

CS120: Java Arrays

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An array collects a fixed number of values in a single variable, and it provides a convenient syntax to reference each value.

1948	1977	1994	1999
0	1	2	3

Java Arrays: Declaration & Assignment

Declare an array
of `int` values

```
int [] counts = new int [4];
```

Create a new
array of four `int`
s, and assign this
object to `counts`

An array stores a sequence of values of the same type. Size of an array (here four) can be variable, but must be non-negative.



Java initializes each element to its zero value.

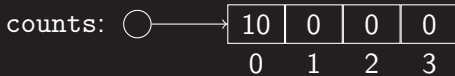


Java Arrays: Update

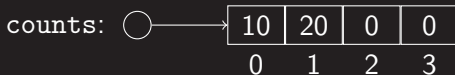
```
int [] counts = new int [4];  
counts [0] = 10; ←
```

Right side of
assignment
operator is
like other
assignments;
type must match

Select which
value to update
using Java's index
notation; indexing
starts at zero



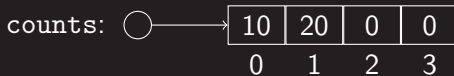
```
counts [1] = 20;
```



Java Arrays: Access

```
int [] counts = new int [4];  
counts [0] = 10;  
counts [1] = 20;  
System.out.println(counts [0] + counts [1]);
```

Use Java's index notation to reference an array element by index; this prints the sum of the values and index 0 and 1 (30)





Java Arrays: Introduction

Use array syntax anywhere Java expects an expression. Update or access will happen appropriately.

```
counts[0] = 7;  
counts[1] = counts[0] * 2;  
counts[2]++;  
counts[3] -= 60;
```

Any expression that produces an integer may be used as index:

```
int i = 0;  
counts[i + 2] = 7;
```

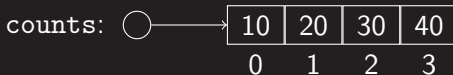


Java Arrays: Loop

```
int [] counts = new int [4];
counts [0] = 10;
counts [1] = 20;
counts [2] = 30;
counts [3] = 40;
for (int i = 0; i < counts.length; i++) {
    System.out.println(counts[i]);
}
```

Each array object
has a length
member field

Remember, an
array's indices
start at zero

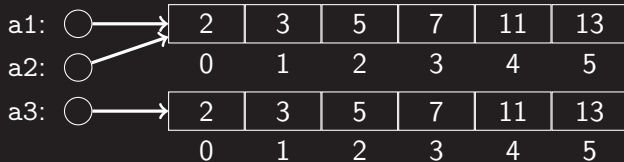


Remember: String s have a length() method, but arrays have a length member field.

Java Arrays: Copying

```
1  int [] a1 = new int []{ 2, 3, 5, 7, 11, 13 };
2  int [] a2 = a1;

4  int [] a3 = new int [6];
5  for (int i = 0; i < a1.length; i++) {
6      a3[i] = a1[i];
7  }
```





Java Arrays: Method Parameters

```
class Array {  
    public static void f(int [] array) {  
        for (int i = 0; i < array.length; i++) {  
            System.out.println(array[i]);  
        }  
    }  
  
    public static void main(String [] args) {  
        f(new int []{ 2, 3, 5, 7, 11, 13 });  
    }  
}
```

Methods can receive arrays as parameters.



Java Arrays: Method Return Values

```
class Array {
    public static int [] f() {
        return new int []{ 2, 3, 5, 7, 11, 13 };
    }

    public static void main(String [] args) {
        int [] array = f();
        for (int i = 0; i < array.length; i++) {
            System.out.println(array[i]);
        }
    }
}
```

Methods can return arrays.



On board: passing arrays by reference.

On board: swapping values.

On board: counting letters ('a' == 97).



Java Arrays: Assignments

Completed Ch. 6; completed Aquinas for and guess3 in Java

Graded Homework Aquinas: greets and swap in Java

Ungraded Labs Aquinas: arrays and debug in Java

Reading Chapter 7

<https://www.flyn.org/courses/cs120-2021-fall/schedule>