Assignment 15

Arrays and functions

#include <stdio.h>

// Function to find the greatest number in an array of any size

int findMax(int arr[], int size) {

int max = arr[0];

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

if (arr[i] > max) {

max = arr[i];}

}

return max;

}

// Function to find the smallest number in an array of any size

int findMin(int arr[], int size) {

int min = arr[0];

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

if (arr[i] < min) {

min = arr[i];}

}

return min;

}

// Function to sort an array of any size (using Selection Sort)

void sortArray(int arr[], int size) {

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

int minIndex = i;

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

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

minIndex = j; }

}

int temp = arr[i];

arr[i] = arr[minIndex];

arr[minIndex] = temp;

}

}

// Function to rotate an array by n positions to the left

void rotateLeft(int arr[], int size, int n) {

int temp;

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

temp = arr[0];

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

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

}

arr[size - 1] = temp;

}

}

// Function to find the first occurrence of adjacent duplicate values in the array

int findAdjacentDuplicate(int arr[], int size) {

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

if (arr[i] == arr[i + 1]) {

return arr[i];}

}

return -1;

}

// Function to display an array in reverse order

void displayReverse(int arr[], int size) {

for (int i = size - 1; i >= 0; i--) {

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

}

printf("\n\n");

}

// Function to count the total number of duplicate elements in an array

int countDuplicates(int arr[], int size) {

int count = 0;

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

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

if (arr[i] == arr[j]) {

count++;

break;}

}

}

return count;

}

// Function to print all unique elements in an array

void printUniqueElements(int arr[], int size) {

printf("Unique elements in the array: ");

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

int isUnique = 1;

for (int j = 0; j < size; j++) {

if (i != j && arr[i] == arr[j]) {

isUnique = 0;

break;}

}

if (isUnique) {

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

}

}

// Function to merge two arrays of the same size sorted in descending order

void mergeArrays(int arr1[], int arr2[], int size, int merged[]) {

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

merged[i] = arr1[i];

}

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

merged[i + size] = arr2[i];

}

sortArray(merged, 2 \* size);

}

// Function to count the frequency of each element in an array

void countFrequency(int arr[], int size) {

printf("Element Frequency\n");

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

int count = 1;

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

if (arr[i] == arr[j]) {

count++;}

}

printf("%d\t%d\n", arr[i], count);

i += count - 1;

}

}

// Driver

int main() {

int arr[100], size, n, d, arr2[100], merged[200];

printf("Enter the size of the array (up to 100): ");

scanf("%d", &size);

printf("Enter %d elements of the array: ", size);

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

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

}

printf("The greatest number in the array is: %d\n\n", findMax(arr, size));

printf("The smallest number in the array is: %d\n\n", findMin(arr, size));

sortArray(arr, size);

printf("Sorted array: ");

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

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

}

printf("\n\n");

printf("Enter the number of positions to rotate: ");

scanf("%d", &d);

printf("Enter the direction (left or right, 'L' or 'R'): ");

char direction;

scanf(" %c", &direction);

if (direction == 'L' || direction == 'l') {

rotateLeft(arr, size, d);}

printf("Array after rotation: ");

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

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

}

printf("\n\n");

int adjacentDuplicate = findAdjacentDuplicate(arr, size);

if (adjacentDuplicate != -1) {

printf("First adjacent duplicate: %d\n\n", adjacentDuplicate);

} else {

printf("No adjacent duplicates found in the array.\n\n");

}

printf("Array in reverse order: ");

displayReverse(arr, size);

printf("Total number of duplicate elements: %d\n\n", countDuplicates(arr, size));

printUniqueElements(arr, size);

printf("Enter the second array of the same size: ");

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

scanf("%d", &arr2[i]);

}

mergeArrays(arr, arr2, size, merged);

printf("Merged and sorted array in descending order:\n ");

for (int i = 0; i < 2 \* size; i++) {

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

}

printf("\n\n");

countFrequency(arr, size \* 2);

return 0;

}



