CS 314: Data Structures

February 1, 2020

Sam's Section

Slides available at: www.cs.utexas.edu/~slaberge

Style Issues for CodeCamp

- Class Style Guide:
  - https://www.cs.utexas.edu/~scottm/cs314/handouts/hygiene_guide/code_hygiene_guide_framed.html
- Come to Help Hours if you have style questions.
- For specific questions, you can ask on Piazza

Style Issues for CodeCamp

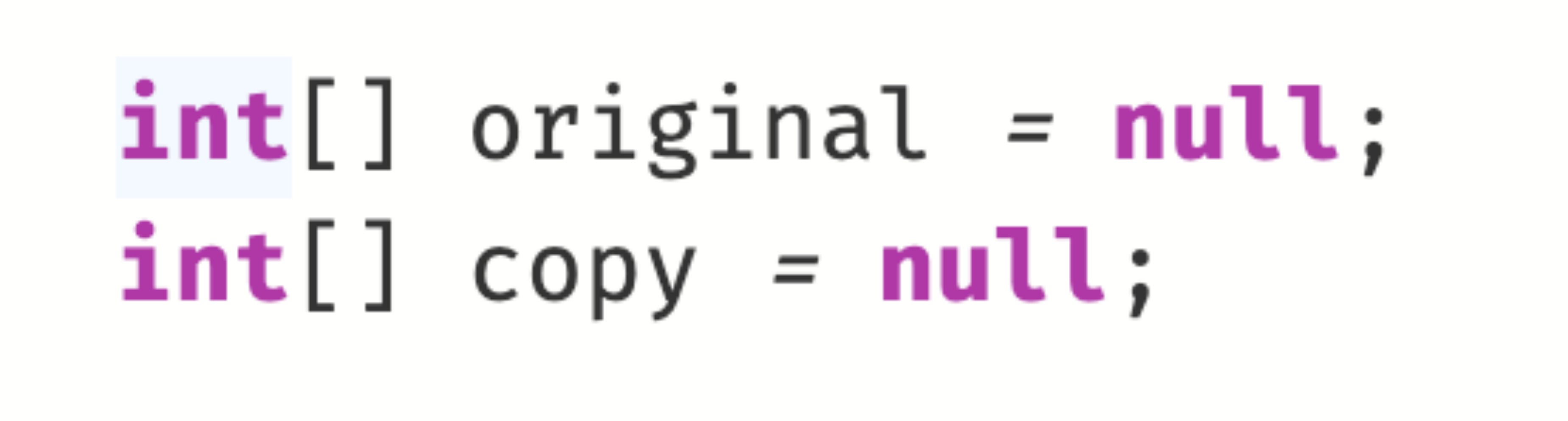
- Many Style Issues can be avoided by using your IDE’s auto-formatter:

	Windows/Linux	macOS
IntelliJ	`Ctrl+Alt+L`	`Command+Option+L`
Eclipse	`Ctrl+Shift+F`	`Command+Shift+F`
VSCode	`Shift+Alt+L`	`Shift+Option+F`

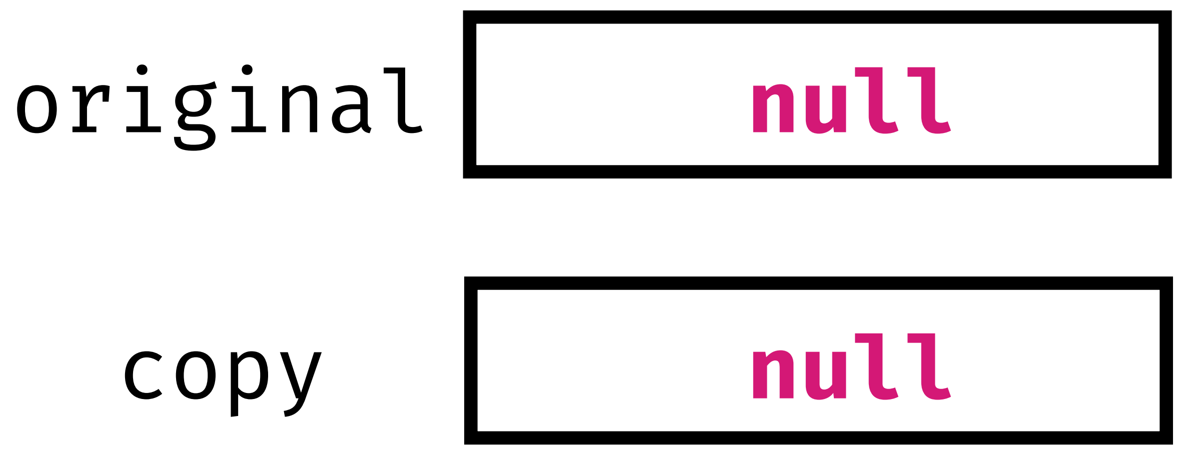
`isPermutation()`

isPermutation()

Shallow vs. Deep Copies

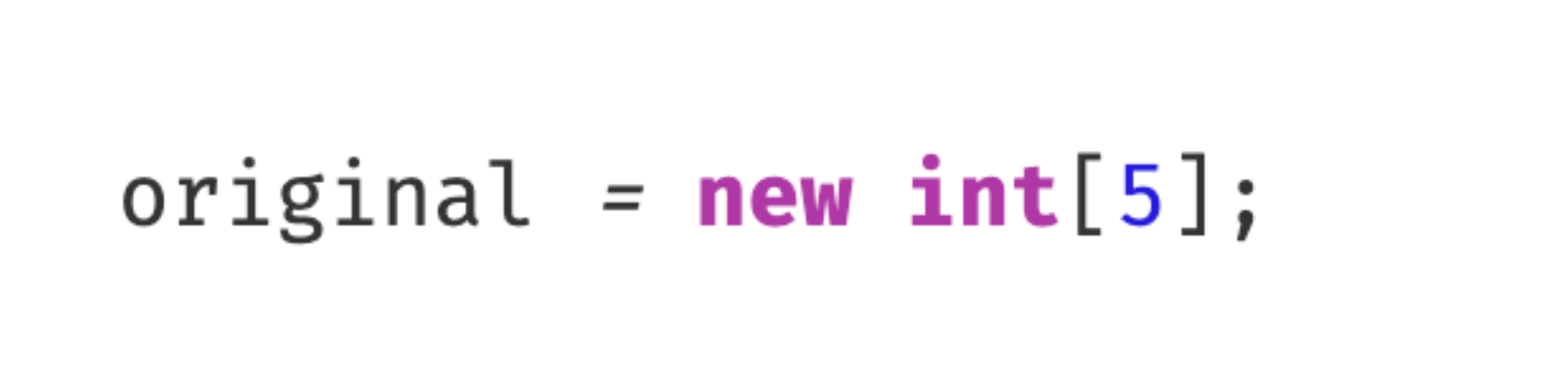


```java
int[] original = null;
int[] copy = null;
```

