**COMSATS INSTITUTE OF INFORMATION TECHNOLOGY,**

**ABBOTTABAD CAMPUS.**

**ASSIGNMENT NO 7.**

**GIT HUB LINK:** [***https://github.com/AemanSajid/CPP.2/blob/main/PF%20ASSIGN%20GITHUB.docx***](https://github.com/AemanSajid/CPP.2/blob/main/PF%20ASSIGN%20GITHUB.docx)

***PF ASSIGN GITHUB.docx***

***https://github.com/AemanSajid/CPP.2/commit/03d84cb585f4f96ef2f7743ae44c7d1f1740faf0***

**SUBJECT:**

**PROGRAMMING FUNDAMENTALS.**

**SUBMITTED TO:**

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**PROGRAM AND SECTION:**

**SOFTWARE ENGINEERING- SEC: 2B.**

**QUESTION:1.**

#include <stdio.h>

int main() {

    // Declare an array of size 5

    int numbers[5];

    // Populate the array with numbers

    numbers[0] = 10;

    numbers[1] = 20;

    numbers[2] = 30;

    numbers[3] = 40;

    numbers[4] = 50;

    // Display the array

    printf("Array: ");

    for (int i = 0; i < 5; i++) {

        printf("%d ", numbers[i]);

    }

    printf("\n");

    return 0;

}

**QUESTION:2.**

#include <stdio.h>

int main() {

    // Declare an array of size 5

    float numbers[5];

    // Populate the array with numbers

    numbers[0] = 1.5;

    numbers[1] = 2.7;

    numbers[2] = 3.9;

    numbers[3] = 4.2;

    numbers[4] = 5.0;

    // Display the array

    printf("Array: ");

    for (int i = 0; i < 5; i++) {

        printf("%.2f ", numbers[i]);

    }

    printf("\n");

    return 0;

}

**QUESTION:3.**

#include <stdio.h>

int main() {

    int numbers[5];

    int max;

    // Ask the user to enter 5 numbers

    printf("Enter 5 numbers:\n");

    for (int i = 0; i < 5; i++) {

        printf("Number %d: ", i+1);

        scanf("%d", &numbers[i]);

    }

    // Find the maximum value in the array

    max = numbers[0];

    for (int i = 1; i < 5; i++) {

        if (numbers[i] > max) {

            max = numbers[i];

        }

    }

    // Display the maximum value

    printf("The maximum value is: %d\n", max);

    return 0;

}

**QUESTION:4.**

#include <stdio.h>

int main() {

    int numbers[5];

    int max, secondMax;

    // Ask the user to enter 5 numbers

    printf("Enter 5 numbers:\n");

    for (int i = 0; i < 5; i++) {

        printf("Number %d: ", i+1);

        scanf("%d", &numbers[i]);

    }

    // Find the maximum value in the array

    max = numbers[0];

    for (int i = 1; i < 5; i++) {

        if (numbers[i] > max) {

            max = numbers[i];

        }

    }

    // Find the second largest value in the array

    secondMax = numbers[0];

    for (int i = 1; i < 5; i++) {

        if (numbers[i] > secondMax && numbers[i] < max) {

            secondMax = numbers[i];

        }

    }

    // Display the second largest value

    printf("The second largest value is: %d\n", secondMax);

    return 0;

}

**QUESTION:5.**

#include <stdio.h>

int main() {

    int numbers[5];

    int max, maxIndex;

    // Ask the user to enter 5 numbers

    printf("Enter 5 numbers:\n");

    for (int i = 0; i < 5; i++) {

        printf("Number %d: ", i+1);

        scanf("%d", &numbers[i]);

    }

    // Find the maximum value in the array

    max = numbers[0];

    maxIndex = 0;

    for (int i = 1; i < 5; i++) {

        if (numbers[i] > max) {

            max = numbers[i];

            maxIndex = i;

        }

    }

    // Display the index of the maximum value

    printf("The index of the maximum value is: %d\n", maxIndex);

    return 0;

