1- Write a program that defines a function print to display the elements of a 2D array. The program should declare a 2D array x with dimensions 3x3 and values { {1, 2, 3}, {4, 5, 6}, {7, 8, 9} }. Call the print function to display the elements of the array.

اكتب برنامجًا يحدد طباعة function لعرض عناصر 2D array. يجب أن يعلن البرنامج عن x 2D array بأبعاد 3x3 والقيم { 1, 2, 3}, {4, 5, 6}, {7, 8, 9 }. قم باستدعاء دالة الطباعة لعرض عناصر array.

Output

```
Original array elements: 1 2 3 4 5 6 7 8 9
```

Solution

```c
// www.gammal.tech

#include <stdio.h>

void print(int x[][3]) {
    for (int i = 0; i < 3; i++)
        for (int j = 0; j < 3; j++)
            printf("%d ", x[i][j]);
}

int main() {
    int x[][3] = {{1, 2, 3}, {4, 5, 6}, {7, 8, 9}};

    // Display the original array elements using the print function
    printf("Original array elements: ");
    print(x);

    return 0;
}
```

2- Write a program to declare and initialize a 2D array with values { {1, 2, 3}, {4, 5, 6}, {7, 8, 9} } and print its elements.

اكتب برنامجًا للإعلان وتهيئة 2D array بالقيم { {1, 2, 3}, {4, 5, 6}, {7, 8, 9} } وطباعة عناصرها.

Output

```
1 2 3
4 5 6
7 8 9
```

Solution

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    int arr[3][3] = {{1, 2, 3}, {4, 5, 6}, {7, 8, 9}};

    // Print the elements of the 2D array
    for (int i = 0; i < 3; i++) {
        for (int j = 0; j < 3; j++) {
            printf("%d ", arr[i][j]);
        }
        printf("\n");
    }

    return 0;
}
```

3- Write a program to declare a 3x3 2D array of integers { {1, 2, 3}, {4, 5, 6}, {7, 8, 9} } and print the elements in the last row.

اكتب برنامجًا للإعلان عن مصفوفة 3x3 ثنائية الأبعاد من الأعداد الصحيحة { {1, 2, 3}, {4, 5, 6}, {7, 8, 9} } واطبع العناصر الموجودة في الصف الأخير.

Output

```
Elements in the last row: 7 8 9
```

Solution

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    // Declare and initialize a 2D array
    int arr[3][3] = {{1, 2, 3}, {4, 5, 6}, {7, 8, 9}};

    // Print elements in the last row
    printf("Elements in the last row: ");
    for (int j = 0; j < 3; j++) {
        printf("%d ", arr[2][j]);
    }

    return 0;
}
```

4- Write a program to declare a 3x3 2D array of integers { {1, 2, 3}, {4, 5, 6}, {7, 8, 9} } and print the elements in the second column.

اكتب برنامجًا للإعلان عن 3x3 2D array من الأعداد الصحيحة { 1} ,2 ,3{, {4, 5, 6}, {7, 8, 9} } واطبع العناصر الموجودة في العمود الثاني.

Output

```
Elements in the second column: 2 5 8
```

Solution

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    // Declare and initialize a 2D array
    int arr[3][3] = {{1, 2, 3}, {4, 5, 6}, {7, 8, 9}};

    // Print elements in the second column
    printf("Elements in the second column: ");
    for (int i = 0; i < 3; i++) {
        printf("%d ", arr[i][1]);
    }

    return 0;
}
```

5- Write a program to count the number of even elements
in the array {2, 5, 8, 11, 14}.

اكتب برنامجًا لحساب عدد العناصر الزوجية في array
{2، 5، 8، 11، 14}.

Output

```
Number of even elements in the array: 3
```

Solution

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    int arr[] = {2, 5, 8, 11, 14};
    int evenCount = 0;

    for (int i = 0; i < 5; i++) {
        if (arr[i] % 2 == 0) {
            evenCount++;
        }
    }

    printf("Number of even elements in the array: %d\n", evenCount);

    return 0;
}
```

6- Write a program to count the number of even elements and calculate their sum in the given array: {2, 5, 8, 11, 14}. Print both the count and the sum as output.

