CSCI 132:
Basic Data Structures and Algorithms

2D Arrays, Program 1

Reese Pearsall

Spring 2025

Announcements

Program 1 posted
→ Due Wednesday Feb 19

Next lab will be posted sometime soon

2D Arrays

```
array =  [  0,  1,  2,  3,  4 ]
```

Here is a one-dimensional array that holds ints (`int[]`)

2D Arrays

```
array =  [  0,  1,  2,  3,  4 ]
```

Here is a one-dimensional array that holds ints (`int[]`)

```
array2 = [  [0,  1,  2,  3,  4],
            [5,  6,  7,  8,  9],
            [10, 11, 12, 13, 14],
            [15, 16, 17, 18, 19],
            [20, 21, 22, 23, 24] ]
```

Here is a two-dimensional array that holds ints (**`int[][]`**)

2D Arrays

```
array =  [  0,  1,  2,  3,  4 ]
```

Here is a one-dimensional array that holds ints (`int[]`)

```
array2 = [  [0,  1,  2,  3,  4],
            [5,  6,  7,  8,  9],
            [10, 11, 12, 13, 14],
            [15, 16, 17, 18, 19],
            [20, 21, 22, 23, 24] ]
```

```
array2[3]
```

Will return a 1D-array

Here is a two-dimensional array that holds ints (**`int[][]`**)

2D Arrays

```
array =  [  0,  1,  2,  3,  4 ]
```

Here is a one-dimensional array that holds ints (`int[]`)

```
array2 = [  [0,  1,  2,  3,  4],
            [5,  6,  7,  8,  9],
            [10, 11, 12, 13, 14],
            [15, 16, 17, 18, 19],
            [20, 21, 22, 23, 24] ]
```

```
array2[3][1]
```

Will return a singular element in that array

Here is a two-dimensional array that holds ints (**`int[][]`**)

2D Arrays

We can use a single **`for`** loop to print out each element of this array

```
array =  [  0,  1,  2,  3,  4 ]
```

```
for(int i = 0; i < array.length; i++) {
    System.out.println(array[i]);
}
```

Here is a one-dimensional array that holds ints (`int[]`)

```
array2 = [  [0,  1,  2,  3,  4],
            [5,  6,  7,  8,  9],
            [10, 11, 12, 13, 14],
            [15, 16, 17, 18, 19],
            [20, 21, 22, 23, 24] ]
```

Here is a two-dimensional array that holds ints (**`int[][]`**)

2D Arrays

We can use a single **for** loop to print out each element of this array

```
array =  [  0,  1,  2,  3,  4 ]
```

```
for(int i = 0; i < array.length; i++) {
    System.out.println(array[i]);
}
```

Here is a one-dimensional array that holds ints (`int[]`)

```
array2 = [  [0,  1,  2,  3,  4],
            [5,  6,  7,  8,  9],
            [10, 11, 12, 13, 14],
            [15, 16, 17, 18, 19],
            [20, 21, 22, 23, 24] ]
```

We can use a nested **for** loop to print out each element of this 2D array

```
for(int i = 0; i < array2.length; i++) {
    for(int j = 0; j < array2.length; j++) {
        System.out.println(array2[i][j]);
    }
}
```

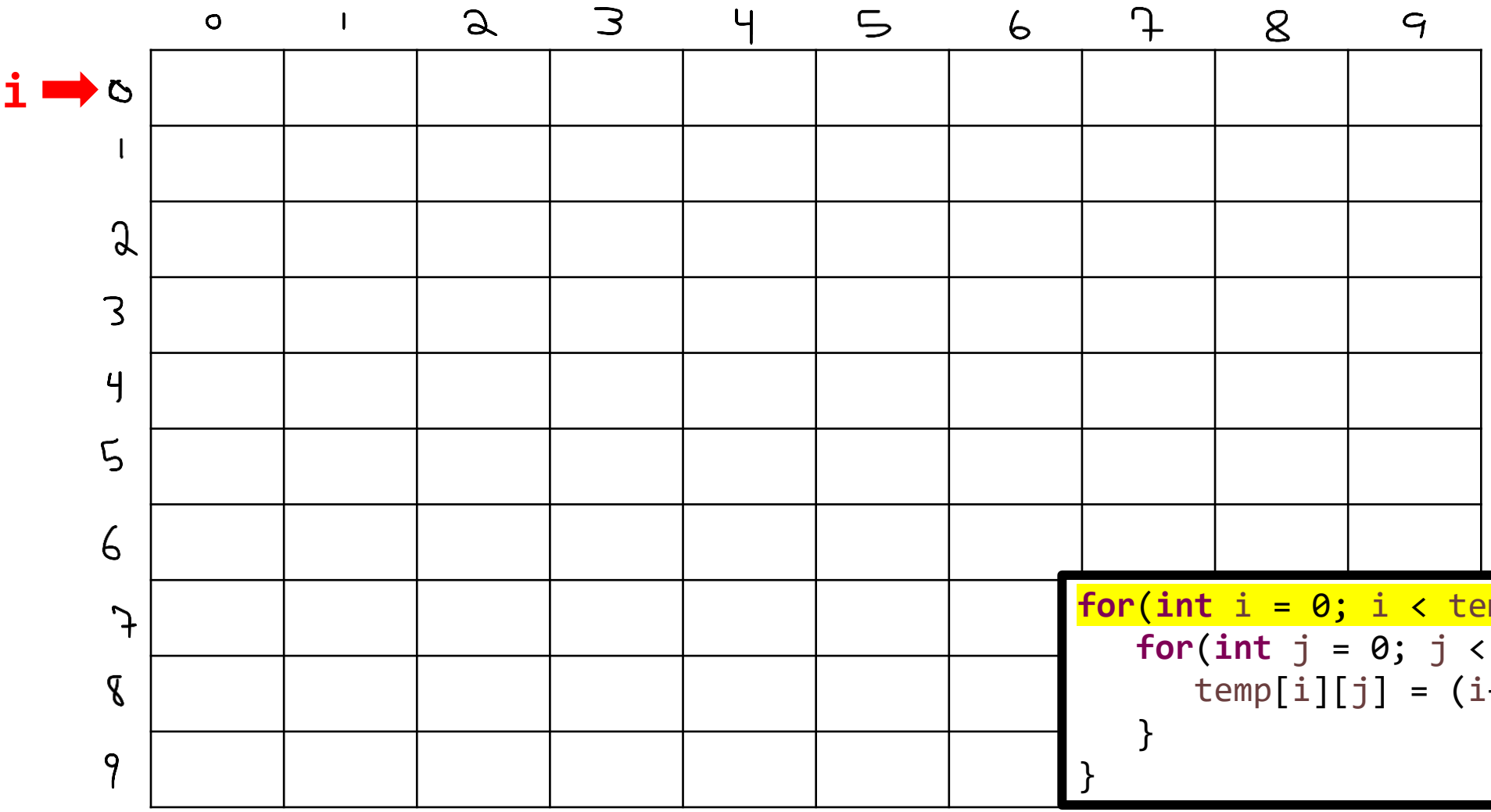
Here is a two-dimensional array that holds ints (**`int[][]`**)

