Multi-Dimensional Arrays in Java

CSCI 111
Birthdate Storage

Suppose we want to store people’s birthdates (e.g. 10/22/1995)? How would we do that?
Birthdate Storage

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<table>
<thead>
<tr>
<th>Month</th>
<th>Day</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>22</td>
<td>1995</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>1992</td>
</tr>
<tr>
<td>6</td>
<td>17</td>
<td>1990</td>
</tr>
<tr>
<td>12</td>
<td>9</td>
<td>1993</td>
</tr>
</tbody>
</table>

We make something we call a table (or matrix) that consists of multiple rows and columns. Each row corresponds to a person’s full birthday and each column corresponds to either Months, Days, or Years.
Birthdate Storage

So, we have an array, where each element in the array (a person’s birthday) consists of 3 pieces of information (Month, Day, Year).

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This is called a multi-dimension array (2D array in this case)
What year was person 2 born in?
### Birthdate Storage

What year was person 2 born in?  
1990
2D Array Manipulation

Code:

```java
int[][][] birthdays = new int[4][3];
```
2D Array Manipulation

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2D Array Manipulation

Code:

```csharp
int[][][] birthdays = new int[4][3];
```
2D Array Manipulation

Code:

```
int[][] birthdays = new int[4][3];
birthdays[0][0] = 10;
```
2D Array Manipulation

Code:

```java
int[][] birthdays = new int[4][3];
birthdays[0][0] = 10;
birthdays[0][1] = 22;
```

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
2D Array Manipulation

Code:

```java
int[][] birthdays = new int[4][3];
birthdays[0][0] = 10;
birthdays[0][1] = 22;
...
birthdays[3][2] = 1993;
```
2D Array Manipulation

Code:
```java
int[][] birthdays = new int[4][3];
birthdays[0][0] = 10;
birthdays[0][1] = 22;
...
birthdays[3][2] = 1993;
System.out.println(birthdays.length);  //prints 4
```

<p>| | | |</p>
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int[][] birthdays = new int[4][3];
birthdays[0][0] = 10;
birthdays[0][1] = 22;
...
birthdays[3][2] = 1993;
System.out.println(birthdays.length);  //prints 4
System.out.println(birthdays[0].length);  //prints 3
```