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

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

int key = arr[i];

int j = i - 1;

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

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

j--;

}

arr[j + 1] = key;

}

}

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

for (int i = 0; i < n-1; i++) {

int minIndex = i;

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

if (arr[j] < arr[minIndex])

minIndex = j;

}

swap(arr[minIndex], arr[i]);

}

}

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

for (int i = 0; i < n - 1; i++) {

for (int j = 0; j < n - i - 1; j++) {

if (arr[j] > arr[j + 1])

swap(arr[j], arr[j + 1]);

}

}

}

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

int gap = n;

bool swapped = true;

while (gap != 1 || swapped) {

gap = gap / 1.3; // Reducing the gap size

if (gap < 1) {

gap = 1;

}

swapped = false;

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

if (arr[i] > arr[i + gap]) {

swap(arr[i], arr[i + gap]);

swapped = true;

}

}

}

}

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

for (int gap = n / 2; gap > 0; gap /= 2) {

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

int temp = arr[i];

int j;

for (j = i; j >= gap && arr[j - gap] > temp; j -= gap) {

arr[j] = arr[j - gap];

}

arr[j] = temp;

}

}

}

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 i = 0; i < n2; i++)

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

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);

}

}

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++;

swap(arr[i], arr[j]);

}

}

swap(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);

}

}