

Programming assignment 2.

Due date: Friday, February 28 2020 at 11:59pm

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In this assignment, we will apply the idea of divide and conquer algorithms (similar to binary search) to solve the below questions.

Note: The running time of your solutions should be $O(\log n)$.

Question 1. Implementing the square root function: Write a function that asks a user to enter an integer N and returns $\lceil \sqrt{N} \rceil$.

Example 1: input: 28

Output: 6

Example 2: input: 16

Output: 4

(**Note:**

- You are **NOT** allowed to use the built-in sqrt function in your code
- Do **NOT** use any type of array in your code)

Question 2. Given a *sorted* array of n **distinct** numbers where the range of the numbers are between 0 to m and $m > n$ (m is given by user). Find the smallest missing number.

Example 1: input: $a = [0, 1, 3, 6, 8, 9]$, $m = 10$

Output: 2

Example 2: input: $a = [2, 5, 7, 11]$, $m = 15$

Output: 0

Example 3: input: $a = [0, 1, 2, 3, 4]$, $m = 8$

Output: 5

Example 4: input: $a = [12]$, $m = 13$

Output: 0