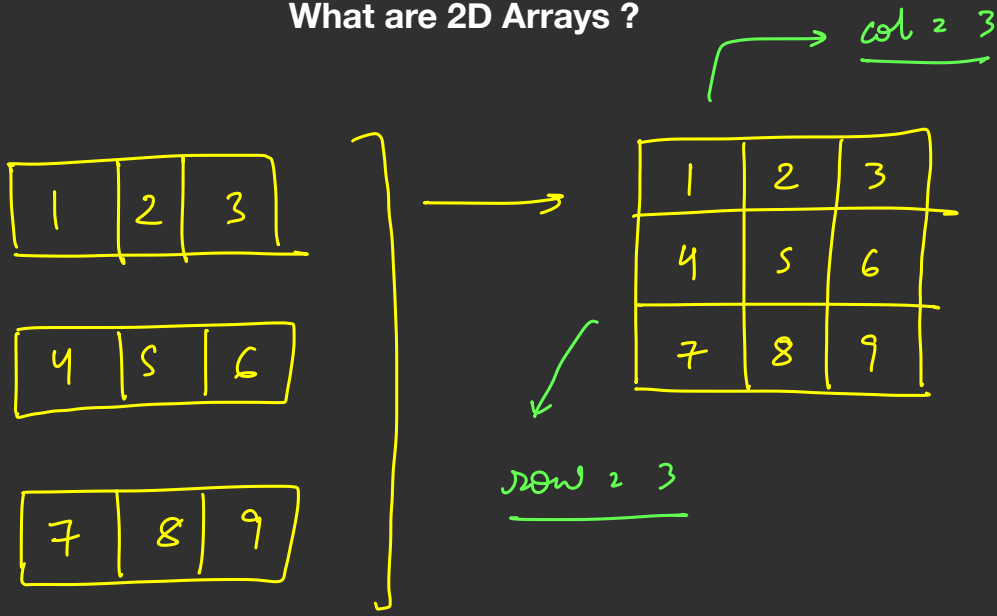
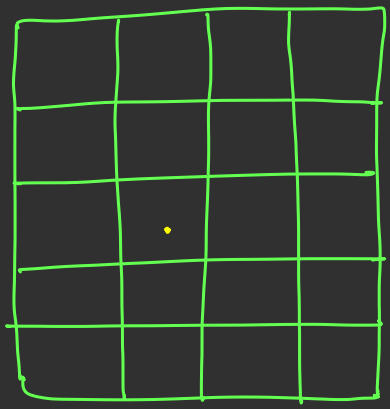
L9
2D arrays

What are 2D Arrays ?



Use-case of 2D Arrays



- Marks → Student
- Chessboard
- Robot / Maze

Declaring different 2D arrays

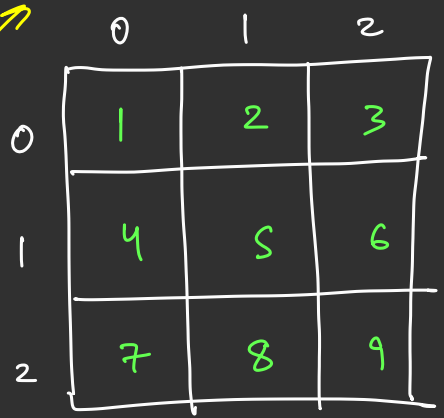
datatype arrayname[] = new datatype[size];

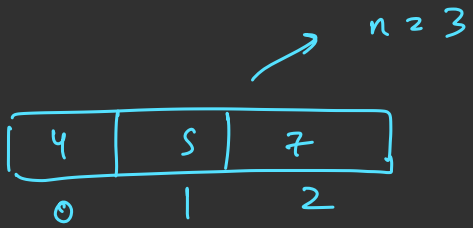
datatype arrayname[][] = new datatype[n][m];

