



Array

Arrays and References

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What is an Array

- An array is a collection of items of same data type stored at contiguous memory locations.

0	1	2	3
0	0	0	0

Declaring an Array

- An array of a type is declared by appending open and close square bracket, [], after the type.

```
int[] intArray;  
double[] doubleArray;  
String[] bunchOfStrings;
```

0	1	2	3
0	0	0	0

Allocating Memory for an Array

- Declaring an array only creates the object, it does not allocate memory to store the array.

```
int[] intArray;
```

int[] intArray



Allocating Memory for an Array

- To allocate memory, we use the keyword `new`.

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

- `new` will allocate the array and initialize all values to zero.



Allocating Memory for an Array

- We can also initialize an array with comma-separated sequence of elements enclosed in curly braces:

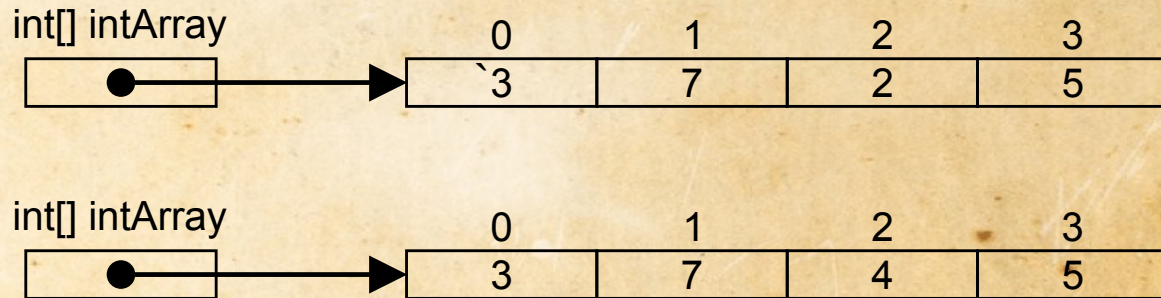
```
int[] intArray = { 3, 7, 2, 5 };
```



Accessing Arrays

- We use the *index* to access the array:

```
int[] intArray = { 3, 7, 2, 5 };  
intArray[2] = 4;
```



Accessing Arrays

- We use the *index* to access the array:

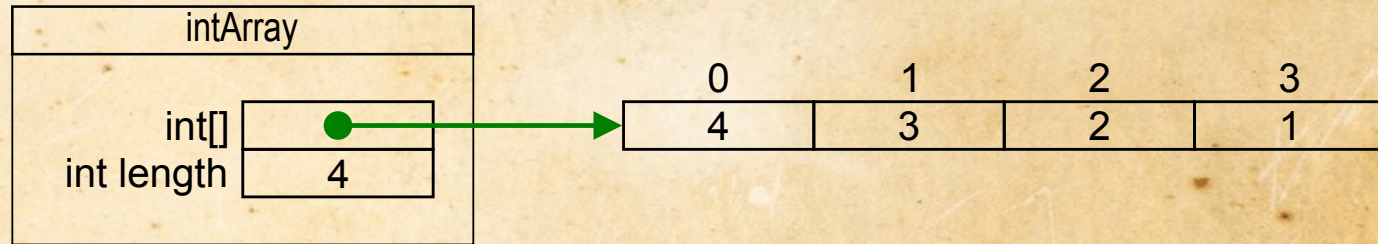
```
int[] intArray = { 3, 7, 2, 5 };  
for(int i = 1; i < 4; i++) {  
    intArray[i] = 9;  
}
```



Finding the Length of an Array

- We use the `.length` field when we need to find the length of the array:

```
int[] intArray = { 3, 7, 2, 5 };  
for(int i = 0; i < intArray.length; i++) {  
    intArray[i] = 4 - i;  
}
```

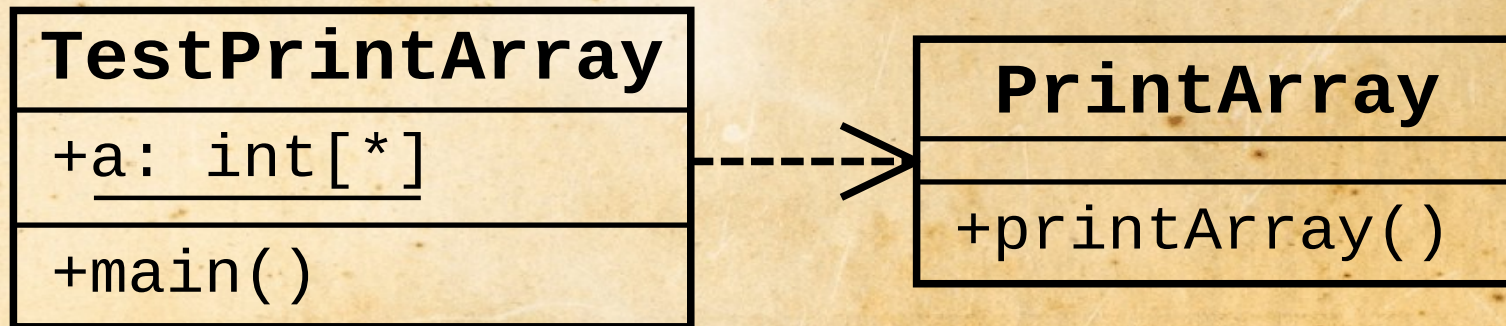


Printing Arrays



Printing Arrays

- Create a class called `PrintArray` that contains a method, `printArray()`, that takes an array of integers (`int[]`) as a parameter, and prints that array in mathematical set notation.
- Then make a class with (at minimum) a `main` method that will test your `PrintArray` class.
- The UML diagram here may help:



Printing Arrays

```
1 package com.bjflles.apcsca.unit6;
2
3 public class TestPrintArray {
4
5     static int a[] = { 5, 7, 6 };
6
7     public static void main(String[] args) {
8         PrintArray.printArray(a);
9     }
10 }
```

Problems Javadoc Declaration Console x Terminal
<terminated> TestPrintArray [Java Application] /Users/christophernielsen/.p2/pool/plugins/org.eclipse.justj.openjdk.hotspot.jre.full/bin/linux.x86_64/java -Xmx1024m -Djava.awt.headless=true -Djava.class.path=. TestPrintArray
{ 5, 7, 6 }

It is suggested that your main method will have more test cases than the one above.

TestPrintArray

+a: int[*]

+main()

PrintArray

+printArray()

```
1 package com.bjflles.apcsca.unit6;
2
3 public class PrintArray {
4     /**
5      * Print the numerical array to the console in
6      * set notation
7      *
8      * For example, the array defined as:
9      *     int[] a = { 5, 7, 6 };
10     * Will display as:
11     *     { 5, 7, 6 }
12     *
13     * @param a the array of numbers
14     */
15     public static void printArray(int[] a) {
16
17     }
```


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