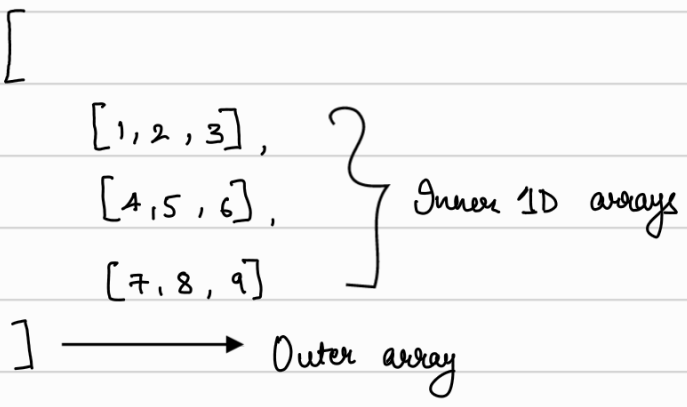
* 2D arrays :-

→ A regular array is 1D structure that occupies contiguous memory.

→ If we club such 1D arrays together in a single array, we form a 2D array.



→ This structure represents a matrix.

outer[0] ; → [1,2,3]

outer[1] ; → [4,5,6]

outer[2] ; → [7,8,9]

→ We can find multiple 1D arrays together inside another array to form 2D array.

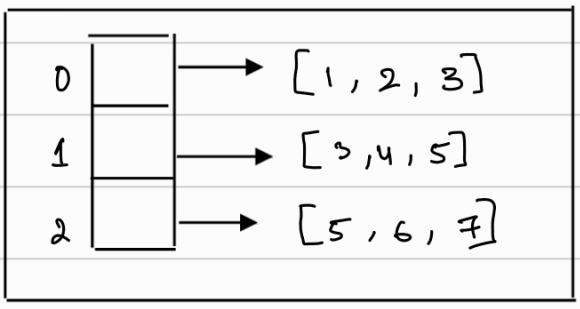
* Creating a 2D array :-

```
Main.java > ...
1   public class Main {
        Run | Debug
2       public static void main(String[] args) {
3           int[][] arr = {
4                   { 1, 2, 3 },
5                   { 3, 4, 5 },
6                   { 5, 6, 7 }
7           };
8
9           System.out.println(arr);
10      }
11  }
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS
➜ java-vscode javac Main.java
➜ java-vscode java Main
[[I@7ad041f3
```

↑ This represents that it is a 2D array.

* Memory representation of 2D arrays :-



Outer [0]; → [1, 2, 3]

Outer [0][1]; → 1

Outer array represents rows & inner array represents columns.

* Jagged array :-

→ An array where a sub-array can be of different lengths.

→ It is also called as ragged arrays or uneven arrays.

```java
Main.java > ...
public class Main {
    Run | Debug
    public static void main(String[] args) {
        int[][] arr = new int[3][];

        // Initializing each row with a different size
        arr[0] = new int[2]; // First row has 2 columns
        arr[1] = new int[3]; // Second row has 3 columns
        arr[2] = new int[1]; // Third row has 1 column

        arr[0][0] = 1;
        arr[0][1] = 2;

        arr[1][0] = 3;
        arr[1][2] = 4;
        arr[1][2] = 5;

        arr[2][0] = 6;

        // Printing the jagged array
        for (int i = 0; i < arr.length; i++) {
            for (int j = 0; j < arr[i].length; j++) {
                System.out.print(arr[i][j] + " ");
            }
            System.out.println();
        }
    }
}
```

Output :-

```
1 2
3 4 5
6
```