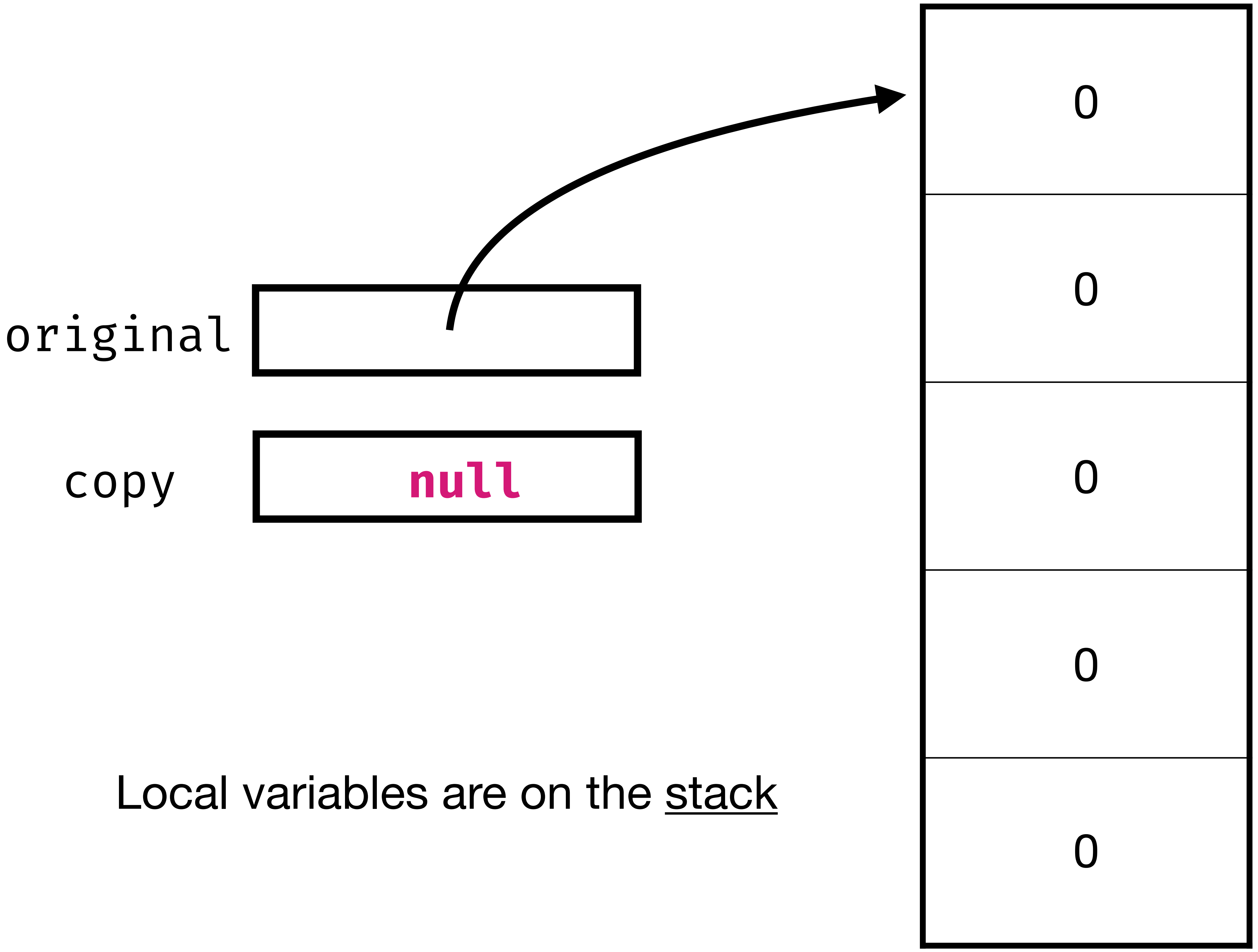


isPermutation()

