

1- Write a program that initializes a 3x3 matrix with predefined values and prints the matrix.

اكتب برنامجًا يقوم بتهيئة array 3x3 بقيم محددة مسبقًا وطباعة array.

Output

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

Solution

```
// www.gammal.tech

#include <stdio.h>

int main() {
    int i, j;

    // Initialize a 3x3 matrix with predefined values
    int matrix[3][3] = {{1, 2, 3},
                        {4, 5, 6},
                        {7, 8, 9}};

    // Print the entered matrix
    printf("\nMatrix:\n");
    for (i = 0; i < 3; i++) {
        for (j = 0; j < 3; j++)
            printf("%d ", matrix[i][j]);
        printf("\n");
    }

    return 0;
}
```

2- Write a program that initializes a 3x3 matrix with predefined values and prints the diagonal elements of the matrix.

اكتب برنامجًا يقوم بتهيئة array 3x3 بقيم محددة مسبقًا ويطبع العناصر القطرية لي ال array.

## Output

```
Diagonal Elements:  
1 5 9
```

## Solution

```
// www.gammal.tech  
  
#include <stdio.h>  
  
int main() {  
    int i, j;  
  
    // Initialize a 3x3 matrix with predefined values  
    int matrix[3][3] = {{1, 2, 3},  
                        {4, 5, 6},  
                        {7, 8, 9}};  
  
    // Print the diagonal elements of the matrix  
    printf("\nDiagonal Elements:\n");  
    for (i = 0; i < 3; i++) {  
        for (j = 0; j < 3; j++)  
            if (i == j)  
                printf("%d ", matrix[i][j]);  
    }  
  
    return 0;  
}
```

3- Write a program that initializes a 3x3 matrix with predefined values and prints the first and last rows of the matrix.

اكتب برنامجًا يقوم بتهيئة array 3x3 بقيم محددة مسبقًا ويطبع الصفين الأول والأخير من array.

## Output

```
First Row:  
1 2 3
```

```
Last Row:  
7 8 9
```

## Solution

```
// www.gammal.tech  
  
#include <stdio.h>  
  
int main() {  
    int i, j;  
  
    // Initialize a 3x3 matrix with predefined values  
    int matrix[3][3] = {{1, 2, 3},  
                        {4, 5, 6},  
                        {7, 8, 9}};  
  
    // Print the first row of the matrix  
    printf("\nFirst Row:\n");  
    for (j = 0; j < 3; j++)  
        printf("%d ", matrix[0][j]);  
  
    // Print a newline for separation  
    printf("\n");  
  
    // Print the last row of the matrix  
    printf("\nLast Row:\n");  
    for (j = 0; j < 3; j++)  
        printf("%d ", matrix[2][j]);  
  
    return 0;  
}
```

4- Write a program that initializes a 3x3 matrix with predefined values and calculates the sum of the elements in the first and last rows separately. Print the sums.

اكتب برنامجًا يقوم بتهيئة array 3x3 بقيم محددة مسبقًا ويحسب مجموع العناصر في الصف الأول والأخير بشكل منفصل. طباعة المبالغ.

## Output

```
Sum of the First Row:  
6
```

```
Sum of the Last Row:  
24
```

## Solution

```
// www.gammal.tech  
  
#include <stdio.h>  
  
int main() {  
    int i, j, sumFirst = 0, sumLast = 0;  
  
    // Initialize a 3x3 matrix with predefined values  
    int matrix[3][3] = {{1, 2, 3},  
                        {4, 5, 6},  
                        {7, 8, 9}};  
  
    // Calculate the sum of elements in the first row  
    printf("\nSum of the First Row:\n");  
    for (j = 0; j < 3; j++)  
        sumFirst += matrix[0][j];  
  
    // Print the sum of the first row  
    printf("%d\n", sumFirst);  
  
    // Calculate the sum of elements in the last row  
    printf("\nSum of the Last Row:\n");  
    for (j = 0; j < 3; j++)  
        sumLast += matrix[2][j];  
  
    // Print the sum of the last row  
    printf("%d\n", sumLast);  
  
    return 0;  
}
```

---

5- Write a program that initializes a 3x3 matrix with predefined values and calculates the sum of the elements on the main diagonal (from top-left to bottom-right). Print the sum.