n → row
m → column

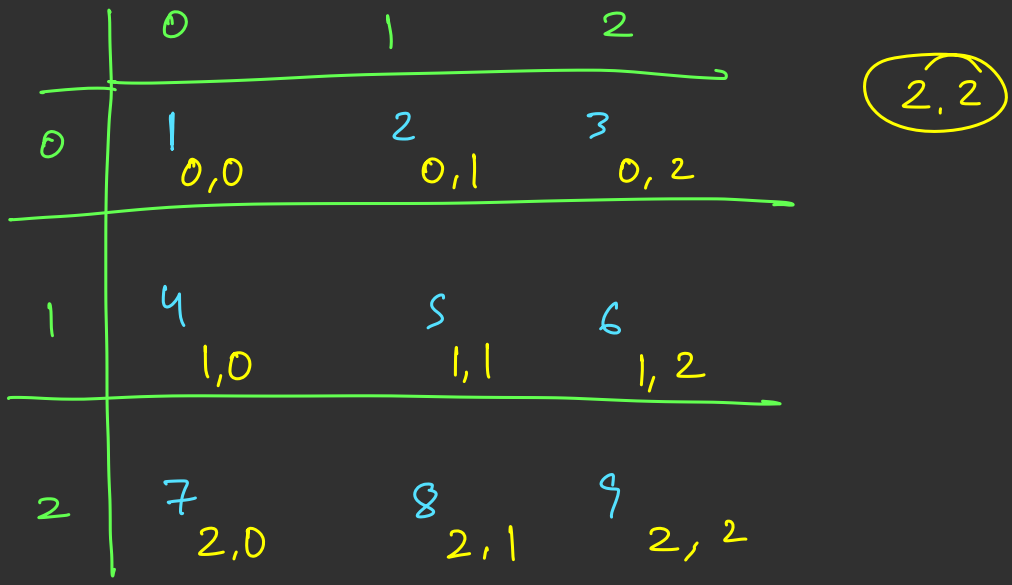
Element Access in 2D array and Indexing in 2D array

arr[rI][cI]