Shallow vs. Deep Copies



```
original = new int[5];
```

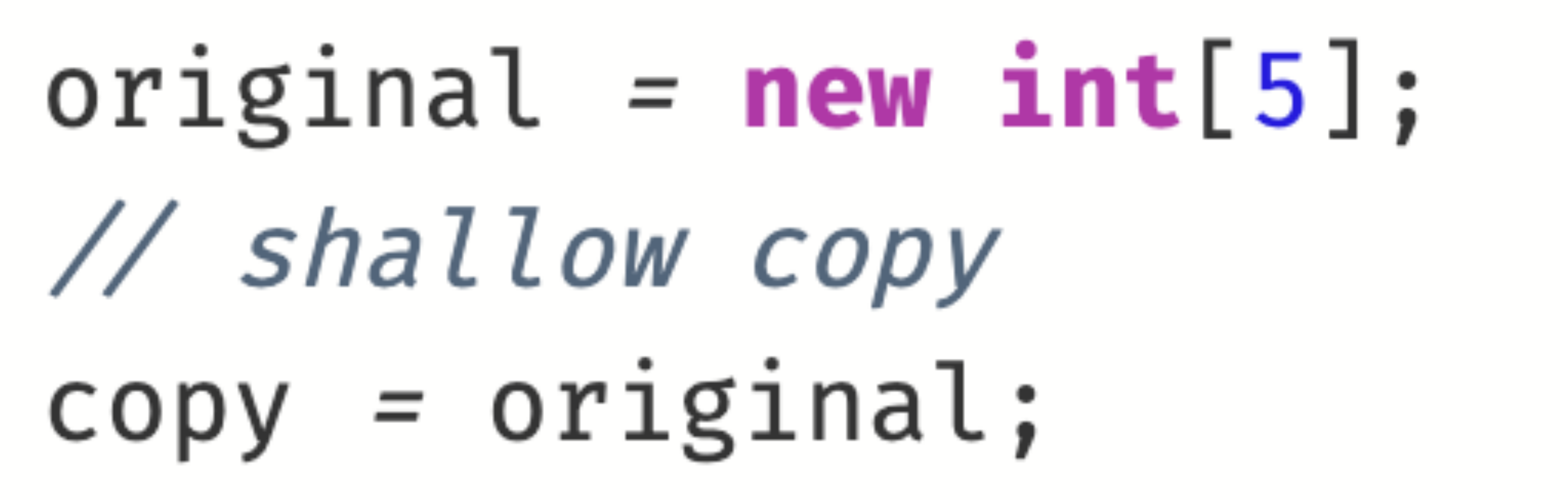


Local variables are on the stack

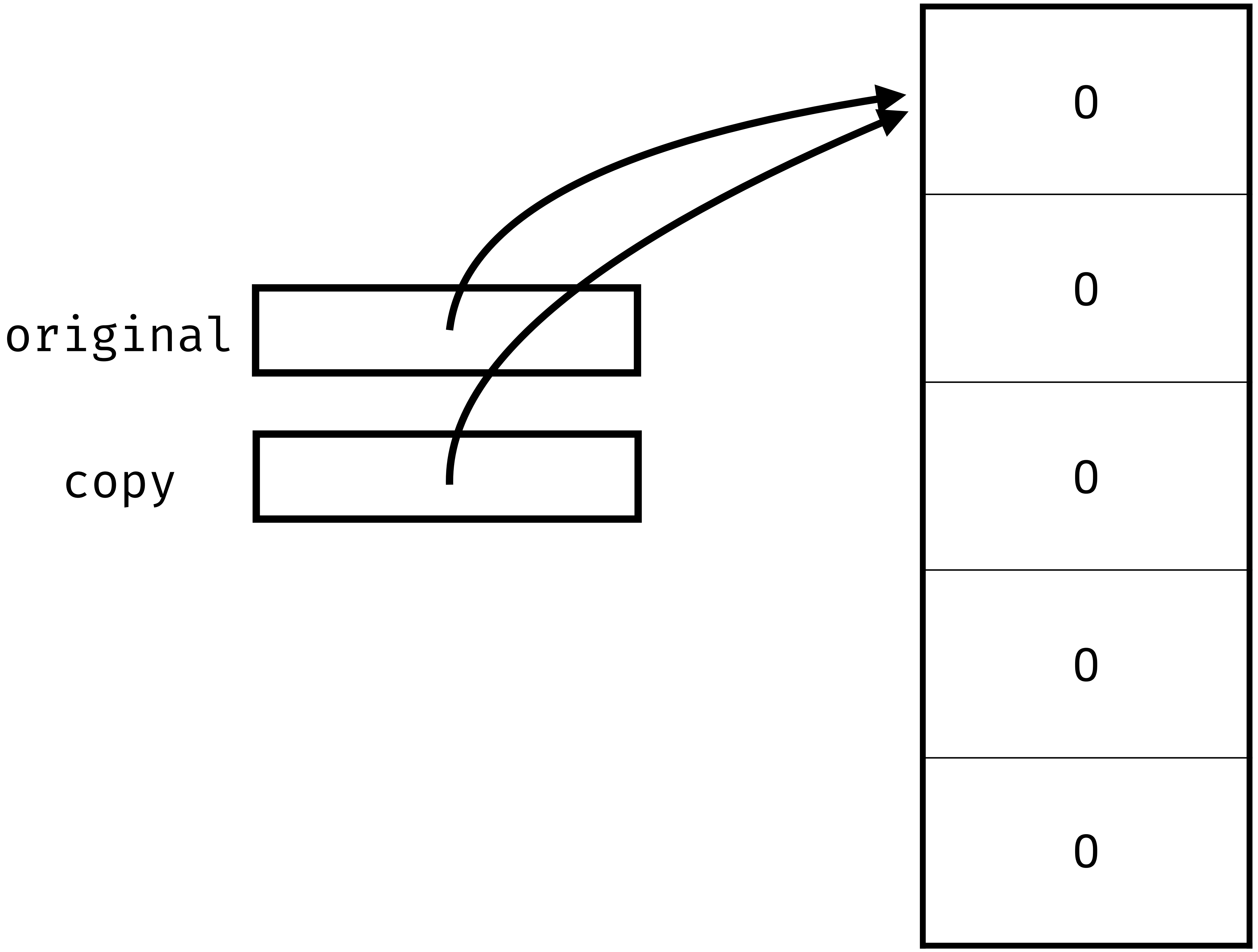
Objects are in the heap

isPermutation()

Shallow vs. Deep Copies

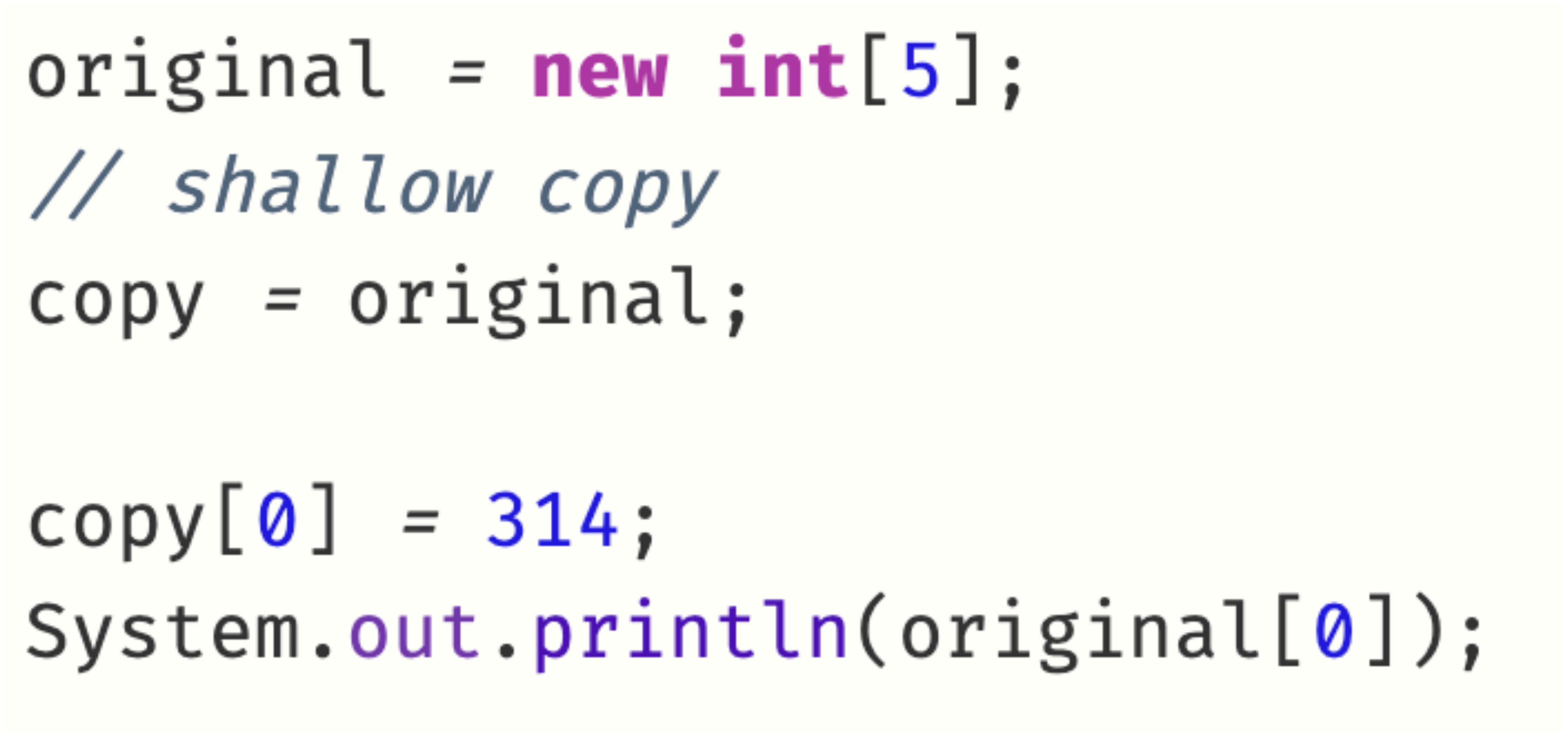


```
original = new int[5];
// shallow copy
copy = original;
```

