Assignment | Binary search - 1 | Week 10

1. Given a sorted array of n elements and a target ‘x’. Find the last occurrence of ‘x’ in the array. If ‘x’ does not exist return -1.

   `Input 1: arr[] = {1,2,3,3,4,4,4,5} , x = 4`

   `Output 1: 6`

2. Given a sorted binary array, efficiently count the total number of 1’s in it.

   `Input 1 : a = [0,0,0,0,1,1]`

   `Output 1: 2`

3. Given a matrix having 0-1 only where each row is sorted in increasing order, find the row with the maximum number of 1’s.

   `Input matrix : 0 1 1 1`

   `0 0 1 1`

   `1 1 1 1  // this row has maximum 1s`

   `0 0 0 0`

   `Output: 2`

4. Given an array of integers nums containing n + 1 integers where each integer is in the range [1, n] inclusive in sorted order.

   There is only one repeated number in nums, return this repeated number.

   `Input 1: arr[] = {1,2,3,3,4}`

   `Output 1: 3`

   `Input 2: arr[] = {1,2,2,3,4,5}`

   `Output 2: 2`

5. Given a number ‘n’. Predict whether ‘n’ is a valid perfect square or not.

   `Input 1: n = 36`

   `Output 1: yes`

`Input 2: n = 45`

`Output 2: no`

6. You have n coins and you want to build a staircase with these coins. The staircase consists of k rows where the ith row has exactly i coins. The last row of the staircase may be incomplete.

   Given the integer n, return the number of complete rows of the staircase you will build.

   `Example 1:`

   `Input: n = 5`

   `Output: 2`

   `Explanation: Because the 3rd row is incomplete, we return 2.`

   `Example 2:`

   `Input: n = 8`

   `Output: 3`

   `Explanation: Because the 4th row is incomplete, we return 3.`