}

**QUESTION:6.**

#include <stdio.h>

#include <stdlib.h>

#include <time.h>

// Function to search for a number in the array

int searchNumber(int arr[], int size, int num) {

    for (int i = 0; i < size; i++) {

        if (arr[i] == num) {

            return i;

        }

    }

    return -1;

}

int main() {

    int numbers[10];

    int searchNum;

    // Seed the random number generator

    srand(time(0));

    // Assign 10 random numbers to the array

    for (int i = 0; i < 10; i++) {

        numbers[i] = rand() % 100;

    }

    // Ask the user to enter a number

    printf("Enter a number: ");

    scanf("%d", &searchNum);

    // Call the searchNumber function to check if the number exists in the array

    int index = searchNumber(numbers, 10, searchNum);

    // Display the result

    if (index != -1) {

        printf("Number found at index: %d\n", index);

    } else {

        printf("Number not found.\n");

    }

    return 0;

}

**QUESTION:7.**

#include <stdio.h>

int main() {

    int numbers[] = {2, 7, 9, 3, 6};

    int size = sizeof(numbers) / sizeof(numbers[0]);

    int sum = 0;

    // Calculate the sum of the numbers in the array

    for (int i = 0; i < size; i++) {

        sum += numbers[i];

    }

    // Display the sum

    printf("The sum of the numbers is: %d\n", sum);

    return 0;

}

#include <stdio.h>

int main() {

    int numbers[] = {2, 7, 9, 3, 6};

    int size = sizeof(numbers) / sizeof(numbers[0]);

    int sum = 0;

    // Calculate the sum of the odd numbers in the array

    for (int i = 0; i < size; i++) {

        if (numbers[i] % 2 != 0) {

            sum += numbers[i];

        }

    }

    // Display the sum of the odd numbers

    printf("The sum of the odd numbers is: %d\n", sum);

    return 0;

}

**QUESTION:8.**

#include <stdio.h>

int main() {

    int numbers[] = {2, 7, 9, 3, 6};

    int size = sizeof(numbers) / sizeof(numbers[0]);

    int sum = 0;

    // Calculate the sum of numbers at even indexes in the array

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

        sum += numbers[i];

    }

    // Display the sum of numbers at even indexes

    printf("The sum of numbers at even indexes is: %d\n", sum);

    return 0;

}

**QUESTION:9.**

#include <stdio.h>

int main() {

    int numbers[10];

    // Ask the user to enter 10 numbers

    printf("Enter 10 numbers:\n");

    for (int i = 0; i < 10; i++) {

        printf("Number %d: ", i+1);

        scanf("%d", &numbers[i]);

    }

    // Check if the array is a palindrome

    int isPalindrome = 1;  // Assume the array is a palindrome

    for (int i = 0, j = 9; i < j; i++, j--) {

        if (numbers[i] != numbers[j]) {

            isPalindrome = 0;  // Not a palindrome

            break;

        }

    }

    // Display the result

    if (isPalindrome) {

        printf("The array is a palindrome.\n");

    } else {

        printf("The array is not a palindrome.\n");

    }

    return 0;

}

**QUESTION:10.**

#include <stdio.h>

int main() {

    int arr1[] = {2, 7, 9, 3, 6};

    int arr2[] = {3, 5, 7, 9, 10};

    int size1 = sizeof(arr1) / sizeof(arr1[0]);

    int size2 = sizeof(arr2) / sizeof(arr2[0]);

    printf("Common numbers: ");

    // Iterate over elements of arr1

    for (int i = 0; i < size1; i++) {

        // Check if the current element of arr1 is present in arr2

        for (int j = 0; j < size2; j++) {

            if (arr1[i] == arr2[j]) {

                printf("%d ", arr1[i]);

                break;

            }

        }

    }

    printf("\n");

    return 0;

}

**QUESTION:11.**

#include <stdio.h>

int main() {

    int arr1[] = {2, 7, 9, 3, 6};

    int arr2[] = {3, 5, 7, 9, 10};

    int size1 = sizeof(arr1) / sizeof(arr1[0]);

    int size2 = sizeof(arr2) / sizeof(arr2[0]);

    printf("Different numbers: ");