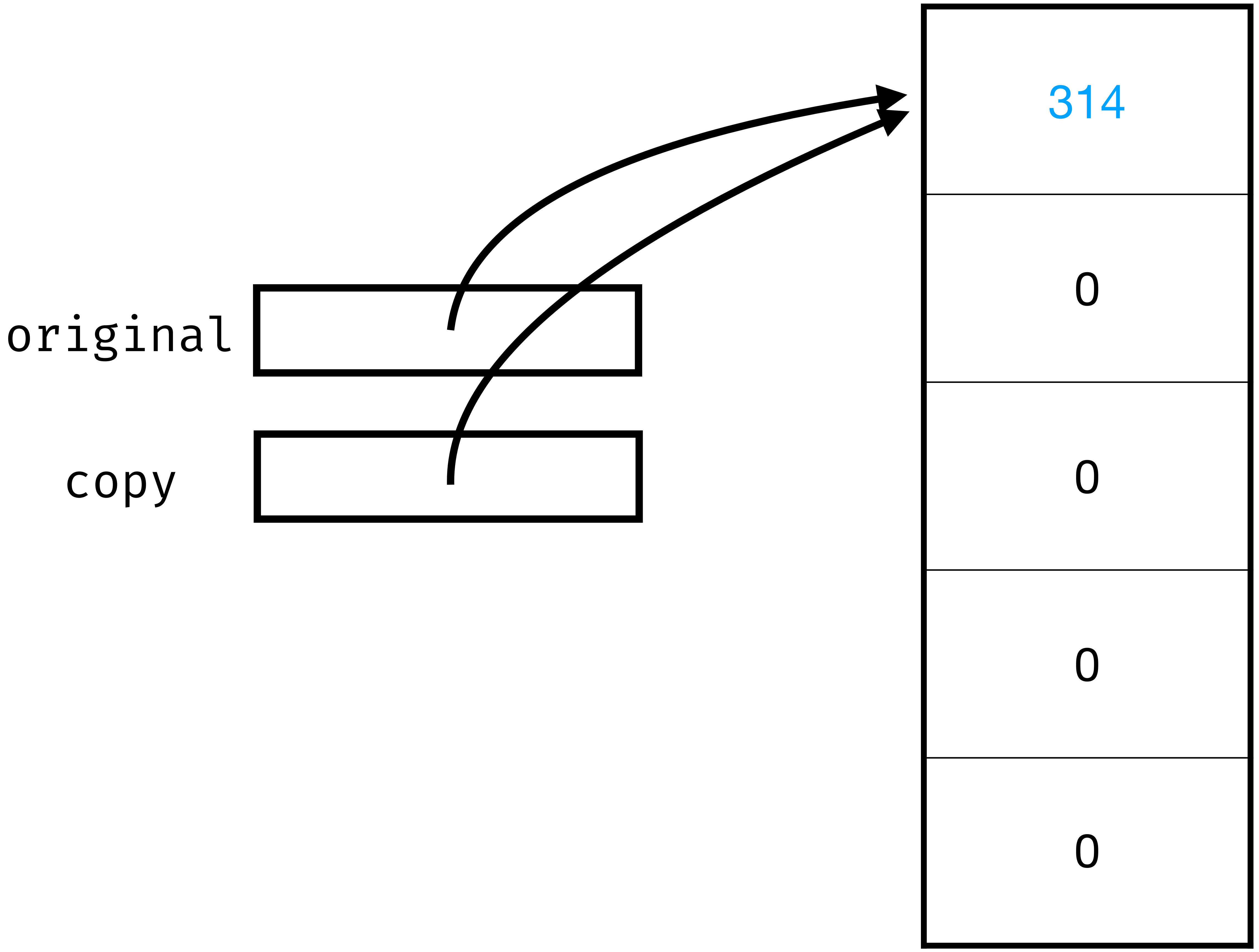


isPermutation()

Shallow vs. Deep Copies



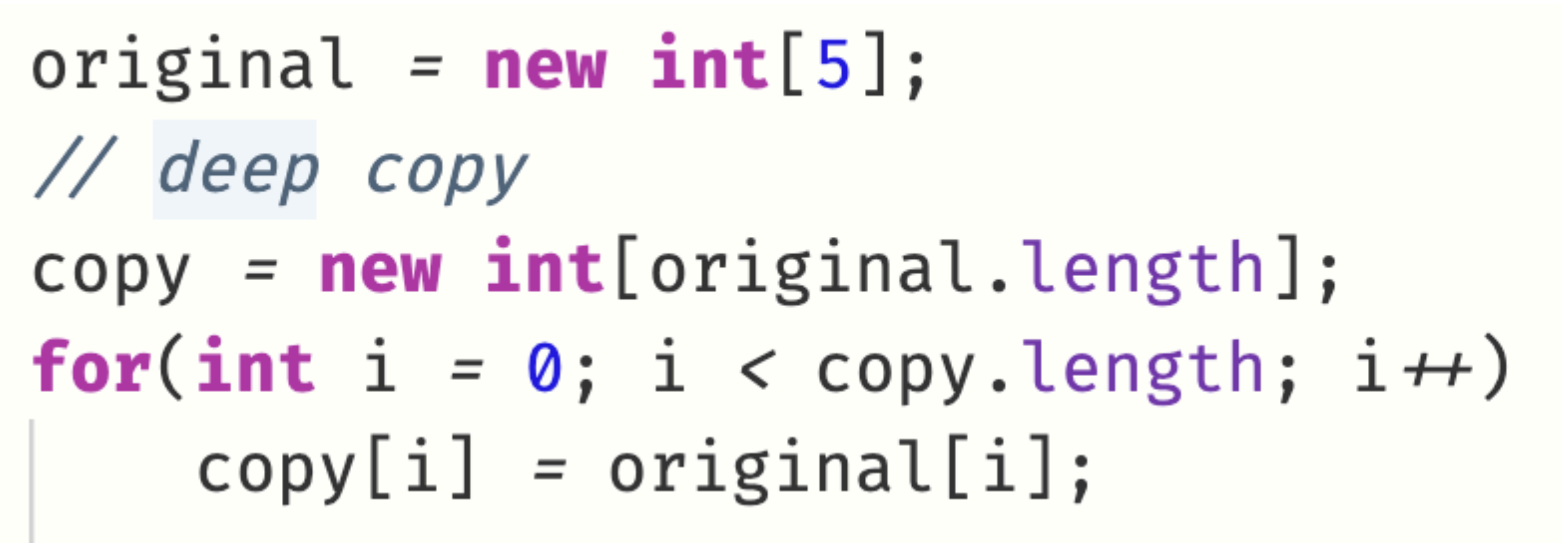
```
original = new int[5];
// shallow copy
copy = original;

copy[0] = 314;
System.out.println(original[0]);
```



