

320341 Programming in Java



JACOBS
UNIVERSITY

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Lecture 4: Arrays

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- Arrays

Objectives

The objective of this lecture is to:

- Introduce the array data structure

An array stores a collection of values of the same type

- The values stored in an array are called its **elements**
- Individual values are accessed through an integer index

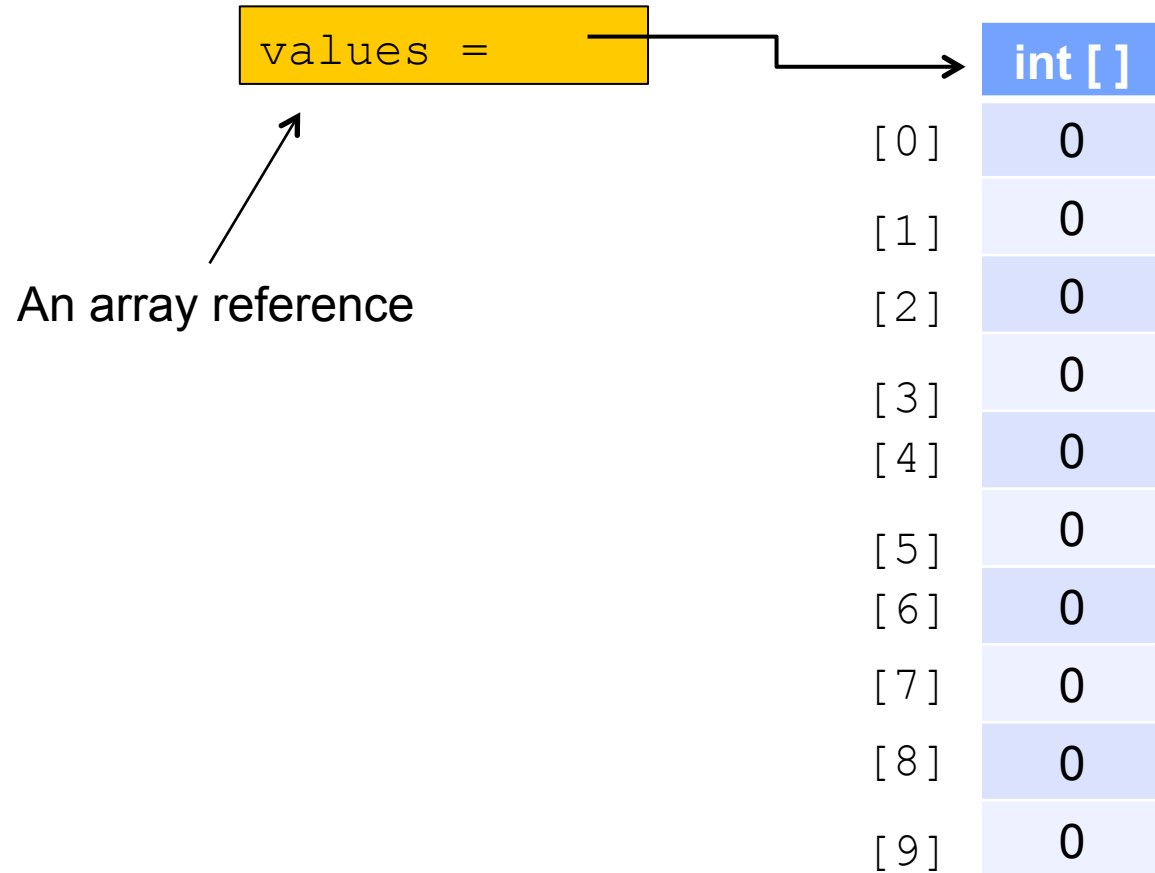
Example:

```
int[] values; // declares variable values as an array of integers
```

```
// declares variable values  
// allocates space  
// elements numbered 0 to 9  
// primitive elements initialized to 0,  
// boolean types initialized to false and  
// object references initialized to null  
int [] values = new int[10];
```

