LAB TASK – 6

1. Write a program to sort the array elements using Quick Sort Technique.

**Code :**

#include <stdio.h>

void swapnumbers(int \*a, int \*b) {

    int t = \*a;

    \*a = \*b;

    \*b = t;

}

int partition(int arr[], int low, int high) {

    int pivot = arr[high], i = low - 1,j;

    for (j = low; j < high; j++) {

        if (arr[j] < pivot) {

            i++;

            swapnumbers(&arr[i], &arr[j]);

        }

    }

    swapnumbers(&arr[i + 1], &arr[high]);

    return i + 1;

}

void quicksort(int arr[], int low, int high) {

    if (low < high) {

        int pi = partition(arr, low, high);

        quicksort(arr, low, pi - 1);

        quicksort(arr, pi + 1, high);

    }

}

int main() {

    int n, i;

    printf("Enter number of elements: ");

    scanf("%d", &n);

    int arr[n];

    printf("Enter %d elements:\n", n);

    for (i = 0; i < n; i++)

        scanf("%d", &arr[i]);

    printf("Original array:\n");

    for (i = 0; i < n; i++)

        printf("%d ", arr[i]);

    printf("\n");

    quicksort(arr, 0, n - 1);

    printf("Sorted array:\n");

    for (i = 0; i < n; i++)

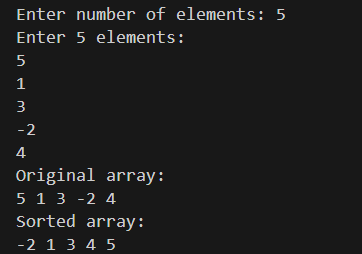
        printf("%d ", arr[i]);

    printf("\n");

    return 0;

}

**Output :**

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1. Divide and conquer: Implementation of Strassen’s algorithm for matrix multiplication.

**Code :**

#include <stdio.h>

void strassenMultiply(int A[2][2], int B[2][2], int result[2][2]) {

    int M1 = (A[0][0] + A[1][1]) \* (B[0][0] + B[1][1]);

    int M2 = (A[1][0] + A[1][1]) \* B[0][0];

    int M3 = A[0][0] \* (B[0][1] - B[1][1]);

    int M4 = A[1][1] \* (B[1][0] - B[0][0]);

    int M5 = (A[0][0] + A[0][1]) \* B[1][1];

    int M6 = (A[1][0] - A[0][0]) \* (B[0][0] + B[0][1]);

    int M7 = (A[0][1] - A[1][1]) \* (B[1][0] + B[1][1]);

    result[0][0] = M1 + M4 - M5 + M7;

    result[0][1] = M3 + M5;

    result[1][0] = M2 + M4;

    result[1][1] = M1 - M2 + M3 + M6;

}

int main() {

    int A[2][2], B[2][2], result[2][2];

    printf("Enter elements of 2x2 matrix A:\n");

    for(int i=0; i<2; i++)

        for(int j=0; j<2; j++)

            scanf("%d", &A[i][j]);

    printf("Enter elements of 2x2 matrix B:\n");

    for(int i=0; i<2; i++)

        for(int j=0; j<2; j++)

            scanf("%d", &B[i][j]);

    strassenMultiply(A, B, result);

    printf("Resultant matrix after multiplication:\n");

    for(int i=0; i<2; i++) {

        for(int j=0; j<2; j++)

            printf("%d ", result[i][j]);

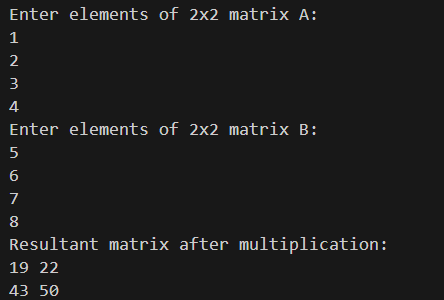
        printf("\n");

    }

    return 0;

}

**Output :**

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