Multi-dimensional Arrays

2D array - like a coordinate system, 4th quadrant

row, column

```java
double[] rainfall  = new double[12][31];
// better way to represent a year
double[] rainfall  = new double[13][32];
rainfall[1][5] = 1.15; // rainfall for January 1st is 1.15
```

Multi-Dimensional Arrays

```java
int years = 10;
int months = 13;
int days = 32;

int[][] numbers = new int[10][20];
// 10 arrays here
//number of arrays is front 1 or 2
double [][][] rainfall = new double[years][months][days];
// there are 130 arrays here

int[][] numbers = new int[10][20];
//numbers[0] = 20 elements

rainfall[month].length
// second dimension length

//initialize
int[][] grid = {
    // two rows of 3 columns each
    {1, 2, 3},
    {4, 5, 6}
};
String[][][] arr3D = {
    // a 2x2x2 "cube" of strings
    {
        {"a", "b"},
        {"c", "d"}
    },
    {
        {"e", "f"},
        {"g", "h"}
    }
};

// jagged arrays
double[][] arrDifferent = {
    {1.0, 2.0, 3.0},
    {4.0, 5.0},
```

```
    {6.0, 7.0, 8.0, 9.0}
};
```

```
int quotient = 76 / 12;  // division
int remainder = 76 % 12; // modulus
```