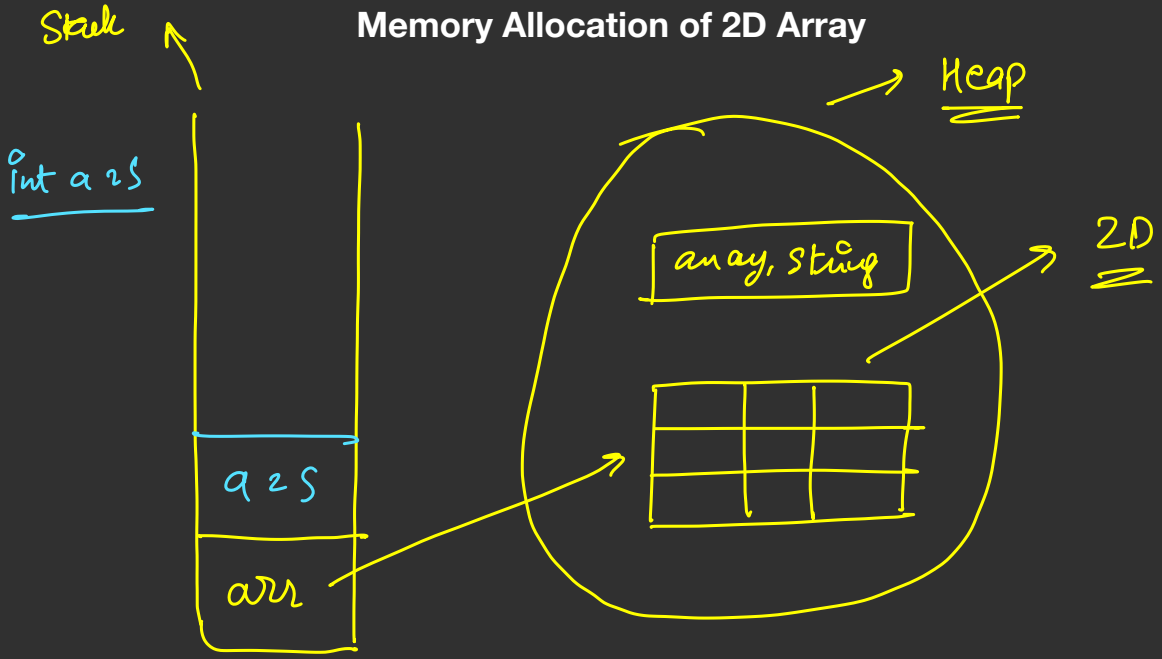




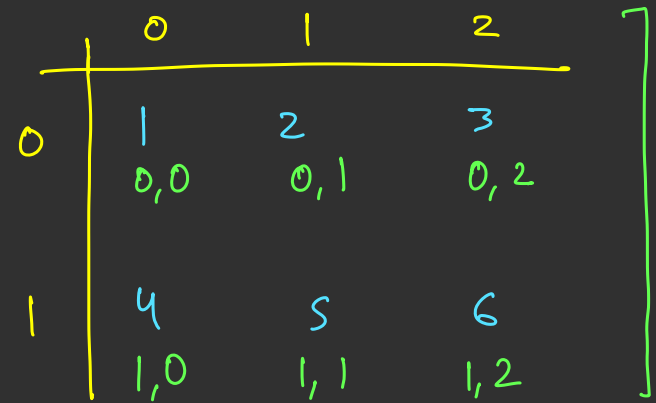
e → (rI, cI)



Memory Allocation of 2D Array



Print Row wise traversal of 2D array



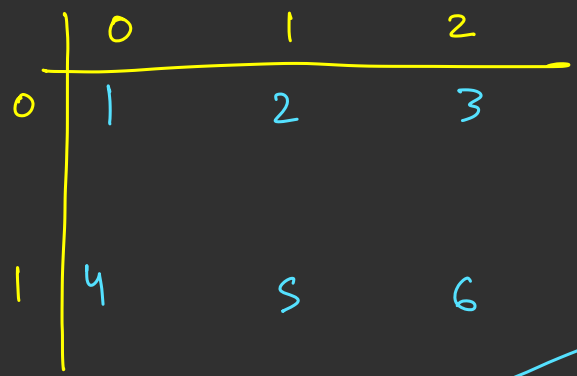
outer → row

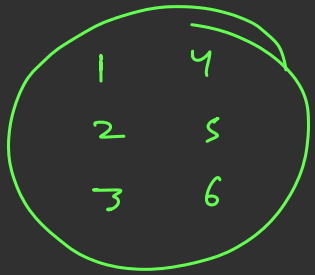
inner → column

Nested Loop → outer loop

→ inner loop

Print Column wise traversal of 2D array



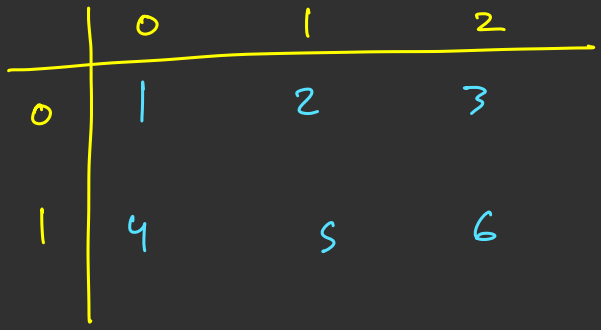


0, (0 - - 1)
1, (0 - - - 1)
2, (0 - - - 1)

outer → column

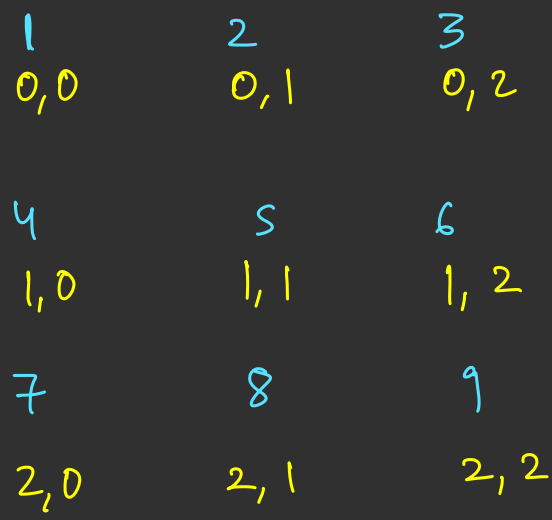
inner → row

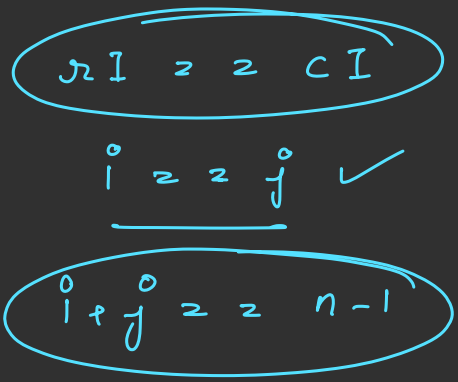
Sum of each row and each column in 2D array

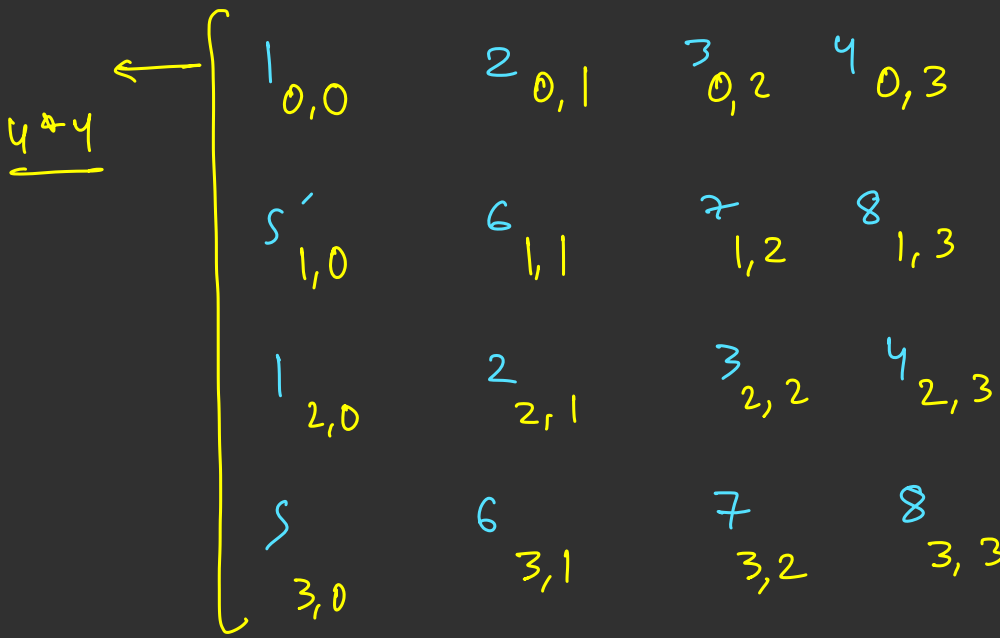



```
for (int i = 0; i < n;
                  i++)
{
  int sum = 0;
  for (int j = 0; j < m;
                    j++)
    sum += arr[i][j];
  System.out.println(sum);
}
```

Find sum of diagonal elements in 2D array



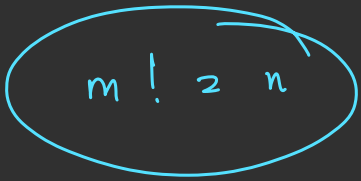



4*4
1 0,0
2 0,1
3 0,2
4 0,3
5 1,0
6 1,1
7 1,2
8 1,3
1 2,0
2 2,1
3 2,2
4 2,3
5 3,0
6 3,1
7 3,2
8 3,3