2D Arrays

x	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

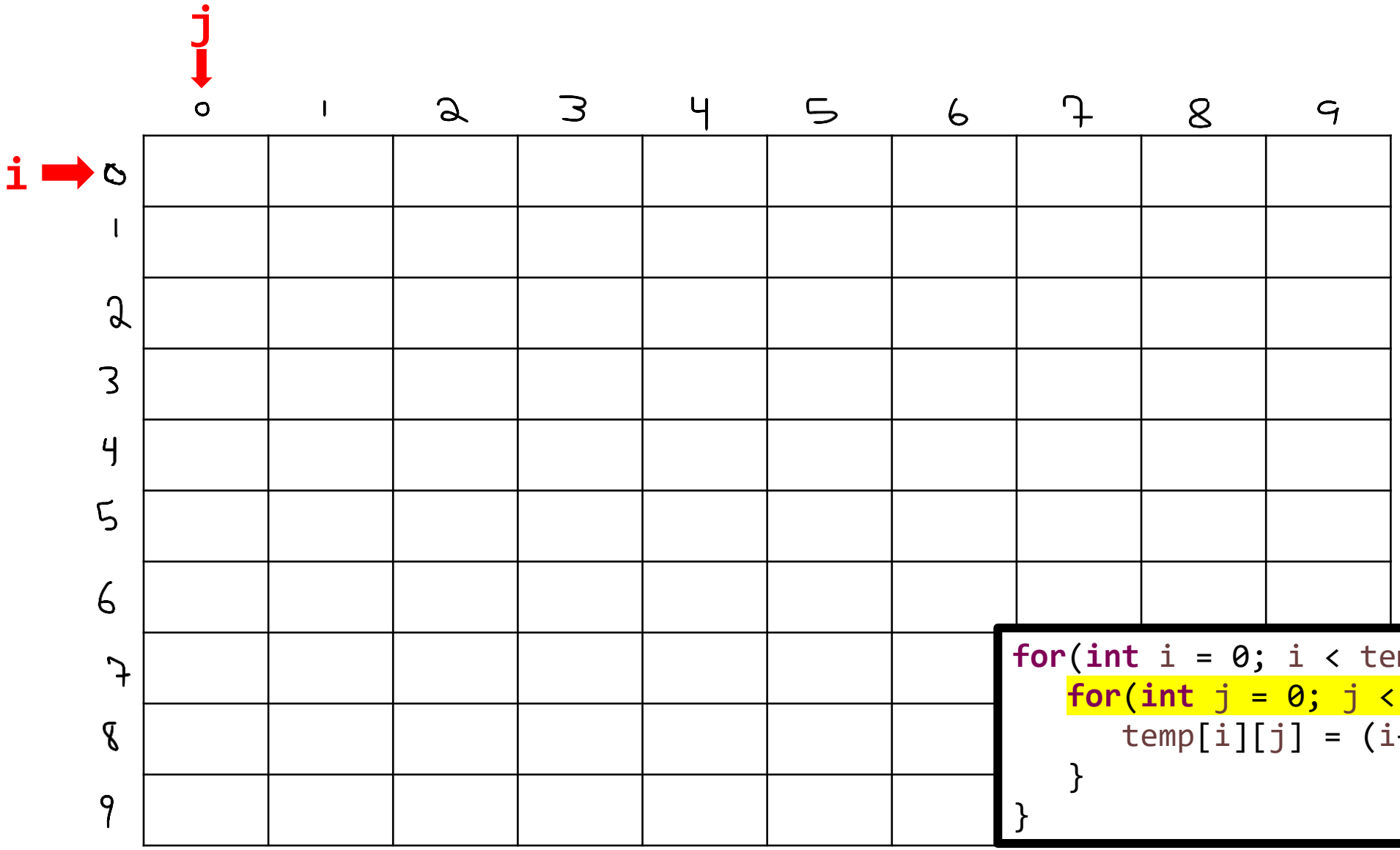
Let's build a multiplication table using 2D arrays

2D Arrays



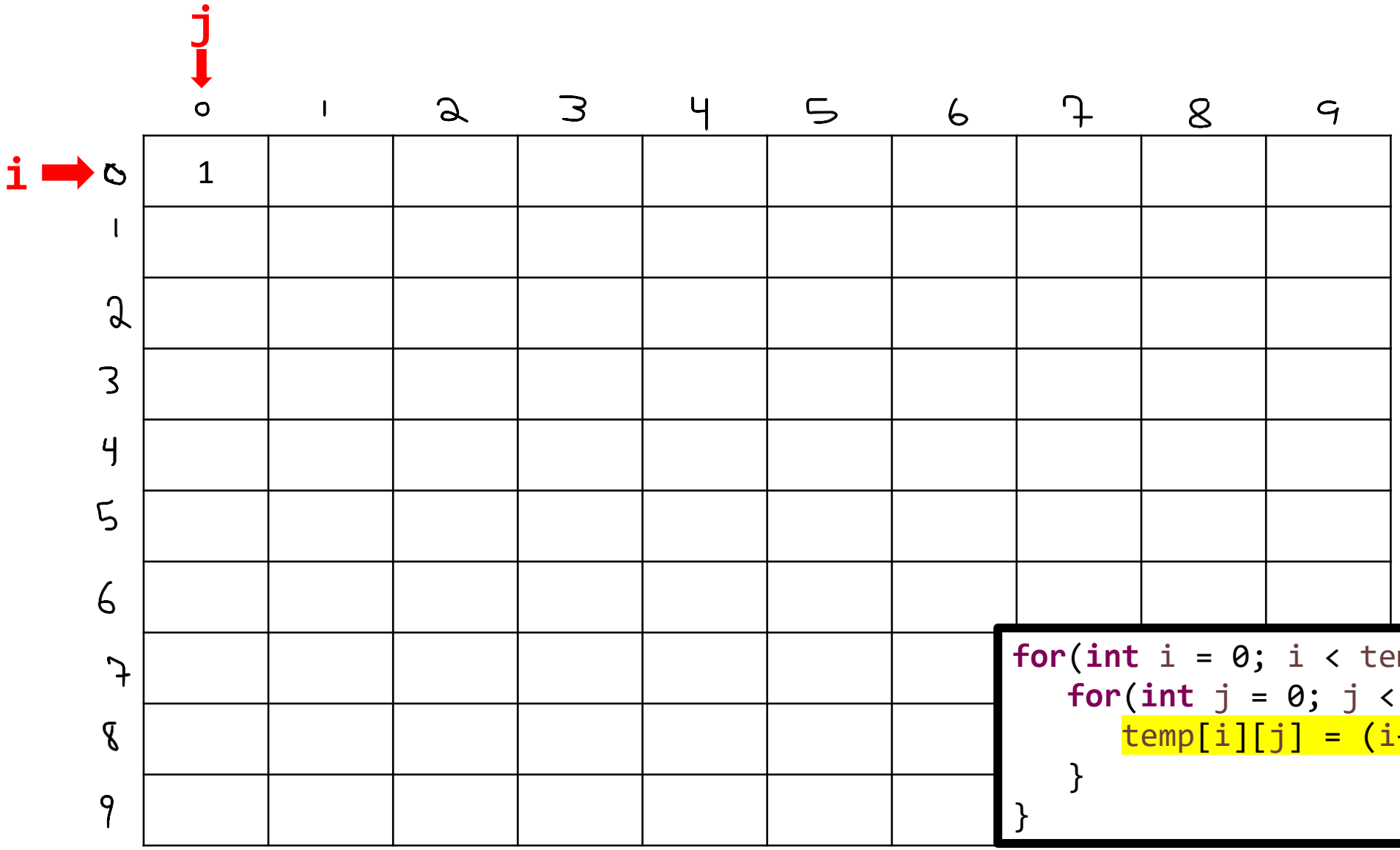

```
for(int i = 0; i < temp.length; i++) {
    for(int j = 0; j < temp.length; j++) {
        temp[i][j] = (i+1) * (j+1);
    }
}
```

