CMSC 131

Object-Oriented Programming I

Conditionals, Block Statements, Style

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This material is based on material provided by Ben Bederson, Bonnie Dorr, Fawzi Emad, David Mount, Jan Plane

Overview

- Conditionals
- Block Statements
- Style

Blocks

- What happens?

```
if (i > 10)
   i = 10;
   saturate = true;
else
    k = 100;
```

- Desired → both `i`, `saturate` are set only when `i` > 10
- Actual → syntax error
  - Only one statement can be associated with `if`
  - The `saturate` assignment statement is not part of the `if`
  - The else can't find the if it belongs to
- Blocks solve this problem

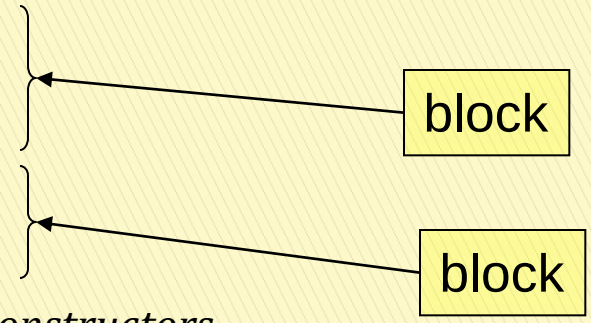
What Blocks Are

- Blocks are sequences of statements "glued together" into one
- Form:

```
{
    <statement 1>;
    <statement 2>;
  …
}
```

- Example:

```
if (i > 10) {
     i = 10;
     saturate = true;
} else {
     i = i+1;
}
```



- if, if-else, {…} are *statement constructors*
  - They take statement(s) and convert them into a new statement
  - Implications: if statements, etc. can also appear inside ("be nested within") one another

Issues with if-else

- Nested If/Elses can be ugly and confusing!
  - Indent and block carefully
  - **Example:** NestingExample.java
- The "Dangling Else" Problem
  - Java rule → else is associated with "innermost" possible if
  - **Example:** BadExample.java (example of bad indenting)
- Cascading Elses
  - **Example:** Cascading1.java, Cascading2.java (Improved version of Cascading1.java), Cascading3.java
- WE WILL USE { … } FOR ALL IF, IF-ELSE, IF-ELSE-IF, STATEMENTS

Scope rules/Initialization

- Variables can be declared anywhere in a Java program
- When are the declarations active?
  - After they are executed
  - *Only inside the block in which they are declared*
- Scope rules formalize which variable declaration are active
  - Global variables: scope is entire program
  - Local variables: scope is a block
- **Example:** Initialization1.java (problem), Initialization2.java
- **Example:** Initialization3.java

Named Constants

- If same value should be used in several places, how to ensure consistency?
  - i.e. Check on temperature may be performed more than once
  - i.e. Same prompt might be printed in several places
- `final int MAX_OK_TEMP = 99;`
  - