

TWO-DIMENSIONAL ARRAYS OF PRIMITIVE TYPE

Two-Dimensional Arrays of Primitive Type

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```
int [][] a = new int [2][3];
```

or

```
int [][] a;
```

```
a = new int [2][3];
```

declares a 2 by 3 array of ints

number of rows

number of columns

$$\begin{bmatrix} a_{00} & a_{01} & a_{02} \\ a_{10} & a_{11} & a_{12} \end{bmatrix}$$

↔

```
a[0][0] a[0][1] a[0][2]
a[1][0] a[1][1] a[1][2]
```

row number (or index)

column number (or index)

Can also have double [],[], boolean [],[],
char [],[], etc.

$a.length \rightarrow$ number of rows

$a[0].length \rightarrow$ number of columns

Class Work: class TwoDimArrays (pg. 2)

Alternate declaration style:

```
int [][] a = new int [][] {
    { 2, 4, 6 },
    { 8, 10, 12 }
};
```

$a[0][1]$ is 4

$a[1][0]$ is 8

etc.

Class Work: Modify class TwoDimArrays to use
the alternate declaration style. (pg. 3)

TWO-DIMENSIONAL ARRAYS OF PRIMITIVE TYPE

Classwork #1. Type in and run the program `TwoDimArrays.java` pretty much as listed.

```
public class TwoDimArrays {
    /**/
    public static void main ( String [] arg ) {
        /**/
        int numRows, numCols, k;
        int [][] a;
        /**/
        a=new int [2][4];
        numRows=a.length;    numCols=a[0].length;
        k=0;
        for ( int i=0; i<numRows; ++i ) {
            for ( int j=0; j<numCols; ++j ) {
                a[i][j]=++k;
            }
        }
        /**/
        System.out.println();
        for ( int i=0; i<numRows; ++i ) {
            for ( int j=0; j<numCols; ++j ) {
                System.out.print("a[");    System.out.print(i);
                System.out.print("][");    System.out.print(j);
                System.out.print("] = ");    System.out.println(a[i][j]);
            }
            System.out.println();
        }
        /**/
        return;
    }
    /**/
    public TwoDimArrays () { }
}
```

The output should look like

```
a[0][0] = 1
a[0][1] = 2
a[0][2] = 3
a[0][3] = 4

a[1][0] = 5
a[1][1] = 6
a[1][2] = 7
a[1][3] = 8
```

TWO-DIMENSIONAL ARRAYS OF PRIMITIVE TYPE

Classwork #2. Modify the program `TwoDimArrays.java` to use the alternate declaration style.