2D Arrays



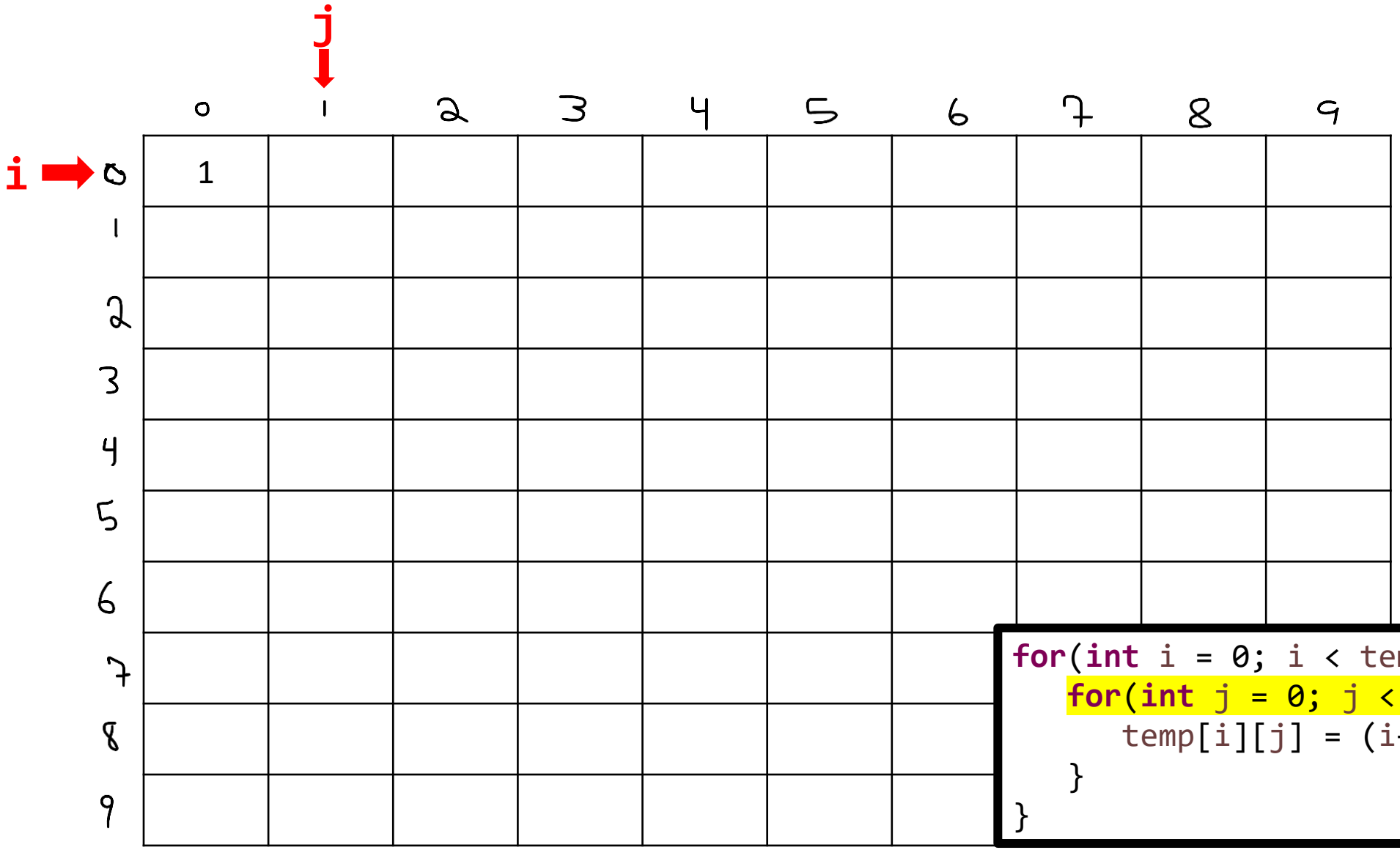

```
for(int i = 0; i < temp.length; i++) {
    for(int j = 0; j < temp.length; j++) {
        temp[i][j] = (i+1) * (j+1);
    }
}
```

2D Arrays



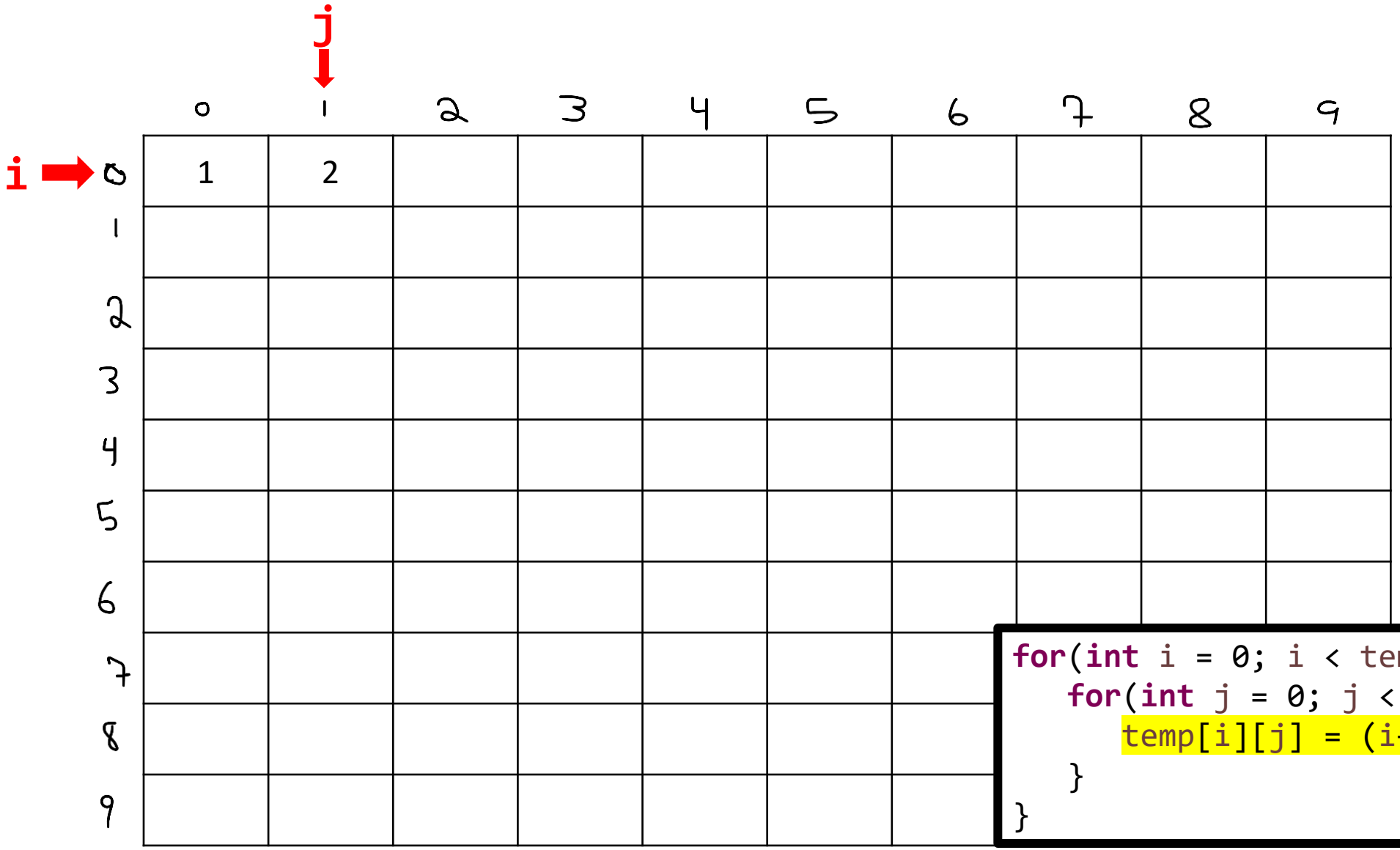

```
for(int i = 0; i < temp.length; i++) {
    for(int j = 0; j < temp.length; j++) {
        temp[i][j] = (i+1) * (j+1);
    }
}
```

2D Arrays



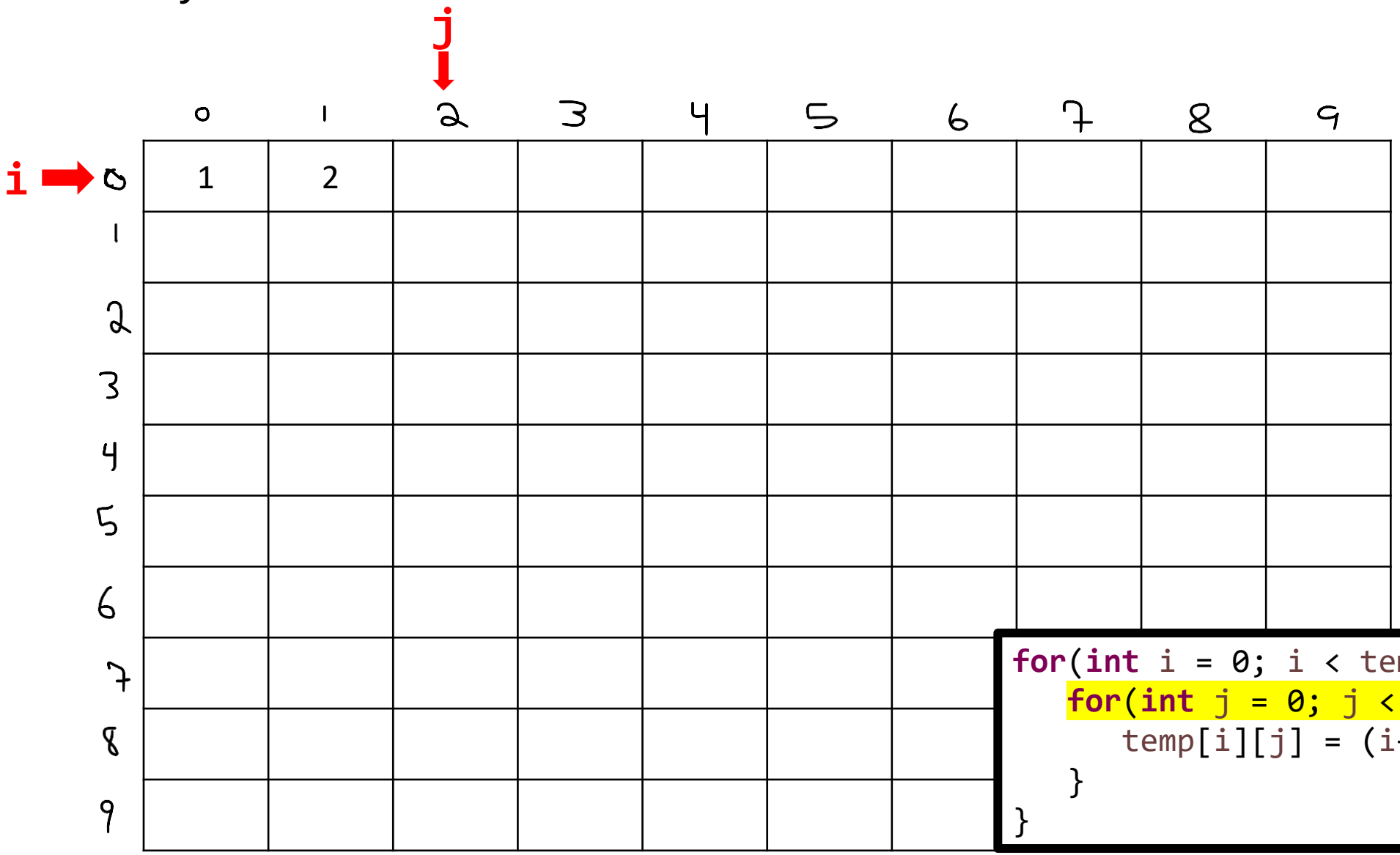

```
for(int i = 0; i < temp.length; i++) {
    for(int j = 0; j < temp.length; j++) {
        temp[i][j] = (i+1) * (j+1);
    }
}
```

2D Arrays



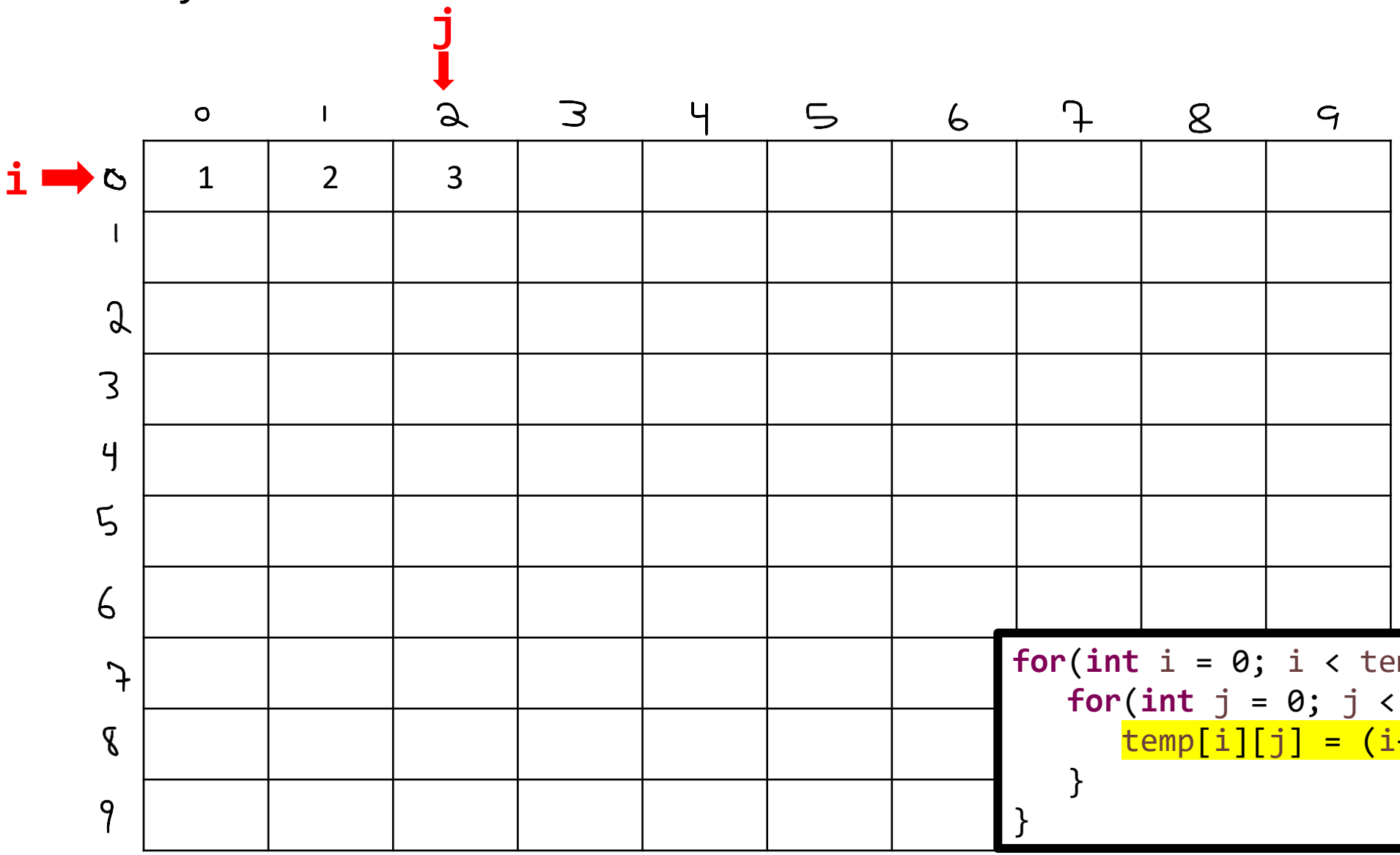

```
for(int i = 0; i < temp.length; i++) {
   for(int j = 0; j < temp.length; j++) {
      temp[i][j] = (i+1) * (j+1);
   }
}
```

