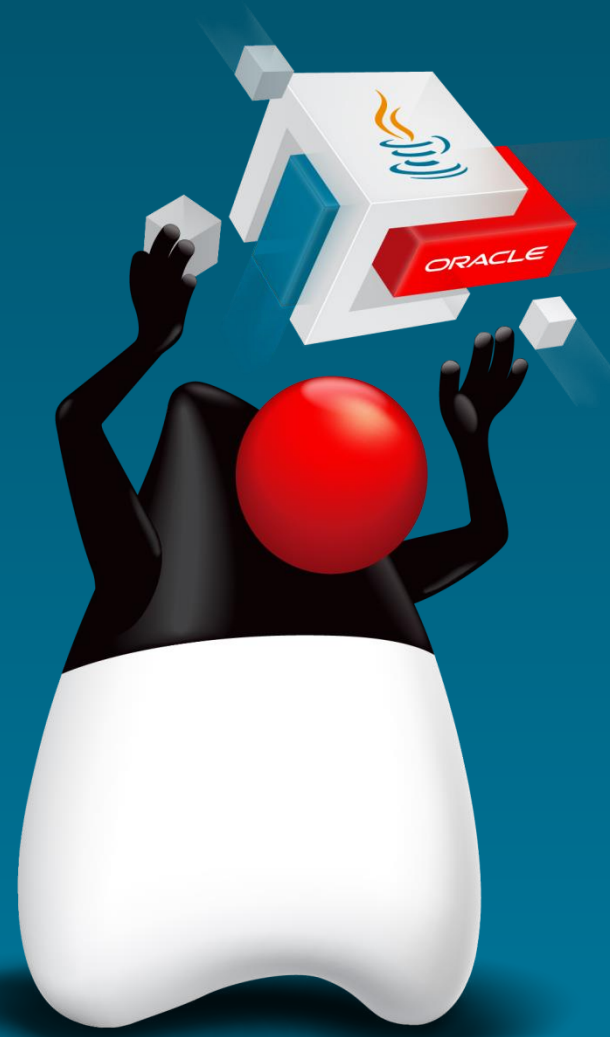


Managing Multiple Items

5



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Objectives

After completing this lesson, you should be able to:

- Explain what a boolean expression is
- Create a simple `if/else` statement
- Describe the purpose of an array
- Declare and initialize a `String` or `int` array
- Access the elements of an array
- Explain the purpose of a `for` loop
- Iterate through a `String` array using a `for` loop



Topics

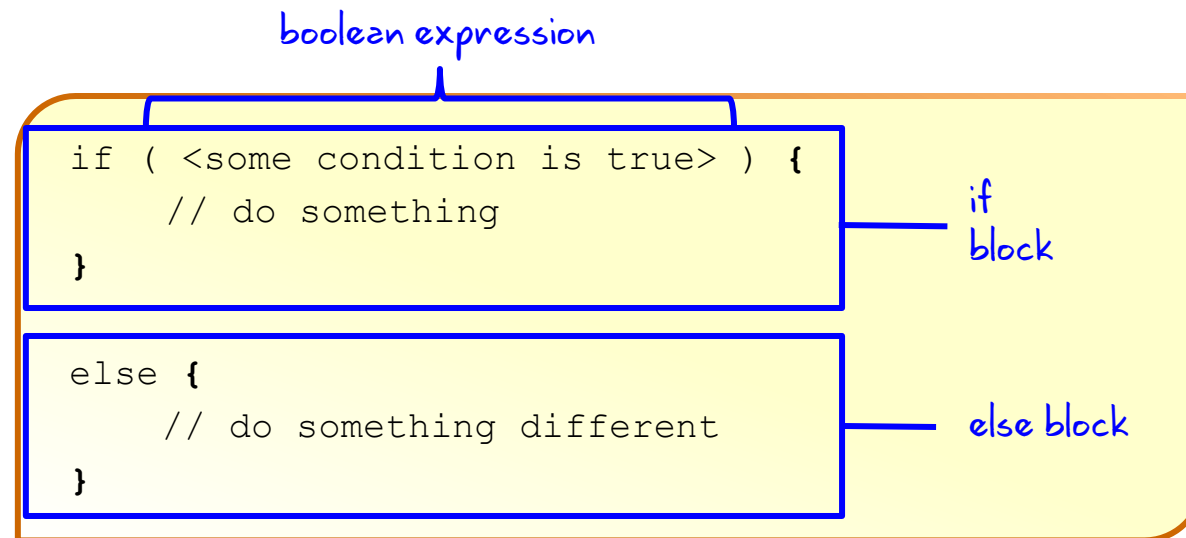
- Working with conditions
- Working with an array of items
- Processing an array of items



Making Decisions



The if/else Statement



Boolean Expressions

Review:

- `boolean` data type has only two possible values:
 - `true`
 - `false`

A boolean expression is a combination of variables, values, and operators that evaluate to `true` **or** `false`.