اكتب برنامجًا يقوم بتهيئة array 3x3 بقيم محددة مسبقًا ويحسب مجموع العناصر على القطر الرئيسي (من أعلى اليسار إلى أسفل اليمين). طباعة المبلغ.

Output

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

Sum of the Main Diagonal:
15
```

## Solution

```
// www.gammal.tech

#include <stdio.h>

int main() {
    int i, j, sum = 0;

    // Initialize a 3x3 matrix with predefined values
    int matrix[3][3] = {{1, 2, 3},
                        {4, 5, 6},
                        {7, 8, 9}};

    // Print the entered matrix
    printf("\nMatrix:\n");
    for (i = 0; i < 3; i++) {
        for (j = 0; j < 3; j++)
            printf("%d ", matrix[i][j]);
        printf("\n");
    }

    // Calculate the sum of elements on the main diagonal
    printf("\nSum of the Main Diagonal:\n");
    for (i = 0; i < 3; i++)
        sum += matrix[i][i];

    // Print the sum of the main diagonal
    printf("%d\n", sum);

    return 0;
}
```

---

6- Write a program that initializes a 3x3 matrix with predefined values and calculates the sum of each column. Print the entered matrix and the sum of each column.

اكتب برنامجاً يقوم بتهيئة array 3x3 بقيم محددة مسبقاً ويحسب مجموع كل عمود. اطبع array المدخلة ومجموع كل عمود.

## Output

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

Sum of Each Column:
Column 1: 12
Column 2: 15
Column 3: 18
```

## Solution

```

// www.gammal.tech

#include <stdio.h>

int main() {
    int i, j, sum;

    // Initialize a 3x3 matrix with predefined values
    int matrix[3][3] = {{1, 2, 3},
                        {4, 5, 6},
                        {7, 8, 9}};

    // Print the entered matrix
    printf("\nMatrix:\n");
    for (i = 0; i < 3; i++) {
        for (j = 0; j < 3; j++)
            printf("%d ", matrix[i][j]);
        printf("\n");
    }

    // Calculate and print the sum of each column
    printf("\nSum of Each Column:\n");
    for (j = 0; j < 3; j++) {
        sum = 0;
        for (i = 0; i < 3; i++)
            sum += matrix[i][j];
        printf("Column %d: %d\n", j + 1, sum);
    }

    return 0;
}
```

7- Write a program that initializes a 3x3 matrix with predefined values, prints the entered matrix row-wise, and calculates the sum of each row.

اكتب برنامجًا يقوم بتهيئة array 3x3 بقيم محددة مسبقًا، ويطبع array المدخلة حسب الصف، ويحسب مجموع كل صف.

## Output

```
Matrix and Sum of Each Row:
1 2 3 (Sum: 6)
4 5 6 (Sum: 15)
7 8 9 (Sum: 24)
```

## Solution

```
// www.gammal.tech

#include <stdio.h>

int main() {
    int i, j, sum;

    // Initialize a 3x3 matrix with predefined values
    int matrix[3][3] = {{1, 2, 3},
                        {4, 5, 6},
                        {7, 8, 9}};

    // Print the entered matrix row-wise and calculate the sum of each row
    printf("Matrix and Sum of Each Row:\n");
    for (i = 0; i < 3; i++) {
        sum = 0;
        for (j = 0; j < 3; j++) {
            printf("%d ", matrix[i][j]);
            sum += matrix[i][j];
        }
        printf(" (Sum: %d)\n", sum);
    }

    return 0;
}
```

---

8- Write a program that initializes a 3x3 matrix with predefined values, prints the entered matrix row-wise, calculates the sum of each row, and finally calculates the total sum of all elements in the matrix.