2D Arrays



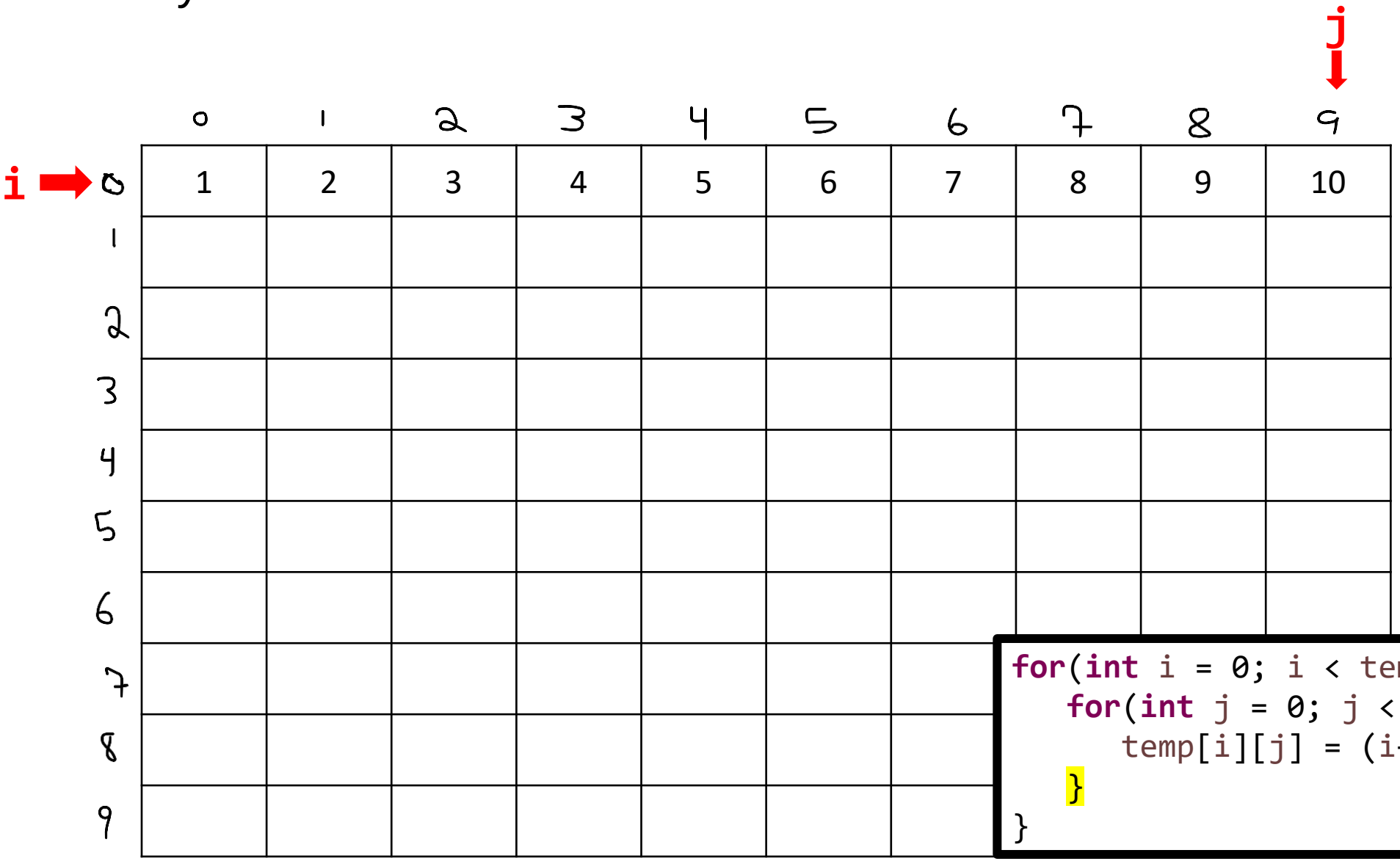

```
for(int i = 0; i < temp.length; i++) {
    for(int j = 0; j < temp.length; j++) {
        temp[i][j] = (i+1) * (j+1);
    }
}
```

2D Arrays



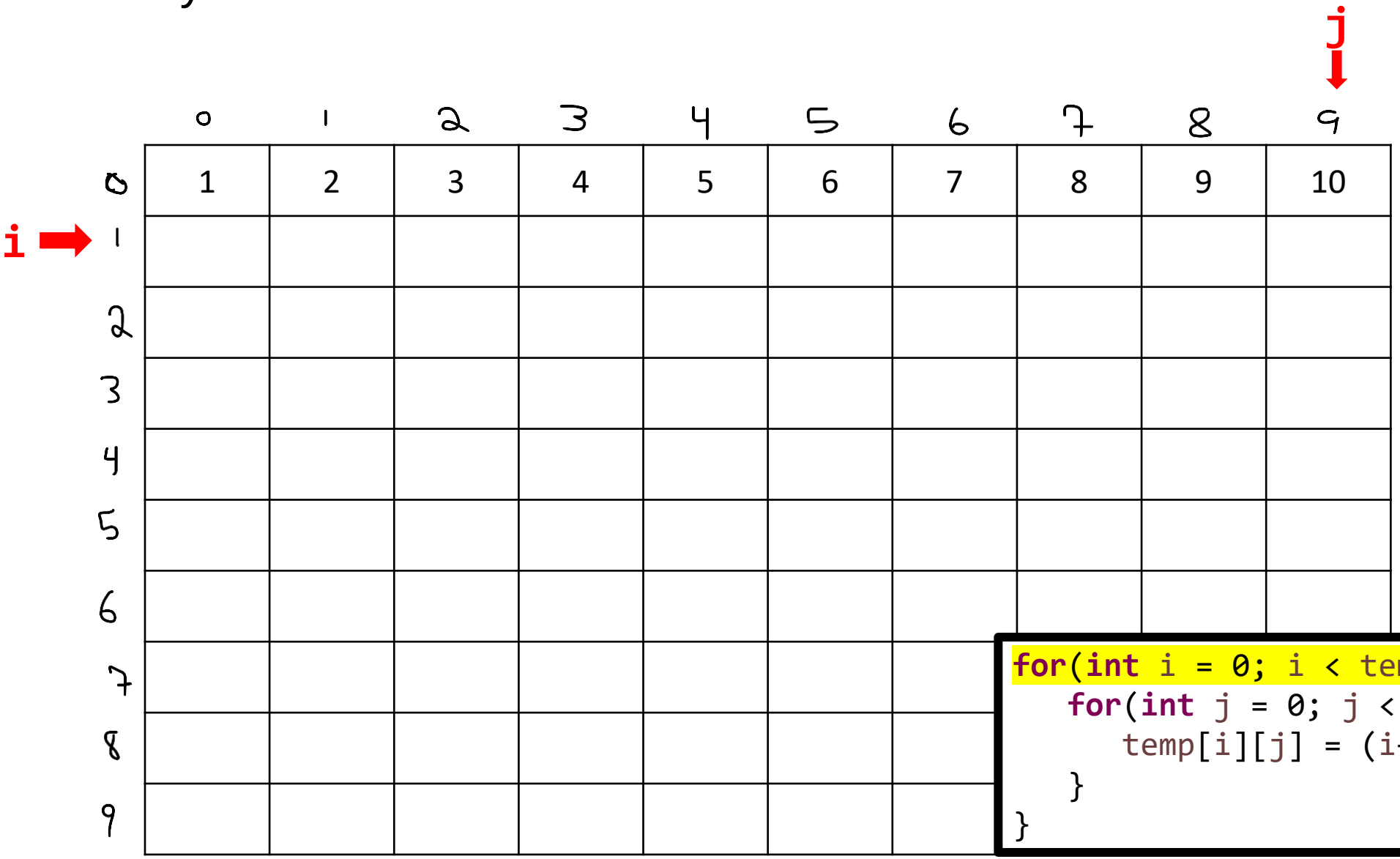

```
for(int i = 0; i < temp.length; i++) {
    for(int j = 0; j < temp.length; j++) {
        temp[i][j] = (i+1) * (j+1);
    }
}
```

