1.Insertion

#include <stdio.h>

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

int i, key, j;

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

key = arr[i];

j = i - 1;

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

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

j = j - 1;

}

arr[j + 1] = key;

}

}

void printArray(int arr[], int n) {

for (int i = 0; i < n; i++)

printf("%d ", arr[i]);

printf("\n");

}

int main() {

int n;

printf("Enter the number of elements: ");

scanf("%d", &n);

int arr[n];

printf("Enter the elements of the array:\n");

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

scanf("%d", &arr[i]);

}

printf("Original Array: ");

printArray(arr, n);

insertionSort(arr, n);

printf("Sorted Array: ");

printArray(arr, n);

return 0;}

2.Merge

#include <stdio.h>

void merge(int arr[], int left, int mid, int right) {

int n1 = mid - left + 1;

int n2 = right - mid;

int L[n1], R[n2];

for (int i = 0; i < n1; i++)

L[i] = arr[left + i];

for (int j = 0; j < n2; j++)

R[j] = arr[mid + 1 + j];

int i = 0, j = 0, k = left;

while (i < n1 && j < n2) {

if (L[i] <= R[j]) {

arr[k] = L[i];

i++;

} else {

arr[k] = R[j];

j++;

}

k++;

}

while (i < n1) {

arr[k] = L[i];

i++;

k++;

}

while (j < n2) {

arr[k] = R[j];

j++;

k++;

}

}

void mergeSort(int arr[], int left, int right) {

if (left < right) {

int mid = left + (right - left) / 2;

mergeSort(arr, left, mid);

mergeSort(arr, mid + 1, right);

merge(arr, left, mid, right);

}

}

void printArray(int arr[], int n) {

for (int i = 0; i < n; i++)

printf("%d ", arr[i]);

printf("\n");

}

int main() {

int n;

printf("Enter the number of elements: ");

scanf("%d", &n);

int arr[n];

printf("Enter the elements of the array:\n");

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

scanf("%d", &arr[i]);

}

mergeSort(arr, 0, n - 1);

printf("Sorted Array: ");

printArray(arr, n);

return 0;

}

3. Quick

#include <stdio.h>

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

int pivot = arr[high];

int i = low - 1;

for (int j = low; j < high; j++) {

if (arr[j] < pivot) {

i++;

int temp = arr[i];

arr[i] = arr[j];

arr[j] = temp;

}

}

int temp = arr[i + 1];

arr[i + 1] = arr[high];

arr[high] = temp;

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);

}

void printArray(int arr[], int n) {

for (int i = 0; i < n; i++)

printf("%d ", arr[i]);

printf("\n");

}

int main() {

int n;

printf("Enter the number of elements: ");

scanf("%d", &n);

int arr[n];

printf("Enter the elements of the array:\n");

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

scanf("%d", &arr[i]);

}

quickSort(arr, 0, n - 1);

printf("Sorted Array: ");

printArray(arr, n);

return 0;

}