اكتب برنامجًا يقوم بتهيئة array 3x3 بقيم محددة مسبقًا، ثم يطبع array المدخلة حسب الصف، ويحسب مجموع كل صف، وأخيرًا يحسب المجموع الإجمالي لجميع العناصر في array.

## Output

```
Matrix and Sum of Each Row:
1 2 3 (Sum: 6)
4 5 6 (Sum: 15)
7 8 9 (Sum: 24)

Total Sum of Matrix Elements: 45
```

## Solution

```
// www.gammal.tech

#include <stdio.h>

int main() {
    int i, j, sum, totalSum = 0;

    // Initialize a 3x3 matrix with predefined values
    int matrix[3][3] = {{1, 2, 3},
                        {4, 5, 6},
                        {7, 8, 9}};

    // Print the entered matrix row-wise, calculate the sum of each row, and total sum
    printf("Matrix and Sum of Each Row:\n");
    for (i = 0; i < 3; i++) {
        sum = 0;
        for (j = 0; j < 3; j++) {
            printf("%d ", matrix[i][j]);
            sum += matrix[i][j];
            totalSum += matrix[i][j];
        }
        printf(" (Sum: %d)\n", sum);
    }

    // Print the total sum of all elements in the matrix
    printf("\nTotal Sum of Matrix Elements: %d\n", totalSum);

    return 0;
}
```

9- Write a program that initializes a 3x3 matrix with predefined values, prints the matrix, and counts the number of occurrences of the value '3' in the matrix.

اكتب برنامجًا يقوم بتهيئة array 3x3 بقيم محددة مسبقًا، ثم يطبع array ويحسب عدد تكرارات القيمة '3' في المصفوفة.

## Output

```
Matrix and Count of Number 3:
1 2 3
4 3 6
7 8 3

Count of Number 3: 3
```

## Solution

```
// www.gammal.tech

#include <stdio.h>

int main() {
    int i, j, countOfThree = 0;

    // Initialize a 3x3 matrix with predefined values
    int matrix[3][3] = {{1, 2, 3},
                        {4, 3, 6},
                        {7, 8, 3}};

    // Print the matrix and count occurrences of the value '3'
    printf("Matrix and Count of Number 3:\n");
    for (i = 0; i < 3; i++) {
        for (j = 0; j < 3; j++) {
            printf("%d ", matrix[i][j]);
            if (matrix[i][j] == 3)
                countOfThree++;
        }
        printf("\n");
    }

    // Print the count of occurrences of the value '3'
    printf("\nCount of Number 3: %d\n", countOfThree);

    return 0;
}
```

10- Write a program that initializes a 3x3 matrix with predefined values, prints the matrix, and counts the number of occurrences of the values '3' and '1' in the matrix.

اكتب برنامجًا يقوم بتهيئة array 3x3 بقيم محددة مسبقًا، ثم يطبع array ويحسب عدد تكرارات القيمتين '3' و '1' في array.

## Output

```
Matrix and Count of Number 3 and 1:
1 2 3
4 3 6
7 1 3

Count of Number 3 and 1: 5
```

## Solution

```
// www.gammal.tech

#include <stdio.h>

int main() {
    int i, j, counter = 0;

    // Initialize a 3x3 matrix with predefined values
    int matrix[3][3] = {{1, 2, 3},
                        {4, 3, 6},
                        {7, 1, 3}};

    // Print the matrix and count occurrences of the values '3' and '1'
    printf("Matrix and Count of Number 3 and 1:\n");
    for (i = 0; i < 3; i++) {
        for (j = 0; j < 3; j++) {
            printf("%d ", matrix[i][j]);
            if (matrix[i][j] == 3 || matrix[i][j] == 1)
                counter++;
        }
        printf("\n");
    }

    // Print the count of occurrences of the values '3' and '1'
    printf("\nCount of Number 3 and 1: %d\n", counter);

    return 0;
}
```