

Q1. Write a program to implement binary search on a sorted array. If the element is present, return its index; otherwise, return -1.

input: arr = [1, 3, 5, 7, 9, 11], target = 7

output: Element found at index 3

Hint for Students

Use two pointers (low, high) and repeatedly check the mid element.

Q2. Rotate an array arr by k positions to the right.

input: arr = [1, 2, 3, 4, 5, 6, 7], k = 3

output: [5, 6, 7, 1, 2, 3, 4]

Hint for Students

Use reverse method:

Reverse whole array

Reverse first k elements

Reverse remaining elements

Q3. Given a string, print the frequency of each character.

input: str = "programming"

output:

p -> 1

r -> 2

o -> 1

g -> 2

a -> 1

m -> 2

i -> 1

n -> 1

Hint for Students

Use a HashMap to count characters.

Q4. Find the factorial of a number n using recursion.

input: Find the factorial of a number n using recursion.

output: Factorial of 5 is 120

Hint for Students

Factorial definition:

$n! = n \times (n-1)!$

Base case:  $0! = 1$