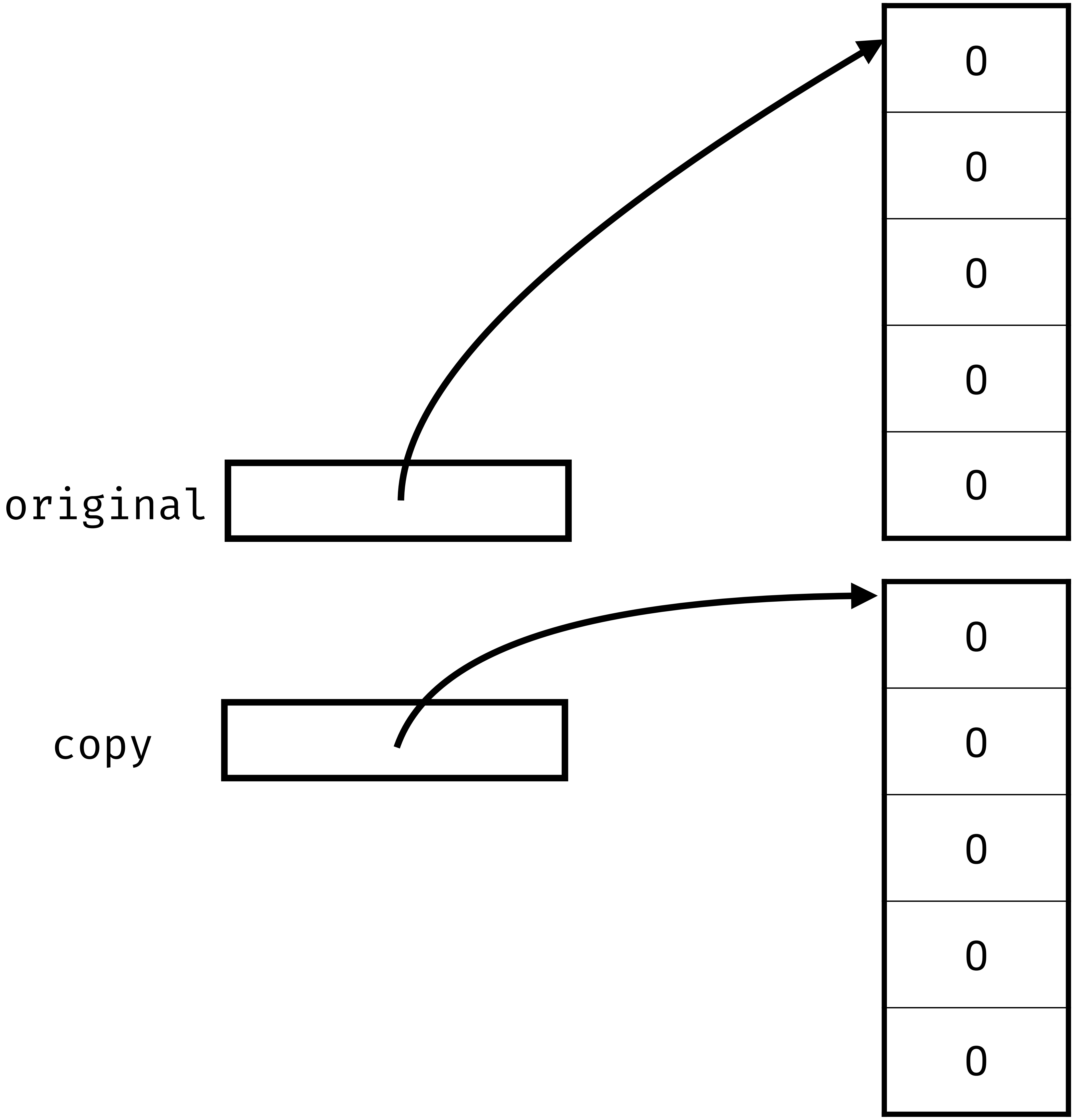
What is printed out here? Why?

isPermutation()

Shallow vs. Deep Copies

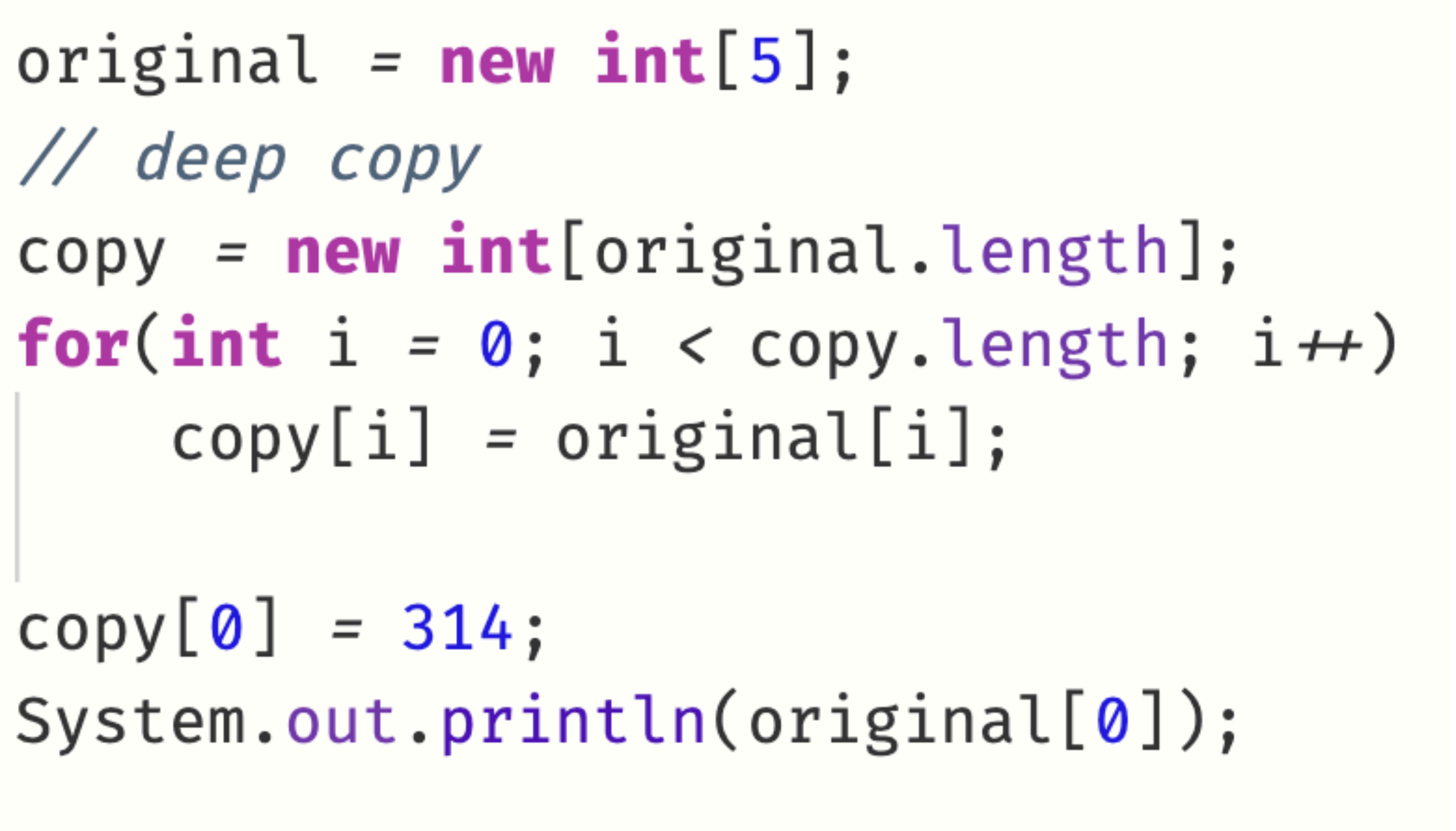


```
original = new int[5];
// deep copy
copy = new int[original.length];
for(int i = 0; i < copy.length; i++)
    copy[i] = original[i];
```



