**Institute of Computer Technology**

**B. Tech. Computer Science and Engineering**

**Sub: DS**

**Course Code: 2CSE302**

**Practical – 21**

**Name: Jaymin Gondaliya**

**Enrollment No: 23162171007**

**Sem - 3**

**Branch: CS**

**Class: A**

**Batch: 32**

**Imagine you&#39;re organizing books on a shelf by their publication year in ascending order. You pick up each book one by one and place it in its correct position relative to the books already sorted on the shelf.**

**Each time you add a book to the sorted part of the shelf, you may need to shift some already-sorted books to make space. This is similar to how Insertion Sort works, where each element is picked from the unsorted portion and placed in its correct position in the sorted portion.**

**Code:**

*#include* <stdio.h>

void insertionSort(int *arr*[], int *n*) {

    int i, j, key;

    printf("Initial Array:\n");

*for* (i = 0; i < *n*; i++) {

        printf("%d ", *arr*[i]);

    }

    printf("\n");

*//* **Insertion Sort Algorithm**

*for* (i = 1; i < *n*; i++) {

        key = *arr*[i];*//* **Element to be inserted into the sorted portion**

        j = i - 1;

*//* **Shift elements of the sorted portion to the right to make space**

*while* (j >= 0 && *arr*[j] > key) {

*arr*[j + 1] = *arr*[j];

            j--;

        }

*arr*[j + 1] = key;*//* **Place the key in its correct position**

*//* **Print the array after each step**

        printf("Step %d:\n", i);

*for* (int k = 0; k < *n*; k++) {

            printf("%d ", *arr*[k]);

        }

        printf("\n");

    }

    printf("Sorted Array:\n");

*for* (i = 0; i < *n*; i++) {

        printf("%d ", *arr*[i]);

    }

    printf("\n");

}

int main() {

    int arr[] = {2021, 2019, 2020, 2018, 2022};

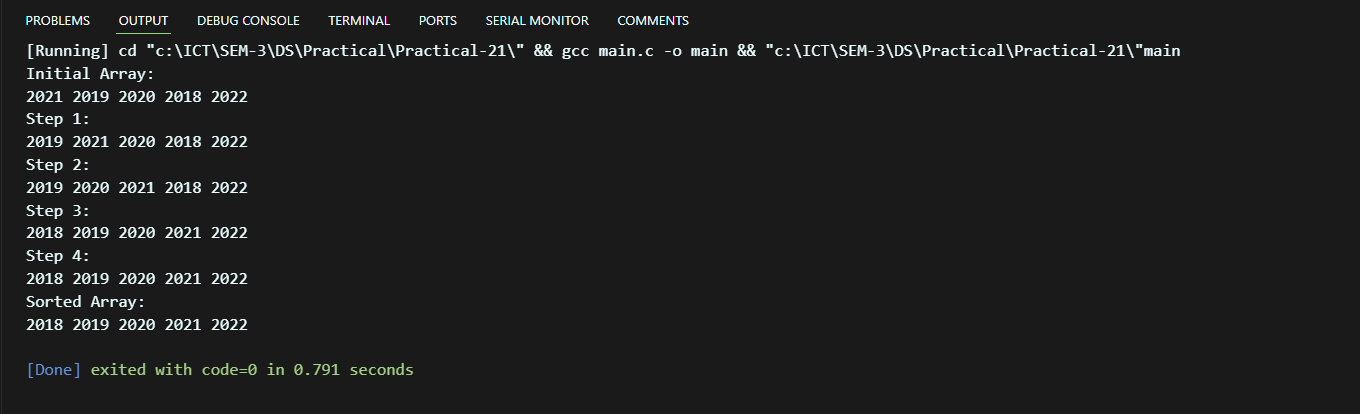
    int n = sizeof(arr) / sizeof(arr[0]);

    insertionSort(arr, n);

*return* 0;

}

**Output:**

****