
- Rob the houses at indices 1 and 3. Capability is $\max(\text{nums}[1], \text{nums}[3]) = 9$.

Therefore, we return $\min(5, 9, 9) = 5$.

Input: `nums = [2,7,9,3,1]`, `k = 2`

Output: 2

Explanation:

There are 7 ways to rob the houses. The way which leads to minimum capability is to rob the house at index 0 and 4. Return $\max(\text{nums}[0], \text{nums}[4]) = 2$.