

Write a program to solve the following problems by applying the Linear Search algorithm (Problems 4-6) and by applying the Binary Search algorithm (Problems 1-3):
Note that, your programs must include adequate user interactive messages.

1. **Find the Square Root of a Number:** Given a non-negative integer n , find the largest integer x such that $x^2 \leq n$. You cannot use built-in square root functions.
Example:
Input: $n=10$
Output: 3
2. **Search in a Rotated Sorted Array:** Given a sorted array that is rotated at some pivot and a target value x , determine the index of x . If x is not found, return -1.
Example 1:
Input: array = [3, 4, 5, 1, 2]; $x = 2$
Output: 4
3. **Finding Minimum in a Rotated Sorted Array:** Given a rotated sorted array where all elements are distinct, find the minimum element.
Example 1:
Input: array = [3, 4, 5, 1, 2]
Output: 1
4. **Find the First Occurrence of a Target:** Given an array of integers, find the index of the first occurrence of a target value x . If the target is not found, return -1.
Example 1:
Input: array = [5, 3, 7, 9, 3] ; $x = 3$
Output: 1
5. **Find the Maximum Element in an Array:** Given an array of integers, find the maximum value.
Example 1:
Input: array = [1, 7, 3, 9, 5]
Output: 9
Example 2:
Input: array = [-3, -1, -7, -2]
Output: -1
6. **Count Occurrences of a Target:** Given an array of integers, count the number of times a target value x appears in the array.
Example 1:
Input: array = [2, 4, 2, 8, 2] ; $x = 2$
Output: 3