

Introduction to Programming

with Java, for Beginners

Conditionals(If statements)

Limitations of sequential programming

- Cannot choose whether or not to perform a command/instruction
- Cannot perform the same command more than once
- Such programs are extremely limited!

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Control Structures

- Allow a program to base its behavior on certain conditions
- Two kinds:
 - Conditional (If) Statements
 - Loop Structures

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Recap: Boolean

- **Boolean** is one of the eight primitive types
 - Only 2 value: true, or false
 - Booleans are used to make **yes** or **no** decisions
 - All control structures use Booleans
- The following expression each give a Boolean result:
 - (25 > 24) **&&** (12 == 13) //results to **false**
 - (25 > 24) **||** (12 == 13) //results to **true**
- Thus based on certain conditions we can alter the outcome or flow of the program

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Conditionals (“if” statements)

- An “if” statement is a *flow control* statement
- It is also called a *conditional*, or a branch
- We’ll see several “flavors”
 - An “if” all by itself
 - An “if” with an “else” part
 - An “if” with an “else if” part

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“if” statement

```
if (condition){  
    statement(s)  
}
```

If the condition is true, then the statement(s) (i.e. instructions) will be executed. Otherwise, it/they won't.

```
//Assume x is an integer  
if(x > 10) {  
    x = x * 2;  
    System.out.println("x = " + x);  
}
```

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If statement (contd..)

- { } indicates the block of code that will get executed given the condition is true
- You can avoid the curly brace after condition if only one statement is to be performed

```
//Assume x is an integer  
if(x > 0)  
    System.out.println(x + " is positive");
```

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“if-else” statement

```
if (condition){  
    statement(s)  
}  
else (condition){  
    statement(s)  
}
```

```
//Assume x is an integer  
if(x > 0) {  
    System.out.println(x + " is positive");  
}  
else {  
    System.out.println(x + " is negative");  
}
```

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Style Rule: Indentation and Spacing

- Recommended indentation is from 2 to 4 spaces, but *must be consistent* throughout the program
 - In Dr Java you can set the indent level:
Edit > Preferences > Miscellaneous
- Single space around every binary operator, including comparisons and assignment (=)

```

if (x < 10) {
    x = x + 1;
}
else {
    x = x - 1;
}
    
```

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Cascading "if-else"

Example

```

//Assume variable score is entered by user
if (score > 90)
    System.out.println("Grade A");
else if (score > 80)
    System.out.println("Grade B");
else if (score > 65)
    System.out.println("Grade C");
    .
    .
else
    System.out.println("F");

//Note: You can avoid the curly brace after
condition if only one statement is to be performed
    
```

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Nested if-statements

An if within an if	Truth Table												
<pre> if (condition1){ if (condition2){ statement(s) A } else{ statement(s) B } } else { statements(s) C } </pre>	<p>What values must the conditions have in order for block A to run? B? C?</p> <table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <th>condition1</th> <td>T</td> <td></td> <td></td> </tr> <tr> <th>condition2</th> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	condition1	T			condition2			
	A	B	C										
condition1	T												
condition2													

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The infamous "dangling else"

Code	Notes
<pre> if (x > y) if (y < z) statementA; else statementB; </pre>	<p>When is statementB executed?</p> <p>In other words, which if is the else paired with?</p>

- An **else** is paired with the last **else-less if**, regardless of spacing, unless { } dictate otherwise.

```

if (x > y){
    if (y < z){
        statementA;
    }
}
else{
    statementB;
}
    
```

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