2D Arrays



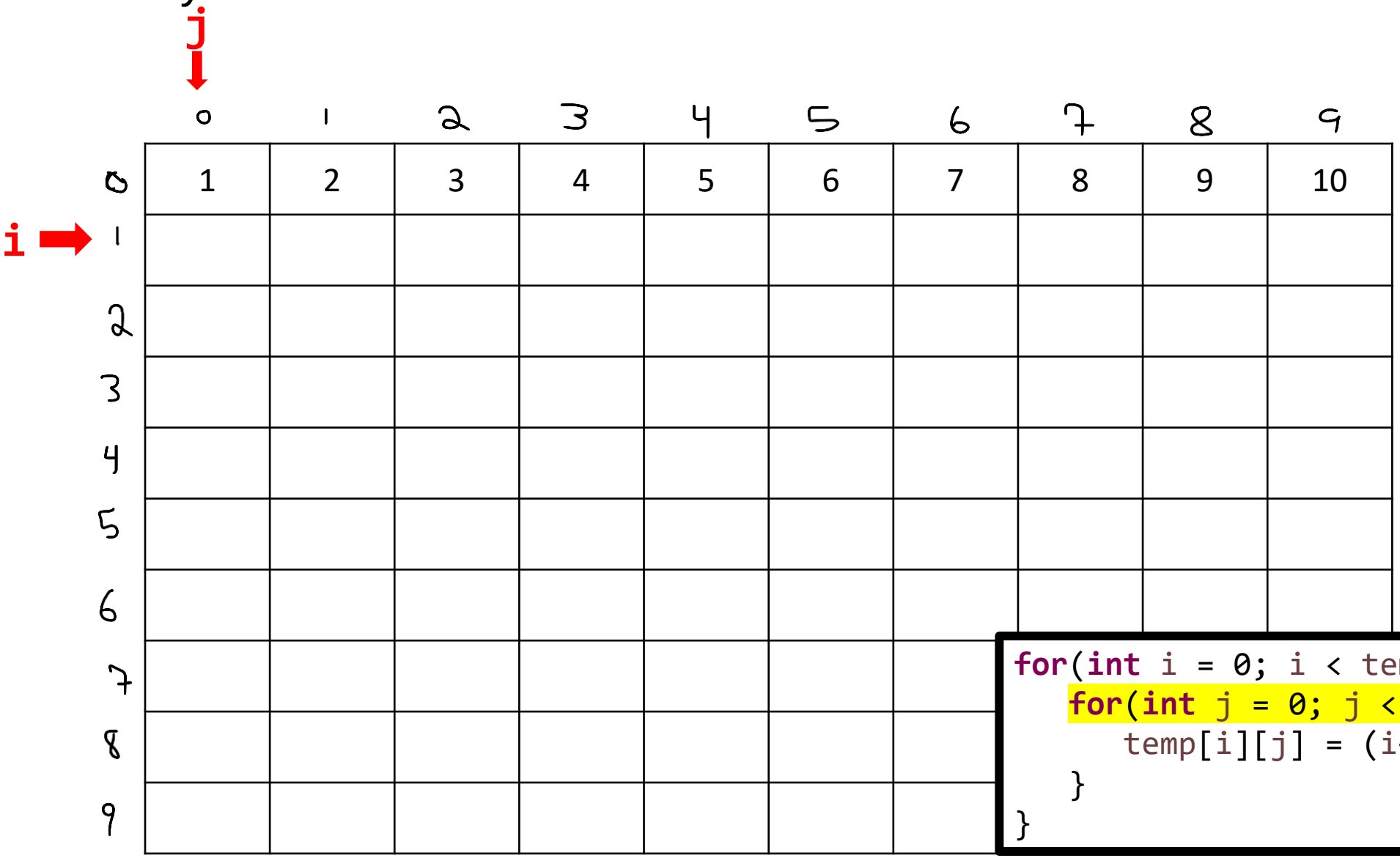

```
for(int i = 0; i < temp.length; i++) {
    for(int j = 0; j < temp.length; j++) {
        temp[i][j] = (i+1) * (j+1);
    }
}
```

2D Arrays



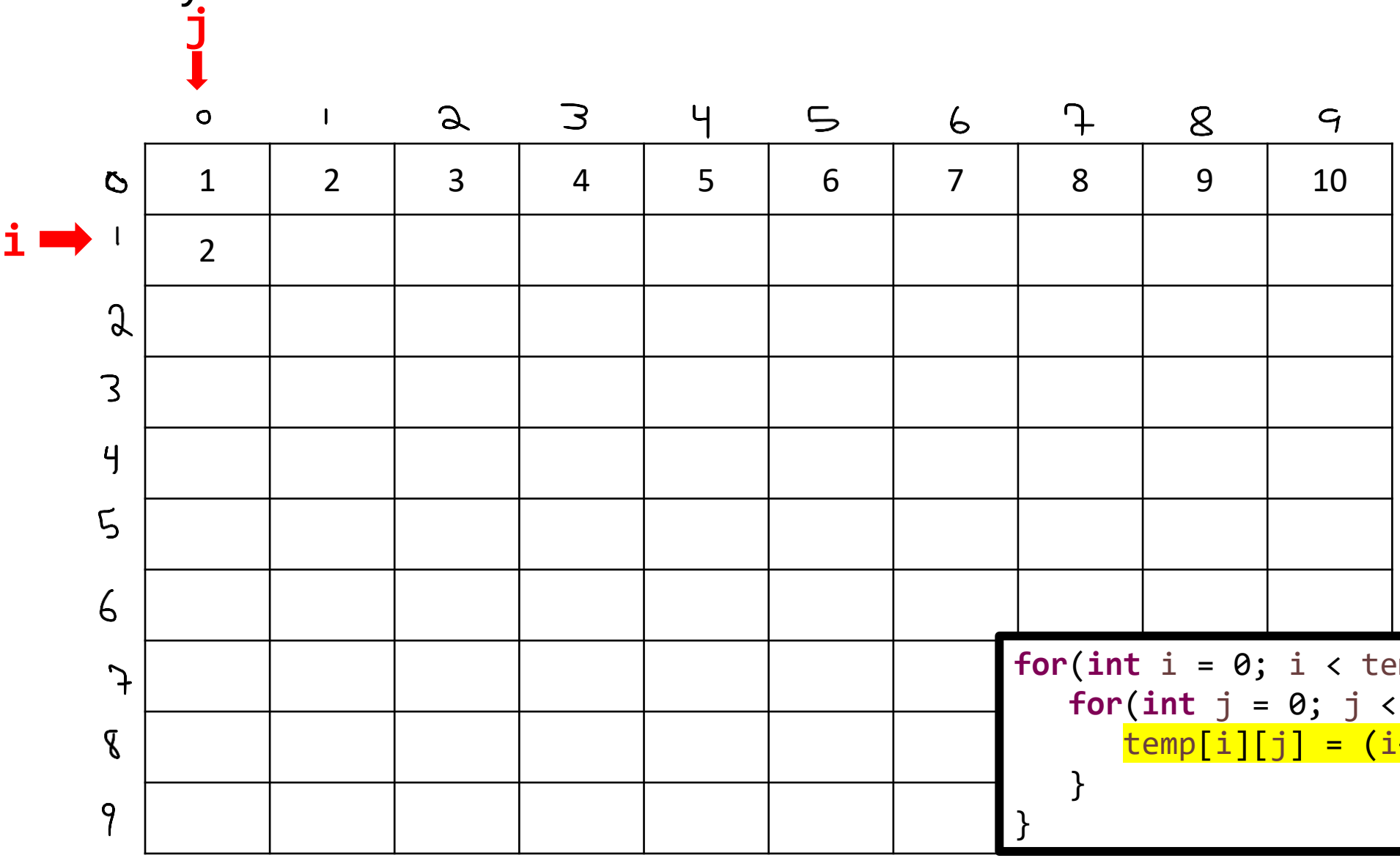

```
for(int i = 0; i < temp.length; i++) {
    for(int j = 0; j < temp.length; j++) {
        temp[i][j] = (i+1) * (j+1);
    }
}
```

