Session Goals

- User should be able to iterate through an array using nested loops while understanding the execution flow, including how the inner loop completes all its iterations for each iteration of the outer loop.
- User should be able to write and initialize two-dimensional arrays in Java, clearly understanding syntax for declaring, and assigning values to 2D arrays.
- User should understand how to access and modify elements in a 2D array, including using nested loops to iterate through rows and columns efficiently.
- User should be able to identify and resolve common errors in 2D arrays, such as ArrayIndexOutOfBoundsException and improper initialization, enhancing their debugging skills.

Java-111- 2D Arrays and Nested Loops in Java

Session 6

Session Agenda

- 2D array
- Nested for loop

Curious Cats

- Can I have a for loop within a for loop?
  - Yes, nested for loops are possible

```
// outer loop prints weeks
for (int i = 1; i <= weeks; ++i) {
    System.out.println("Week: " + i);

    // inner loop prints days
    for (int j = 1; j <= days; ++j) {
        System.out.println("  Day: " + j);
    }
}
```

- Are the initialization, condition and expression in a for loop, mandatory?
  - No, this would work → `for ( ; ; ) { /* Your loop code here */ }`
- How would this loop end if there is no condition?
  - By using a return statement or a break statement.

Nested Loops

Show on replit, print all possible pairs of an array.

2D Array

```
int[][] b = {{1,2,3,4},{5,6,7,8},{9,10,11,12}};
```

2d array diagram

Columns

Rows				
	1	2	3	4
	5	6	7	8
	9	10	11	12

index position of 2d array

Columns

Rows				
	0,0	0,1	0,2	0,3
	1,0	1,1	1,2	1,3
	2,0	2,1	2,2	2,3

Recap - 6 Step Strategy

1. ***Understand the problem*** *(ask questions and get clarity)*
2. ***Design test data/test cases*** *(input and expected output)*
3. ***Derive the solution - solve the problem*** *(write pseudo code)*
4. ***Test the solution*** *(against the test data/case - dry run)*
5. ***Write the program/code*** *(using Java here)*
6. ***Test the code*** *(syntax errors, run time errors, logical errors)*

Activity: Find total number of students

In a school, the number of students per class are represented as an n*m matrix. Each row represents one grade with each column representing a separate section of that grade.

Given one such matrix, return the total number of students in the school.

Link

What will be your approach to the problem? (Step 3)

Quickly put your answers in the chat!

5 minute break

Activity: Determine the matrix center

Given a 2D matrix return the element at the center of the matrix.

If there is no center return null;

Do it from scratch

Link

What will be your approach to the problem? (Step 3)

Quickly put your answers in the chat!

Keep
Learning,
Keep
Coding.