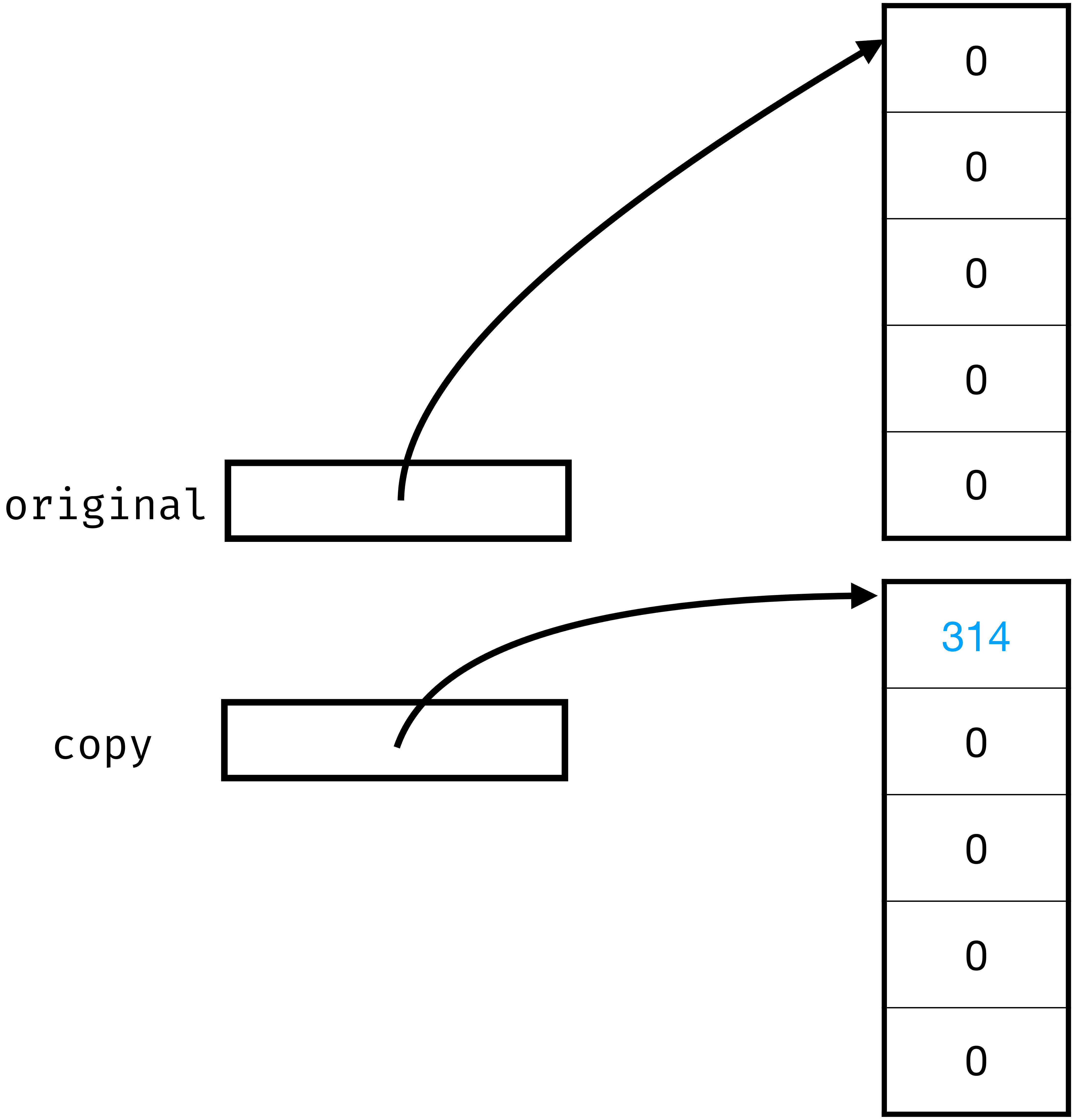
isPermutation()

Shallow vs. Deep Copies



```
original = new int[5];
// deep copy
copy = new int[original.length];
for(int i = 0; i < copy.length; i++)
    copy[i] = original[i];

copy[0] = 314;
System.out.println(original[0]);
```

What is printed out *here*? Why is it not the same as last time?



Slides Redacted

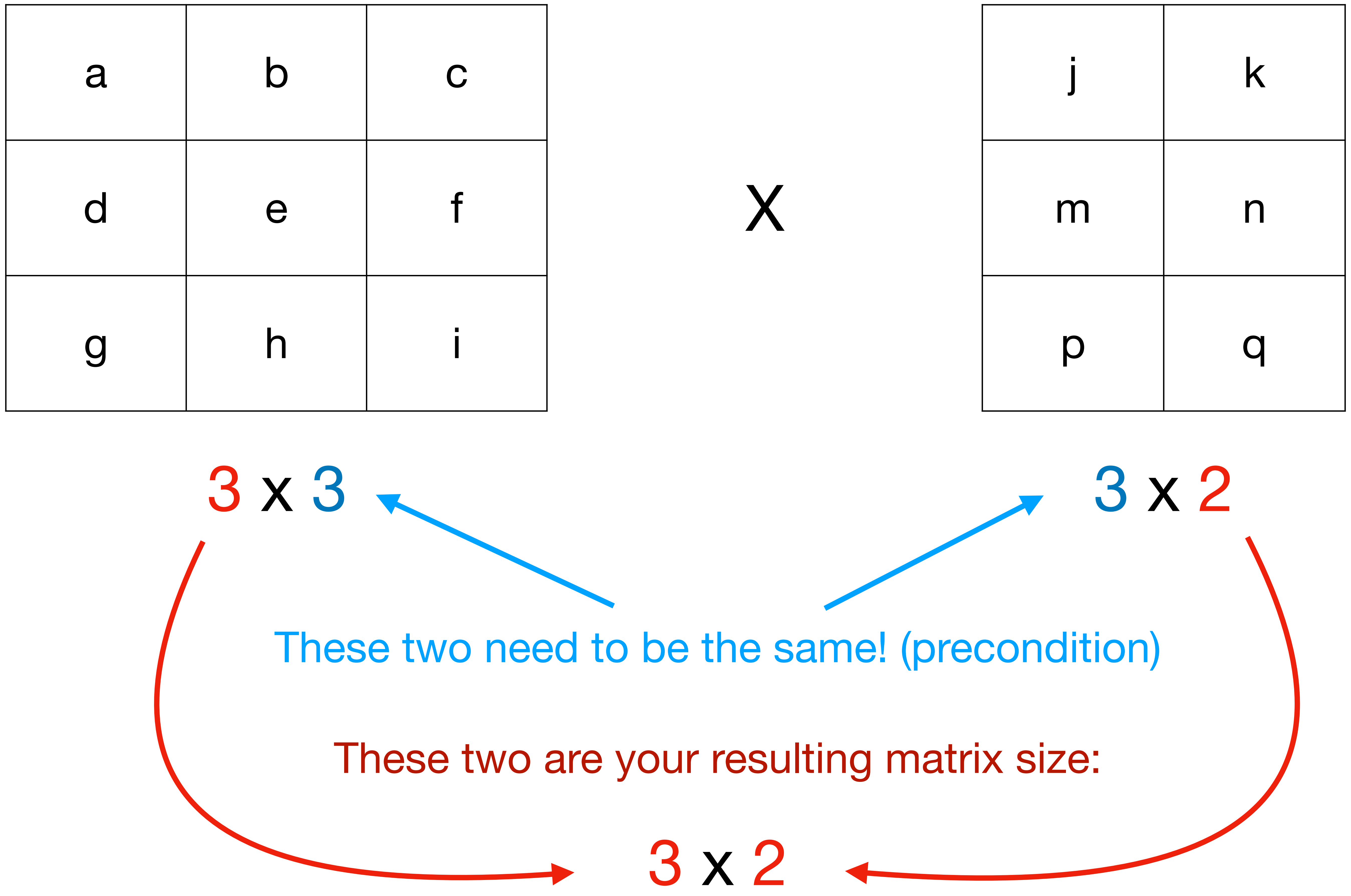
(See Discussion Section Recording)

