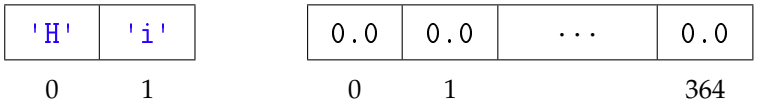
Model 1 Array Syntax

An ***array*** variable allows you to store multiple variables (of the same type). Each value in an array is known as an ***element***. The programmer must specify the ***length*** of the array (the number of array elements). Once the array is created, its length cannot be changed.

```
char[] letterArray = {'H', 'i'};
System.out.println(letterArray[0]);          // outputs H
System.out.println(letterArray.length);      // outputs 2

double[] numberArray = new double[365];
System.out.println(numberArray[0]);          // outputs 0.0
System.out.println(numberArray.length);      // outputs 365
```

Array elements are accessed by ***index*** number, starting at zero:



Questions (15 min) Start time:

1. Examine the results of the code.

a) What is the length of `letterArray`? 2

b) What is the length of `numberArray`? 365

c) What is the index of the element `'i'` in `letterArray`? 1

d) What is the index of the last element of `numberArray`? 364

2. Now examine the syntax of the code.

a) What are three ways that square brackets [] are used?

1) To declare the type: `double[]`
2) To specify the length: `double[365]`
3) To access an element: `numberArray[0]`

b) In contrast, how are curly braces {} used for an array?

To create an array with an initial set of values.

3. What are the resulting type and value of the following expressions? Show your work by writing the value of each array element in the space provided.

```
int[] a = {3, 6, 15, 22, 100, 0};
double[] b = {3.5, 4.5, 2.0, 2.0, 2.0};
String[] c = {"alpha", "beta", "gamma"};
```

a) `a[3] + a[2]` Type: `int` Value: `37`

`22` `15`

b) `b[2] - b[0] + a[4]` Type: `double` Value: `98.5`

`2.0` `3.5` `100`

c) `c[1].charAt(a[0])` Type: `char` Value: `'a'`

`beta` `3`

d) `a[4] * b[1] <= a[5] * a[0]` Type: `boolean` Value: `false`

`100` `4.5` `0` `3`

As shown in #3, an array variable can be declared and initialized without using `new`. However, to assign an array variable that was previously declared, `new` is required:

```
a = new int[] {3, 6, 15, 22, 100, 0};
c = new String[] {"alpha", "beta", "gamma"};
```

4. Write statements that declare and initialize variables for the following arrays.

a)

0	14	1024	127	3	5521

```
int[] a = {0, 14, 1024, 127, 3, 5521};
```

b)

3.23	1.52	4.23	32.5	2.45	5.23	3.33

```
double[] b = {3.23, 1.52, 4.23, 32.5, 2.45, 5.23, 3.33};
```

5. Write statements that assign the following arrays to variables you declared in #4.

a)

0	14	1024	127	3	5521

```
a = new int[] {0, 14, 1024, 127, 3, 5521}
```

b)

3.23	1.52	4.23	32.5	2.45	5.23	3.33

```
b = new double[] {3.23, 1.52, 4.23, 32.5, 2.45, 5.23, 3.33}
```