**2D Array**

|  |  |
| --- | --- |
|  | **Find the summation of the elements of a 2D array.** |
|  | |  |  | | --- | --- | | sum | 71 |  |  |  |  |  | | --- | --- | --- | --- | |  | 0 | 1 | 2 | | 0 | 12 | 5 | 8 | | 1 | 6 | 7 | 4 | | 2 | 18 | 9 | 2 |   **Input (***Declarations and Initializations***):** int arr[3][3], int sum = 0;  **Process:**   1. Start from the row with ***row-value*** r=0. 2. Start from the column with ***column-value*** c= 0. 3. Add the value of **sum** with the **element** in **arr[r][c]** index. 4. Store the summation of the add operation in (3) in **sum**. 5. Increase the value of **c** by 1. 6. Repeat (3), (4) and (5) for all the columns. 7. Increase the value of **r** by 1. 8. Repeat (2), (3), (4), (5), (6), (7) for all the rows.   **Output:** Print the value of **sum.** |
|  | **Find the summation of two 2D arrays and store the result in another 2D array.** |
|  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | 0 | 1 | 2 |  |  | 0 | 1 | 2 |  |  | 0 | 1 | 2 | | 0 | 12 | 5 | 8 |  | 0 | 2 | 8 | 18 |  | 0 | 24 | 13 | 26 | | 1 | 6 | 7 | 4 | + | 1 | 16 | 14 | 5 | = | 1 | 22 | 21 | 9 | | 2 | 18 | 9 | 2 |  | 2 | 8 | 19 | 12 |  | 2 | 26 | 28 | 24 |   **Input (***Declarations and Initializations***):** int A[3][3], int B[3][3], int S[3][3];  **Process:**   1. Start from the row with ***row-value*** r=0. 2. Start from the column with ***column-value*** c= 0. 3. Add the value of **A[r][c]** with **B[r][c]** and store the summation in **S[r][c]**. 4. Increase the value of **c** by 1. 5. Repeat (3) and (4) for all the columns. 6. Increase the value of **r** by 1. 7. Repeat (2), (3), (4), (5) and (6) for all the rows.   **Output:** Print the array **S.** |
|  | **Find the Summation of the boundary elements of a 2D array.** |
|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 0 | 1 | 2 | 3 | | 0 | 12 | 5 | 8 | 10 | | 1 | 6 | 7 | 4 | 11 | | 2 | 18 | 9 | 2 | 1 | | 3 | 20 | 3 | 15 | 13 |   **Input (***Declarations and Initializations***):** int arr[4][4], int sum = 0;  **Process:**   1. Start from the row with ***row-value*** r=0. 2. Start from the column with ***column-value*** c= 0. 3. If the value of r is 0 or r is (4-1) or c is 0 or c is (4-1), go to (4), else go to (6). 4. Add the value of **sum** with the **element** in **arr[r][c]** index. 5. Store the summation of add operation in (4) in **sum**. 6. Increase the value of **c** by 1. 7. Repeat (3), (4), (5) and (6) for all the columns. 8. Increase the value of **r** by 1. 9. Repeat (2), (3), (4), (5), (6), (7) and (8) for all the rows.   **Output:** Print the value of **sum.** |
|  | **Find the summation of the diagonal elements of a 2D array.** |
|  | |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | 0 | 1 | 2 | 3 |  |  | 0 | 1 | 2 | 3 | 4 | | 0 | 12 | 5 | 8 | 10 |  | 0 | 12 | 5 | 8 | 10 | 18 | | 1 | 6 | 7 | 4 | 11 |  | 1 | 6 | 7 | 4 | 11 | 21 | | 2 | 18 | 9 | 2 | 1 |  | 2 | 18 | 9 | 2 | 1 | 31 | | 3 | 20 | 3 | 15 | 13 |  | 3 | 20 | 3 | 15 | 13 | 28 | |  |  |  |  |  |  | 4 | 30 | 3 | 35 | 23 | 29 |   **Input (***Declarations and Initializations***):** int arr[4][4], int sum = 0;  **Process:**   1. Start from the row with ***row-value*** r=0. 2. Start from the column with ***column-value*** c= 0. 3. If the value of **r** is equal to **c** or **(r+c)** is equal to (4-1), go to (4), else go to (6). 4. Add the value of **sum** with the **element** in **arr[r][c]** index. 5. Store the summation of add operation in (4) in **sum**. 6. Increase the value of **c** by 1. 7. Repeat (3), (4), (5) and (6) for all the columns. 8. Increase the value of **r** by 1. 9. Repeat (2), (3), (4), (5), (6), (7) and (8) for all the rows.   **Output:** Print the value of **sum.** |
|  | **Find the transpose matrix of a 2D Array.** |
|  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | 0 | 1 | 2 | 3 |  |  |  |  | 0 | 1 | 2 | 3 | 4 | | 0 | 12 | 5 | 8 | 10 |  |  |  | 0 | 12 | 6 | 18 | 20 | 30 | | 1 | 6 | 7 | 4 | 11 |  |  |  | 1 | 5 | 7 | 9 | 3 | 21 | | 2 | 18 | 9 | 2 | 1 | ---Transpose---> | | | 2 | 8 | 4 | 2 | 15 | 35 | | 3 | 20 | 3 | 15 | 13 |  |  |  | 3 | 10 | 11 | 1 | 3 | 23 | | 4 | 30 | 21 | 35 | 23 |  |  |  |  |  |  |  |  |  |   **Input (***Declarations and Initializations***):** int A[5][4], int A\_Tr[4][5];  **Process:**   1. Start from the row with ***row-value*** r=0. 2. Start from the column with ***column-value*** c= 0. 3. Store the element of **A[r][c]** in **A\_Tr[c][r].** 4. Increase the value of **c** by 1. 5. Repeat (3) and (4) for all the columns. 6. Increase the value of **r** by 1. 7. Repeat (2), (3), (4), (5) and (6) for all the rows.   **Output:** Print the value of **sum.** |