Assignment 2: MathMatrix

Due: Thursday, February 4, 2020

MathMatrix

Matrix Multiplication “Review”



$$\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix} \text{X} \begin{bmatrix} j & k \\ m & n \\ p & q \end{bmatrix}$$

3 x 3

3 x 2

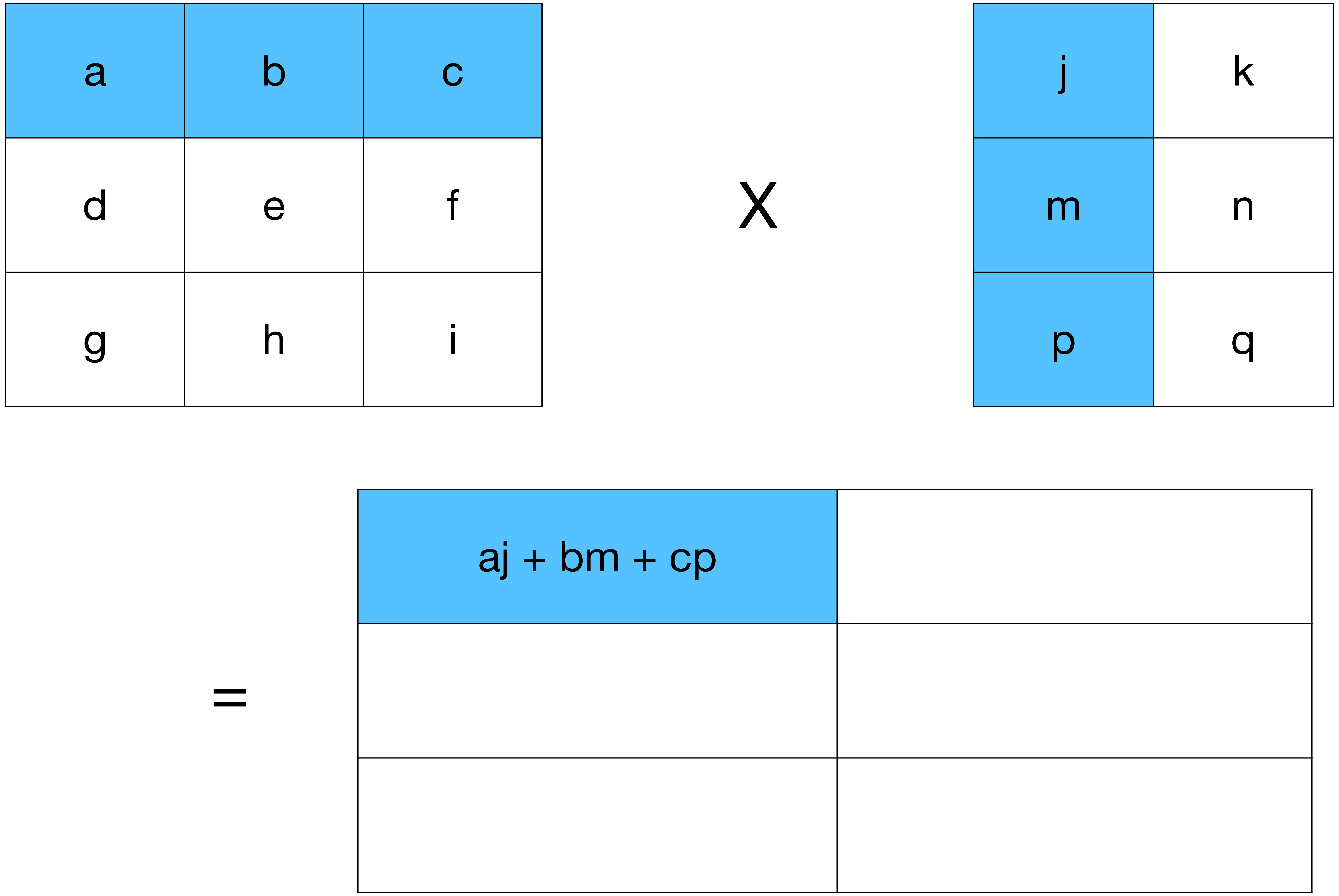
These two need to be the same! (precondition)

These two are your resulting matrix size:

3 x 2

MathMatrix

Matrix Multiplication “Review”

