Lab Assignment: Insertion Sort

Problem Statement

Write a function to sort an array of integers using the Insertion Sort algorithm. The sorting should be done in-place, and the final array must be sorted in ascending order.

Example 1:

Input: arr = [5, 2, 9, 1, 5, 6]

Output: arr = [1, 2, 5, 5, 6, 9]

Example 2:

Input: arr = [3, 0, -2, 10, 7]

Output: arr = [-2, 0, 3, 7, 10]

Explanation: The Insertion Sort algorithm works by iteratively inserting elements into their correct position relative to already sorted elements on the left.

Logic: Insertion Sort

- Start from the second element and iterate through the array.

- For each element, compare it with elements to its left and shift larger elements to the right.

- Insert the current element into the correct position.

- Time Complexity:

  - Best case (already sorted): $O(n)$

  - Worst case (reversed): $O(n^2)$

- Space Complexity: $O(1)$ (in-place sorting)

Function Signature (C Language)

void insertionSort(int arr[], int size);

- arr[]: The input array to sort

- size: Number of elements in the array

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- Returns: Nothing (array is sorted in-place)

Task

- Implement the insertionSort function in C language.

- Sort the array in-place using the Insertion Sort technique.

- You may assume that the input array contains integers only.

- Do not use built-in sorting functions.