3. One and Two Dimensional Arrays :: Declaring and Initializing a 2D Array

A two dimensional (2D) array is viewed as a table with rows and columns. The syntax for declaring a 2D array is:

```
T[][] name = new T[rows][cols]
```

where T is the data type of each element of the array, *name* is the name of the array variable, *rows* is the number of rows in the array, and *cols* is the number of columns. 2D arrays may be initialized at the time of declaration:

```
int[][] a = {
  { 1, 2, 3 },
  { 4, 5, 6 }
};
```

3. One and Two Dimensional Arrays :: Interating over a 2D Array

Array *a* will have 2 rows and 3 columns. To iterate through the elements of a 2D array we can write nested **for loops** with the outer loop controlling which row we are working on and the inner loop controlling the column within the row.

```
for (int row = 0; row < a.length; ++row) {
  for (int col = 0; col < a[0].length; ++col) {
    System.out.print(a[row][col]);
  }
  System.out.println();
}
```

Essentially, a 2D array is a 1D array of length *rows* where each element is another 1D array of length *cols*. Hence, the number of columns in a 2D array is the length of any row, so we can find the number of columns in *a* using the expression a[0].length.