

Methods, Boolean Expressions, & Control Structures

CS 99 – Summer 2000
Michael Clarkson
Lecture 3

Administration

- No class tomorrow
- Lab 2 due Wednesday (on floppy)
- Lab 3 posted this afternoon, due Thursday
- Instruct accounts

Agenda

- Finish discussing methods
- Boolean expressions
- Control structures

Method Calls

- Method Call Walkthrough
- Online at course website

Boolean Expressions

- Named for George Boole (1815-1864)
- Boolean algebra ~ Propositional logic
 - All variables have a value of either true or false
- Java has `boolean` available as a primitive type
- Java also has several operators that can be applied to boolean variables and values

Boolean Operators

- AND
 - a AND b is true exactly when both a and b are true
 - Truth table:
 - Java: `&&`
 - Math: \wedge

a	b	a AND b
false	false	false
false	true	false
true	false	false
true	true	true

Boolean Operators [2]

- OR

- a OR b is true exactly when a is true, b is true, or both are true

- Truth table:

- Java: `||`

- Math: \vee

a	b	a OR b
false	false	false
false	true	true
true	false	true
true	true	true

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Boolean Operators [3]

- NOT

- NOT a is the opposite of a

- Truth table:

- Java: `!`

- Math: \neg

a	NOT a
false	true
true	false

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Logical Operators

<code>&&</code>	AND
<code> </code>	OR
<code>!</code>	NOT
<code>&=, =</code>	AND assignment, OR assignment

Operands and resulting values are boolean

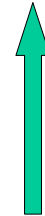
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Precedence

- `!`
- `&&`
- `||`



<code>()</code>
<code>++ -- !</code>
<code>* / %</code>
<code>+ -</code>
<code>> >= < <=</code>
<code>== !=</code>
<code>&&</code>
<code> </code>
<code>= op=</code>

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Control Structures

- Two things missing:

- Ability to make a choice to execute one piece of code or another

- Ability to execute a piece of code an unknown number of times

- Conditional statements (selection, alternation)

- Repetition statements (loops)

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Selection Statements

- Express a choice between two different pieces of code to execute

- Example:

```
if user entered "quit"
    terminate program
otherwise
    process input
```

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Repetition Statements

- Allow code to be repeated until something is true or false
- Example:

```
do
  display menu
  get choice
until choice is "quit"
```