n → row

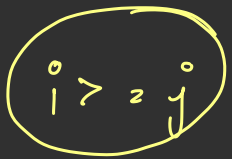
m → column

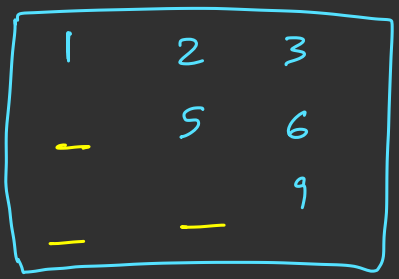
↳ square

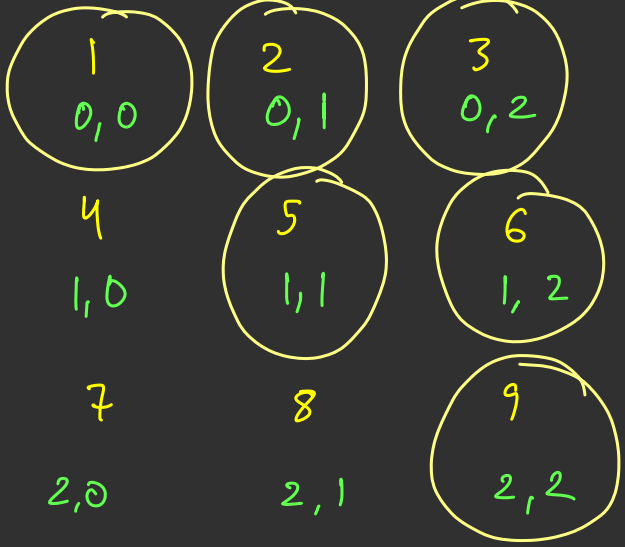


→ Rectangle matrix

Print Only Upper Triangular Elements

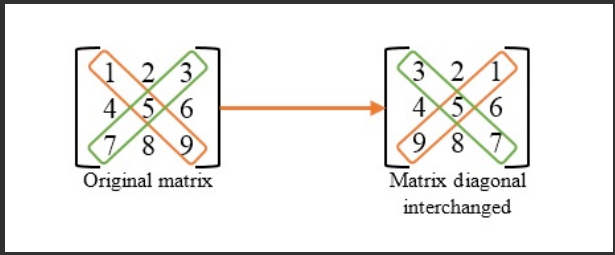






Interchange the diagonals in 2D array

Square Matrix



0,0 0,1 0,2

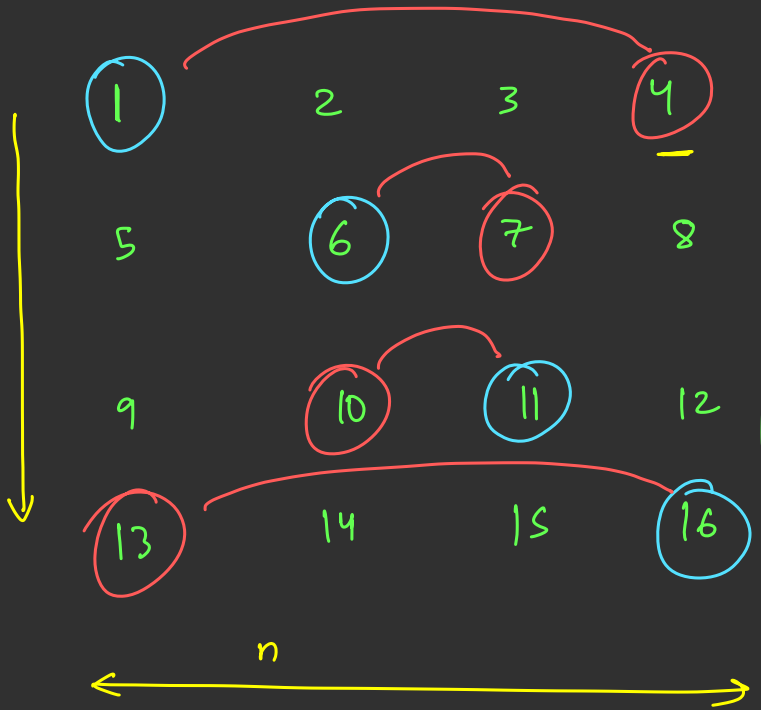
1 2 3

1,0 1,1 1,2

4 5 6

2,0 2,1 2,2

7 8 9



(i, j)

$(i, n-1-j)$

$(0,0) \rightarrow (0,3)$

$(1,1) \rightarrow (1,2)$

$(2,2) \rightarrow (2,1)$

$(3,3) \rightarrow (3,0)$

Practice and Homework Questions

Homework questions -

1. https://codeforwin.org/c-programming/c-program-to-add-two-matrices
2. https://codeforwin.org/c-programming/c-program-to-subtract-two-matrices
3. https://codeforwin.org/c-programming/c-program-to-find-lower-triangular-matrix
4. https://codeforwin.org/c-programming/c-program-to-find-sum-of-upper-triangular-matrix
5. https://codeforwin.org/c-programming/c-program-to-find-sum-of-lower-triangular-matrix

Thank You!

Please practice more questions and examples as above !!