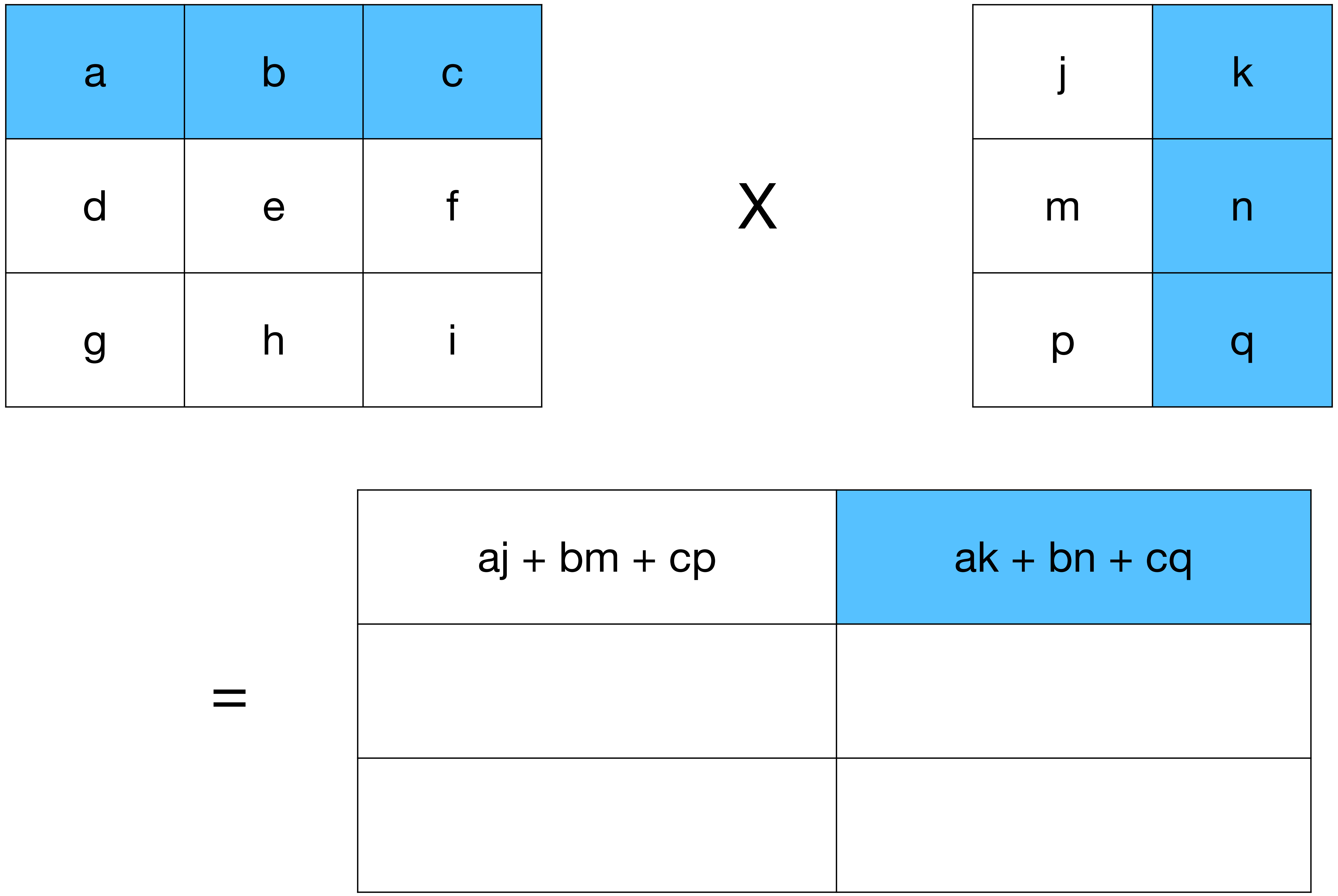


$$\begin{array}{|c|c|c|} \hline a & b & c \\ \hline d & e & f \\ \hline g & h & i \\ \hline \end{array} \quad X \quad \begin{array}{|c|c|} \hline j & k \\ \hline m & n \\ \hline p & q \\ \hline \end{array}$$

$$= \begin{array}{|c|c|} \hline aj + bm + cp & \\ \hline & \\ \hline & \\ \hline \end{array}$$

MathMatrix

Matrix Multiplication “Review”



a	b	c
d	e	f
g	h	i

X

j	k
m	n
p	q

=

aj + bm + cp	ak + bn + cq

MathMatrix

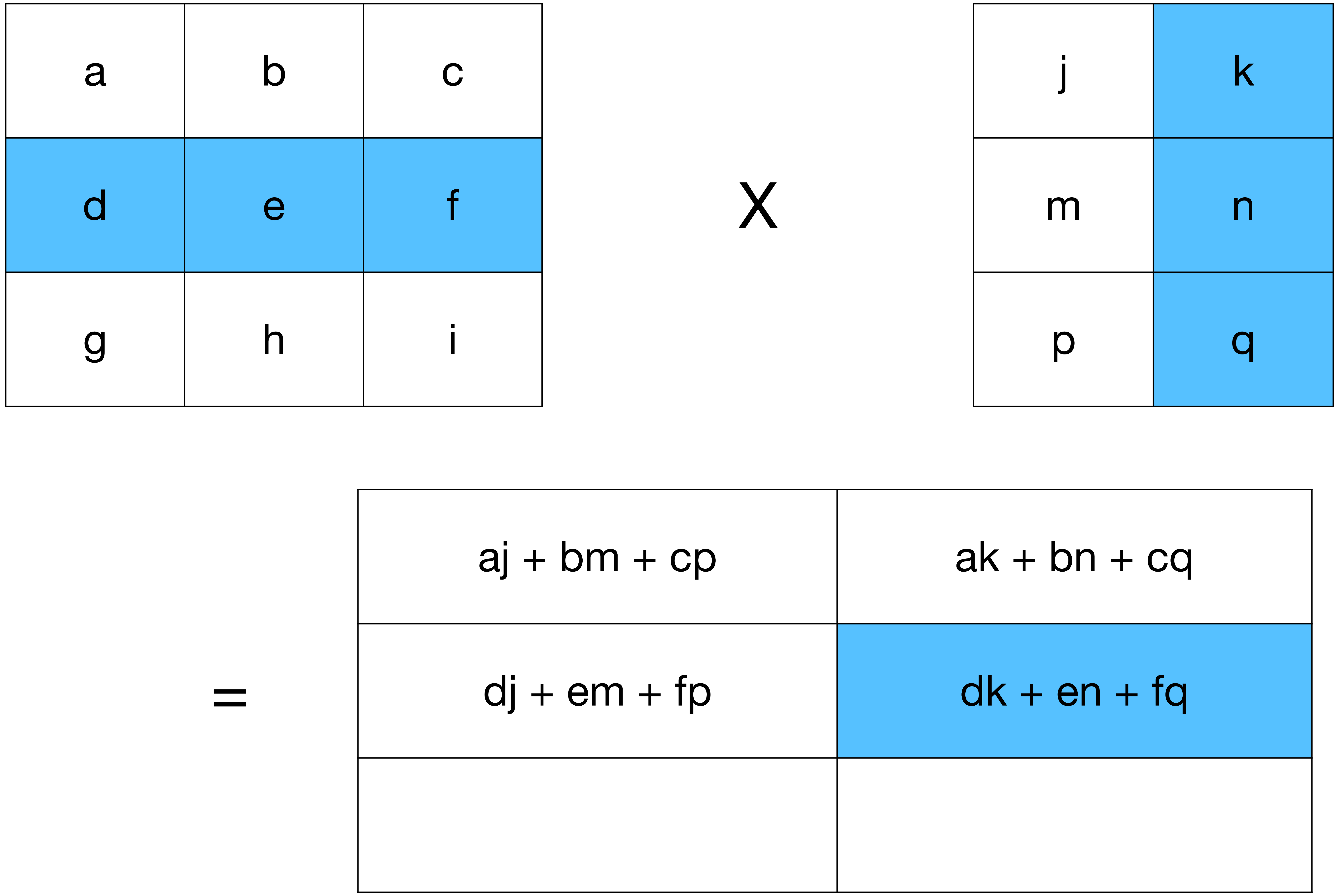
Matrix Multiplication “Review”

$$\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix} \quad X \quad \begin{bmatrix} j & k \\ m & n \\ p & q \end{bmatrix}$$

$$= \begin{bmatrix} aj + bm + cp & ak + bn + cq \\ dj + em + fp & \\ & \end{bmatrix}$$

MathMatrix

Matrix Multiplication “Review”



$$\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix} \quad X \quad \begin{bmatrix} j & k \\ m & n \\ p & q \end{bmatrix}$$

$$= \begin{bmatrix} aj + bm + cp & ak + bn + cq \\ dj + em + fp & dk + en + fq \\ & \end{bmatrix}$$

MathMatrix

Matrix Multiplication “Review”

$$\begin{array}{|c|c|c|}\hline a & b & c \\ \hline d & e & f \\ \hline g & h & i \\ \hline\end{array} \quad X \quad \begin{array}{|c|c|}\hline j & k \\ \hline m & n \\ \hline p & q \\ \hline\end{array}$$

And so on…

$$= \begin{array}{|c|c|}\hline aj + bm + cp & ak + bn + cq \\ \hline dj + em + fp & dk + en + fq \\ \hline gj + hm + ip & gk + hn + iq \\ \hline\end{array}$$

Section Problem

Array-based Lists