- `length > 10;`
 - `size <= maxSize;`
 - `total == (cost * price);`
- Relational operators

Relational Operators

Condition	Operator	Example
Is equal to	==	<pre>int i=1; (i == 1)</pre>
Is not equal to	!=	<pre>int i=2; (i != 1)</pre>
Is less than	<	<pre>int i=0; (i < 1)</pre>
Is less than or equal to	<=	<pre>int i=1; (i <= 1)</pre>
Is greater than	>	<pre>int i=2; (i > 1)</pre>
Is greater than or equal to	>=	<pre>int i=1; (i >= 1)</pre>

Examples

Sometimes there is a quicker way to meet your objective. Boolean expressions can be used in many ways.

```
24      int attendees = 4;
25      boolean largeVenue;
26
27      // if statement example
28      if (attendees >= 5){
29          largeVenue = true;
30      }
31      else {
32          largeVenue = false;
33      }
34
35      // same outcome with less code
36      largeVenue = (attendees >= 5);
```

Assign a boolean by
using an if
statement.

Assign the boolean directly
from the boolean expression.

Exercise 5-1: Using `if` Statements

1. Open the project **Exercise_05-1**.
2. Use an `if` statement to test the `quantity` of the item:
 - `if` it is > 1 , concatenate an `'s'` to `message` so that it indicates multiple items.
3. Declare a boolean, `outOfStock`.
4. Use an `if|else` statement to test if the item is out of stock:
 - `if` item is out of stock, inform the user that the item is unavailable.
 - `else`, print the `message` and total cost
5. Run the program with `outOfStock = true`.
6. Run it again with `outOfStock = false`.



Quiz



What is the purpose of the `else` block in an `if/else` statement?

- a. To contain the remainder of the code for a method
- b. To contain code that is executed when the expression in an `if` statement is false
- c. To test if an expression is false



Topics

- Working with conditions
- Working with an array of items
- Processing an array of items



What If There Are Multiple Items in the Shopping Cart?

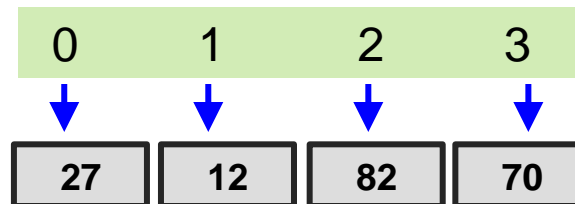
```
01      // Without an array
02      String itemDesc1 = "Shirt";
03      String itemDesc2 = "Trousers";
04      String itemDesc3 = "Scarf";
05
06      // Using an array
07      String[] items = {"Shirt", "Trousers", "Scarf"};
```

Not realistic if
100s of items!

Much better!

Introduction to Arrays

- An array is an indexed container that holds a set of values of a single type.
- Each item in an array is called an *element*.
- Each element is accessed by its numerical index.
- The index of the first element is 0 (zero).
 - A four-element array has indices: 0, 1, 2, 3.



Array Examples

Array of `int` types

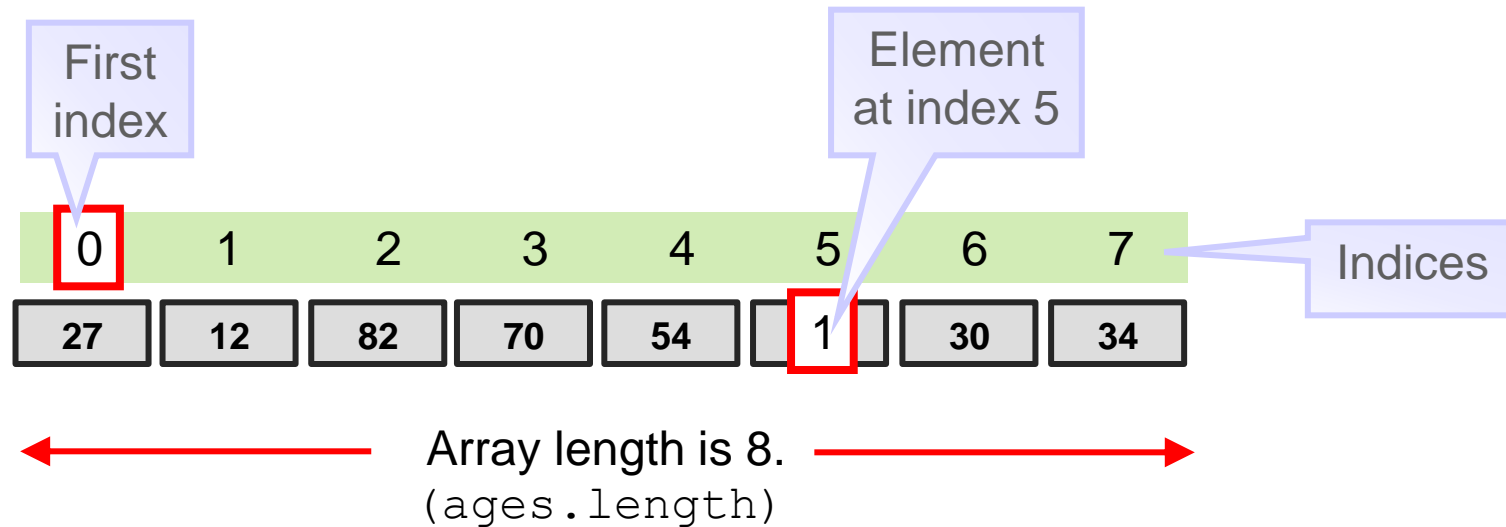
27	12	82	70	54	1	30	34
----	----	----	----	----	---	----	----