Arrays

```
int [] values = new int[10];
```



Declaring Arrays

Examples

Code Segment	Description
<pre>int[] numbers = new int[10]</pre>	<ul style="list-style-type: none">• An array of 10 elements is created.• All elements are initialized to zero.
<pre>final int NUMBER_LENGTH = 10; int [] numbers = new int [NUMBER_LENGTH];</pre>	<ul style="list-style-type: none">• Good practice to use a named constant.
<pre>int valuesLength = in.nextInt(); int[] values = new int[valuesLength];</pre>	<ul style="list-style-type: none">• The length need not be a constant.
<pre>int[] squares = {0, 1, 4, 9, 16};</pre>	<ul style="list-style-type: none">• An array of 5 integers with initial values.
<pre>String[] names = new String[3];</pre>	<ul style="list-style-type: none">• An array of 3 string references, all initially null.
<pre>String[] friends = {"Emily", "Bob", "Cindy"};</pre>	<ul style="list-style-type: none">• An array of 3 strings.

Use a loop to fill an array

```
int [] a = new int[100];  
for (int i = 0; i < 100; i++)  
    a[i] = i; // fills array with 0 - 99
```

Find the number of elements in an array

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

- Once an array has been created, you cannot change its size

Array Initializers and Anonymous Arrays

It is possible to declare and initialize an array at the same time

```
int [] smallPrimes = {2, 3, 5, 7, 11, 13};
```

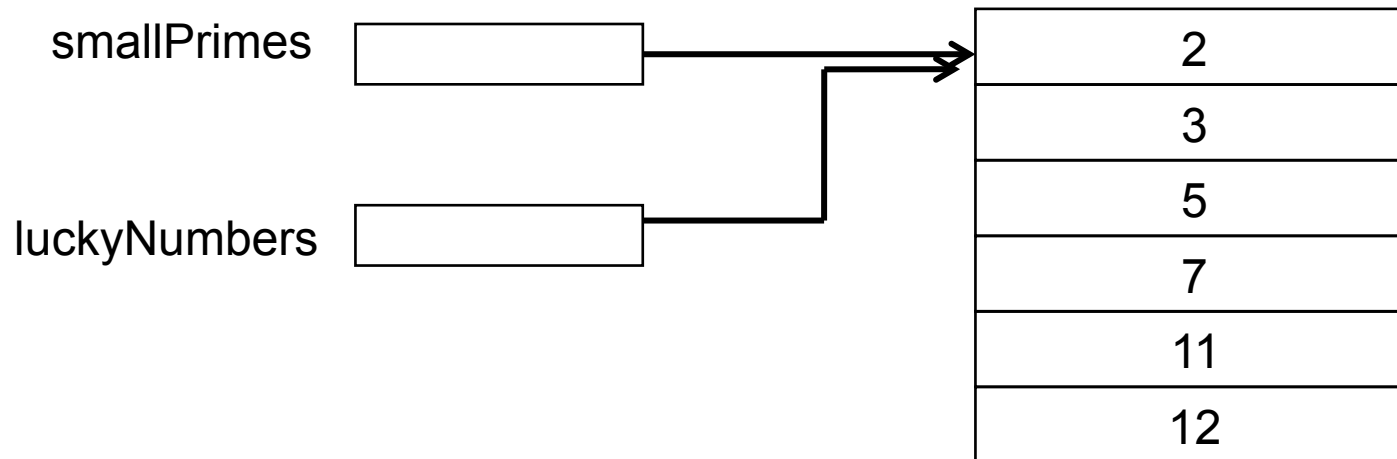
- You can also initialize an anonymous array

```
new int [] {17, 19, 23, 29, 31, 37};
```


Array Copying

Copy one array variable to another, but both refer to same array

```
int [] smallPrimes = {2, 3, 5, 7, 11, 13};  
int [] luckyNumbers = smallPrimes;  
luckyNumbers[5] = 12; // now smallPrimes[5]  
                       // is also 12
```



Reading Assignment

Cay S. Horstmann and Gary Cornell, Core Java(TM) 2. Vol. I. 9th Ed.
Prentice Hall, 9th Edition. 2013. Chapters 3.