2D Arrays



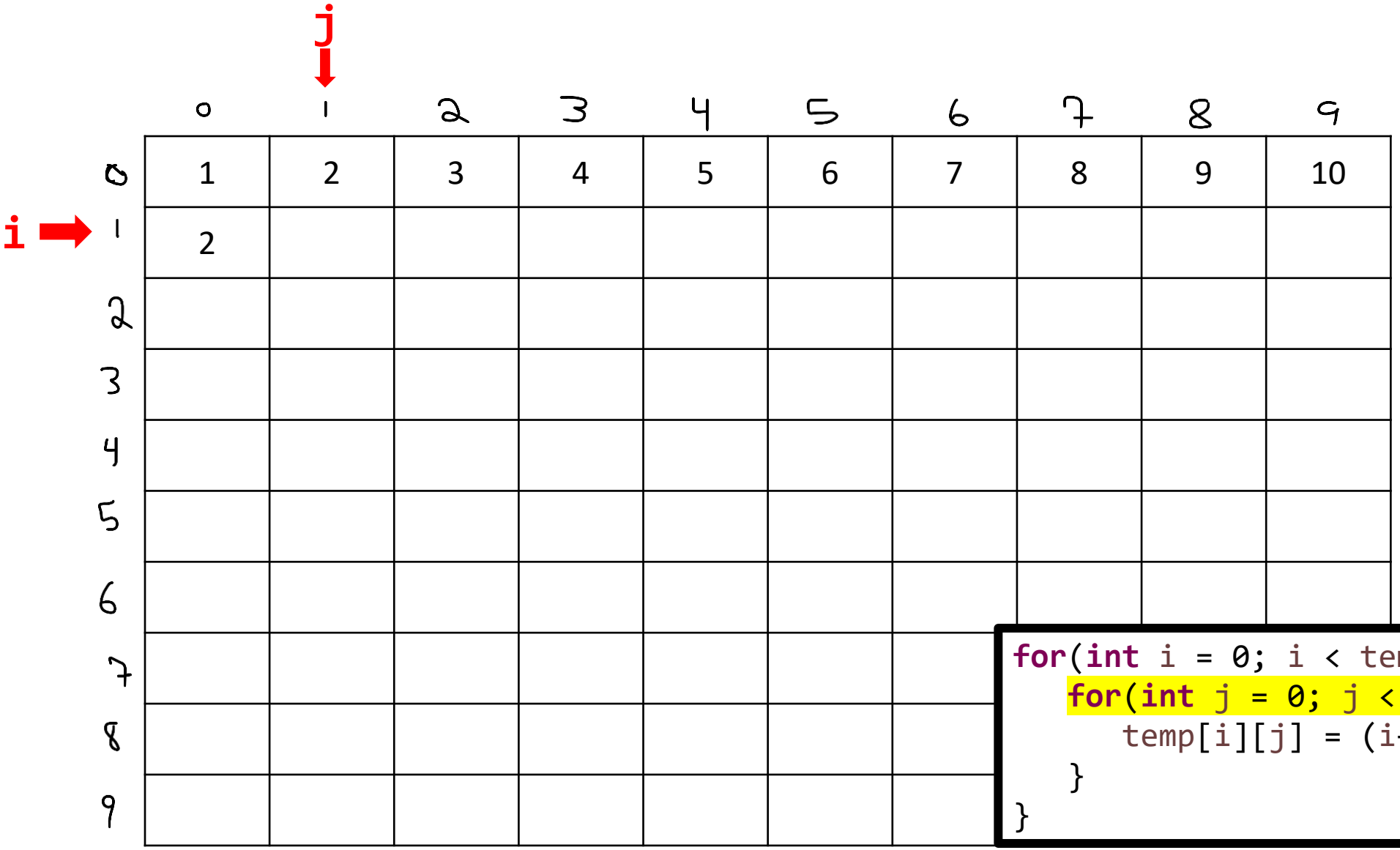

```
for(int i = 0; i < temp.length; i++) {
    for(int j = 0; j < temp.length; j++) {
        temp[i][j] = (i+1) * (j+1);
    }
}
```

2D Arrays



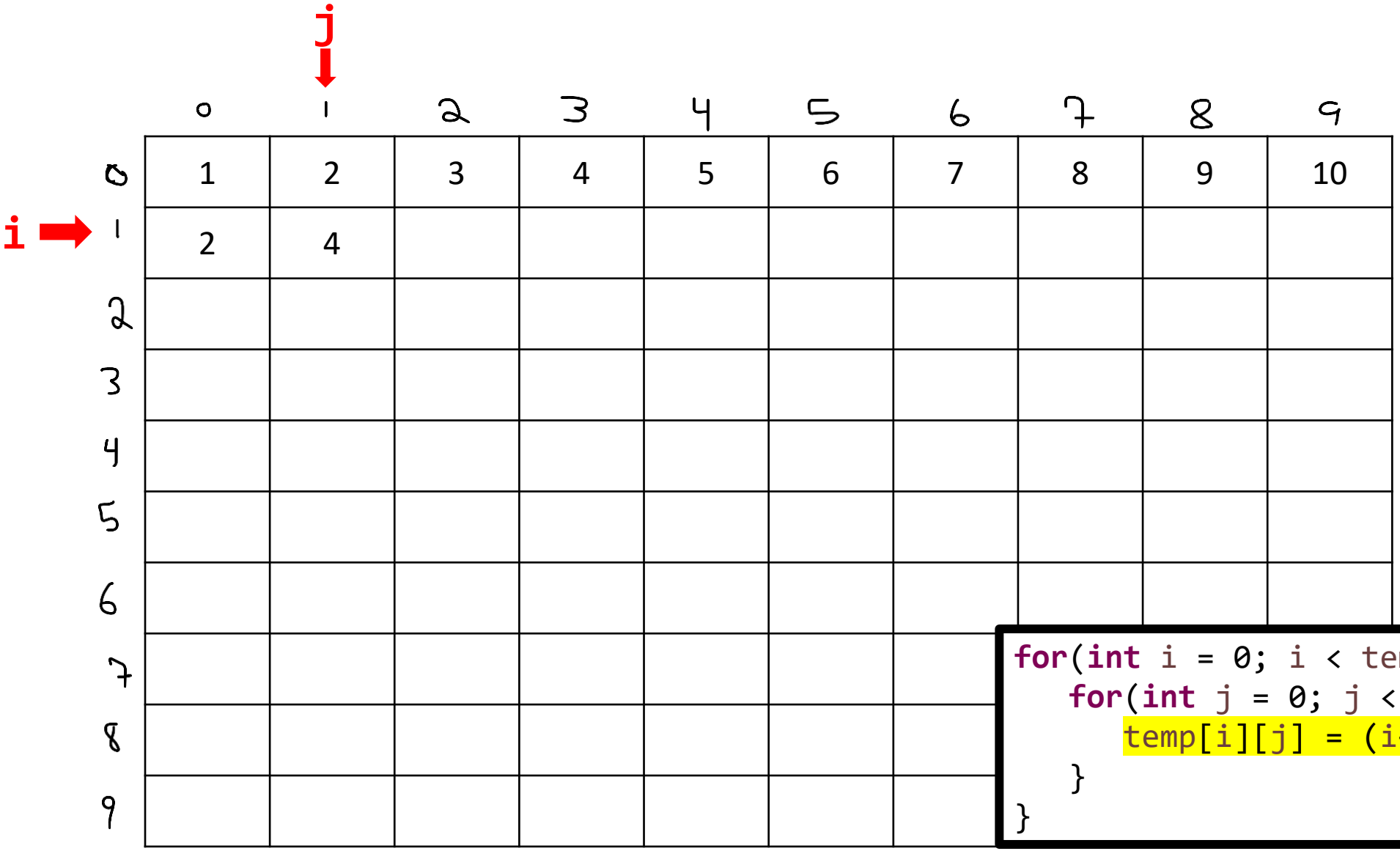

```
for(int i = 0; i < temp.length; i++) {
    for(int j = 0; j < temp.length; j++) {
        temp[i][j] = (i+1) * (j+1);
    }
}
```