اكتب برنامجًا لحساب عدد العناصر الزوجية وحساب مجموعها في array المعطاة: {2، 5، 8، 11، 14}. اطبع كلاً من العدد والمجموع كمخرجات.

Output

```
Array elements: {2, 5, 8, 11, 14}
Number of even elements in the array: 3
Sum of even elements in the array: 24
```

Solution

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    // Initialize the array
    int arr[] = {2, 5, 8, 11, 14};

    // Initialize variables for even count and sum
    int evenCount = 0, sum = 0;

    // Iterate through the array
    for (int i = 0; i < 5; i++) {
        // Check if the current element is even
        if (arr[i] % 2 == 0) {
            // Increment even count and add the element to the sum
            evenCount++;
            sum += arr[i];
        }
    }

    // Print the array elements
    printf("Array elements: {");
    for (int i = 0; i < 5; i++) {
        printf("%d", arr[i]);
        if (i < 4) {
            printf(", ");
        }
    }
    printf("}\n");

    // Print the results
    printf("Number of even elements in the array: %d\n", evenCount);
    printf("Sum of even elements in the array: %d\n", sum);

    return 0;
}
```

7- Write a program to find the index of the element 9 in the array {3, 6, 9, 12, 15}.

اكتب برنامجًا لإيجاد فهرس العنصر 9 في array {3، 6، 9، 12، 15}.

Output

```
Index of 9 in the array: 2
```

Solution

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    int arr[] = {3, 6, 9, 12, 15};
    int target = 9;
    int index = -1;

    for (int i = 0; i < 5; i++) {
        if (arr[i] == target) {
            index = i;
            break;
        }
    }

    if (index != -1) {
        printf("Index of %d in the array: %d\n", target, index);
    } else {
        printf("%d not found in the array.\n", target);
    }

    return 0;
}
```

8- Write a program to copy elements from the array {2, 4, 6, 8, 10} to another array.

اكتب برنامجًا لنسخ العناصر من المصفوفة {2، 4، 6، 8، 10} إلى array أخرى.

Output

```
Elements in arr2: 2 4 6 8 10
```

Solution

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    int arr1[] = {2, 4, 6, 8, 10};
    int arr2[5];

    for (int i = 0; i < 5; i++) {
        arr2[i] = arr1[i];
    }

    printf("Elements in arr2: ");
    for (int i = 0; i < 5; i++) {
        printf("%d ", arr2[i]);
    }

    return 0;
}
```

9- Write a program to reverse the elements of the array {1, 2, 3, 4, 5}.

اكتب برنامجا لعكس عناصر array
{1، 2، 3، 4، 5}.

Output

```
Reversed array: 5 4 3 2 1
```

Solution

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    int arr[] = {1, 2, 3, 4, 5};
    int temp;

    for (int i = 0; i < 2; i++) {
        temp = arr[i];
        arr[i] = arr[4 - i];
        arr[4 - i] = temp;
    }

    printf("Reversed array: ");
    for (int i = 0; i < 5; i++) {
        printf("%d ", arr[i]);
    }

    return 0;
}
```

10- Write a program to find the product of each column in a 2D array { {1, 2, 3}, {4, 5, 6}, {7, 8, 9} }.

اكتب برنامجًا لإيجاد حاصل ضرب كل عمود في 2D array
{ {1, 2, 3}, {4, 5, 6}, {7, 8, 9} }.

Output

```
Product of elements in column 1: 28
Product of elements in column 2: 80
Product of elements in column 3: 162
```

Solution

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    int arr[3][3] = {{1, 2, 3}, {4, 5, 6}, {7, 8, 9}};

    // Calculate the product of each column
    for (int j = 0; j < 3; j++) {
        int colProduct = 1;
        for (int i = 0; i < 3; i++) {
            colProduct *= arr[i][j];
        }
        printf("Product of elements in column %d: %d\n", j + 1, colProduct);
    }

    return 0;
}
```