Array of `String` types

Hugh Mongus
Aaron Datires
Stan Ding
Albert Kerkie
Carrie DeKeys
Walter Mellon
Hugh Morris
Moe DeLawn

Array Indices and Length

The `ages` array has eight elements.



Declaring and Initializing an Array

- Syntax:

```
type[] arrayIdentifier = {comma-separated list of values};
```

- Declare arrays of types `String` and `int`:

```
String[] names = {"Mary", "Bob", "Carlos"};  
int[] ages = {25, 27, 48};
```

All in one line

Declaring and Initializing an Array

Examples:

```
1    int[] ages = new int[3];
```

```
2    ages[0] = 19;
```

```
3    ages[1] = 42;
```

```
4    ages[2] = 92;
```

```
5
```

```
6    String[] names = new String[3];
```

```
7    names[0] = "Mary";
```

```
8    names[1] = "Bob";
```

```
9    names[2] = "Carlos";
```

Multistep approach

Multistep approach

Accessing Array Elements

- Get values from the `ages` array:

```
int[] ages = {25, 27, 48};  
int myAge = ages[0];  
int yourAge = ages[1];  
System.out.println("My age is " + ages[0]);
```

- Set values from the `names` array:

```
String[] names = {"Mary", "Bob", "Carlos"};  
names[0] = "Gary";  
names[1] = "Rob";
```

Exercise 5-2: Using an Array

1. Open the project **Exercise_05-2** in NetBeans.
2. Declare a `String` array and initialize it with four elements.
 - Each element represents a different item description ("Shirt", for instance).
3. Change `message` to show how many items the customer wants to purchase.
 - Hint: Use the `.length` property of your array.
4. Print just one element in the array.
 - What happens if you use index number 4?



Quiz



Why does the following code not compile? Select all that apply.

```
int[] lengths = {2, 4, 3.5, 0, 40.04};
```

- a. `lengths` cannot be used as an array identifier.
- b. All of the element values should have the same format (all using `double` values, or all using `int` values).
- c. The array was declared to hold `int` values. `double` values are not allowed.



Quiz



Given the following array declaration, which of the following statements are true?

```
int[] classSize = {5, 8, 0, 14, 194};
```

- a. `classSize[0]` is the reference to the first element in the array.
- b. `classSize[5]` is the reference to the last element in the array.
- c. There are 5 integers in the `classSize` array.
- d. `classSize.length == 5`



Topics

- Working with conditions
- Working with an array of items
- Processing an array of items



Loops

Loops are used in programs to repeat blocks of statements

- Until an expression is false
or
- For a specific number of times:
 - I want to print each element of an array.
 - I want to print each element of an `ArrayList`. (The `ArrayList` class is covered in the lesson titled “Working with Arrays, Loops, and Dates.”)

Processing a String Array

Loop accesses each
element in turn.



```
for (String name : names ) {  
    System.out.println("Name is " + name);  
}
```

Each iteration returns the
next element of the array.

Output:

```
Name is George  
Name is Jill  
Name is Xinyi  
Name is Ravi
```


Using break with Loops

break example:

```
01  int passmark = 12;
02  boolean passed = false;
03  int[] scores = {4,6,2,8,12,35,9};
04  for (int unitScore : scores) {
05      if (unitScore >= 12) {
06          passed = true;
07          break;
08      }
09  }
10  System.out.println("At least one passed? " + passed);
```

No need to go through the loop again, so use break.

Output:

```
At least one passed? true
```

Exercise 5-3: Using a Loop to Process an Array

1. In NetBeans, continue editing **Exercise_05-2** or open **Exercise_05-3**.
2. Create a `for` loop that iterates through the array of item descriptions, displaying each element.
3. Precede the list of elements with the message: "Items purchased:".



Quiz



Given the following code,

```
int[] sizes = {4, 18, 5, 20};  
for (int size : sizes){  
    if (size > 16){break;}  
    System.out.println("Size: "+size + ", ");  
}
```

which option below shows the correct output?

- a. Size: 4,
- b. Size: 4
- c. Size: 4,
Size: 5,
- d. There is no output.



Summary

In this lesson, you should have learned how to:

- Use a boolean expression
- Create a simple `if/else` block
- Describe the purpose of an array
- Declare and initialize a `String` or `int` array
- Access the elements of an array
- Explain the purpose of a `for` loop
- Iterate through a `String` Array using a `for` loop