    // Iterate over elements of arr1

    for (int i = 0; i < size1; i++) {

        int found = 0;

        // Check if the current element of arr1 is present in arr2

        for (int j = 0; j < size2; j++) {

            if (arr1[i] == arr2[j]) {

                found = 1;

                break;

            }

        }

        // If the element is not found in arr2, print it

        if (!found) {

            printf("%d ", arr1[i]);

        }

    }

    printf("\n");

    // Iterate over elements of arr2

    for (int i = 0; i < size2; i++) {

        int found = 0;

        // Check if the current element of arr2 is present in arr1

        for (int j = 0; j < size1; j++) {

            if (arr2[i] == arr1[j]) {

                found = 1;

                break;

            }

        }

        // If the element is not found in arr1, print it

        if (!found) {

            printf("%d ", arr2[i]);

        }

    }

    printf("\n");

    return 0;}

**QUESTION:12.**

#include <stdio.h>

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

    // Create a frequency array to store the count of each number

    int frequency[100] = {0}; // Assuming the numbers in the array are between 0 and 99

    // Count the occurrences of each number

    for (int i = 0; i < size; i++) {

        frequency[arr[i]]++;

    }

    // Display the number of occurrences for each number

    for (int i = 0; i < 100; i++) {

        if (frequency[i] > 0) {

            printf("Number %d occurs %d time(s)\n", i, frequency[i]);

        }

    }

}

int main() {

    int arr[] = {2, 7, 9, 3, 6, 2, 7, 9, 9};

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

    countOccurrences(arr, size);

    return 0;

}

**QUESTION:13.**

#include <stdio.h>

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

    // Create a frequency array to store the count of each number

    int frequency[100] = {0}; // Assuming the numbers in the array are between 0 and 99

    // Count the occurrences of each number

    for (int i = 0; i < size; i++) {

        frequency[arr[i]]++;

    }

    // Find the maximum occurrences for each number

    for (int i = 0; i < size; i++) {

        if (frequency[arr[i]] != -1) {

            printf("%d = %d\n", arr[i], frequency[arr[i]]);

            frequency[arr[i]] = -1;

        }

    }

}

int main() {

    int arr[5];

    // Ask the user to enter 5 numbers

    printf("Enter 5 numbers:\n");

    for (int i = 0; i < 5; i++) {

        printf("Number %d: ", i+1);

        scanf("%d", &arr[i]);

    }

    countOccurrences(arr, 5);

    return 0;

}

**QUESTION:14.**

#include <stdio.h>

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

    int start = 0;

    int end = size - 1;

    // Swap elements from start and end until the middle is reached

    while (start < end) {

        int temp = arr[start];

        arr[start] = arr[end];

        arr[end] = temp;

        start++;

        end--;

    }

}

int main() {

    int arr[] = {2, 7, 9, 3, 6};

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

    printf("Original array: ");

    for (int i = 0; i < size; i++) {

        printf("%d ", arr[i]);

    }

    reverseArray(arr, size);

    printf("\nReversed array: ");

    for (int i = 0; i < size; i++) {

        printf("%d ", arr[i]);

    }

    printf("\n");

    return 0;

}

**QUESTION:15.**

#include <stdio.h>

void insertSorted(int arr[], int size, int num) {

    int i = size - 1;

    // Shift elements to the right to make space for the new number

    while (i >= 0 && arr[i] > num) {

        arr[i + 1] = arr[i];

        i--;

    }

    // Insert the new number at the correct position

    arr[i + 1] = num;

}

int main() {

    int arr[10];

    int size = 0;

    // Ask the user to enter numbers in sorted order

    printf("Enter numbers in sorted order:\n");

    while (size < 10) {

        printf("Number %d: ", size + 1);

        scanf("%d", &arr[size]);

        // Call the insertSorted function to insert the number in the correct position

        insertSorted(arr, size, arr[size]);

        size++;

    }

    // Display the sorted array

    printf("\nSorted array: ");

    for (int i = 0; i < size; i++) {

        printf("%d ", arr[i]);

    }

    printf("\n");

    return 0;

}

***THE END!***

***THANKS!***