2D Arrays



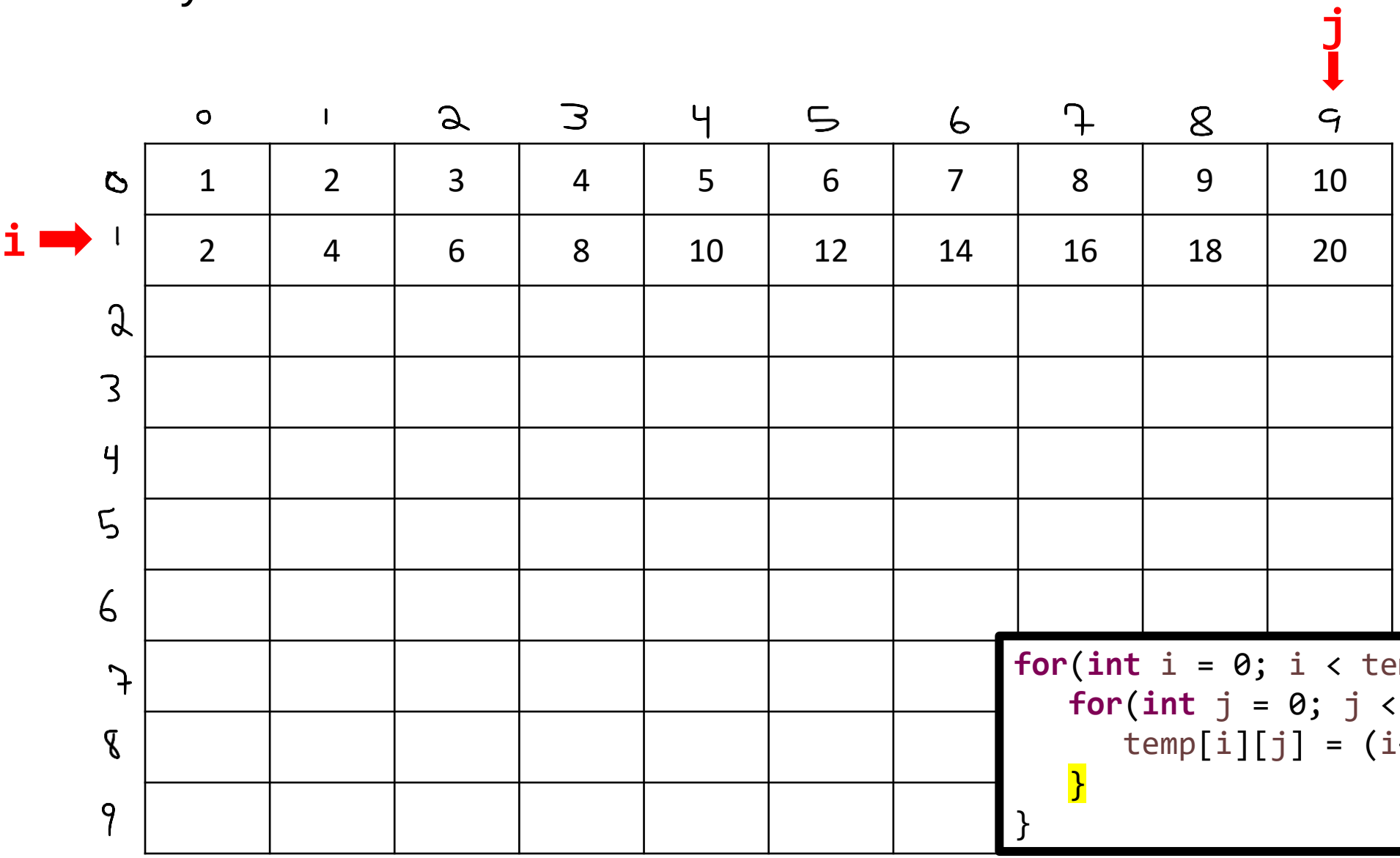

```
for(int i = 0; i < temp.length; i++) {
    for(int j = 0; j < temp.length; j++) {
        temp[i][j] = (i+1) * (j+1);
    }
}
```

2D Arrays




```
for(int i = 0; i < temp.length; i++) {
    for(int j = 0; j < temp.length; j++) {
        temp[i][j] = (i+1) * (j+1);
    }
}
```

2D Arrays




```
for(int i = 0; i < temp.length; i++) {
   for(int j = 0; j < temp.length; j++) {
      temp[i][j] = (i+1) * (j+1);
   }
}
```

2D Arrays

	0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9	10
1	2	4	6	8	10	12	14	16	18	20
2	3	6	9	12	15	18	21	24	27	30
3	4	8	12	16	20	24	28	32	36	40
4	5	10	15	20	25	30	35	40	45	50
5	6	12	18	24	30	36	42	48	54	60
6	7	14	21	28	35	42	49	56	63	70
7	8	16	24	32	40	48	56			
8	9	18	27	36	45	54	63			
9	10	20	30	40	50	60	70			

j

i

```
for(int i = 0; i < temp.length; i++) {
    for(int j = 0; j < temp.length; j++) {
        temp[i][j] = (i+1) * (j+1);
    }
}
```

2D Arrays

	0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9	10
1	2	4	6	8	10	12	14	16	18	20
2	3	6	9	12	15	18	21	24	27	30
3	4	8	12	16	20	24	28	32	36	40
4	5	10	15	20	25	30	35	40	45	50
5	6	12	18	24	30	36	42	48	54	60
6	7	14	21	28	35	42	49	56	63	70
7	8	16	24	32	40	48	56			
8	9	18	27	36	45	54	63			
9	10	20	30	40	50	60	70			

j

i

```
for(int i = 0; i < temp.length; i++) {
    for(int j = 0; j < temp.length; j++) {
        temp[i][j] = (i+1) * (j+1);
    }
}
```

2D Arrays

Program 1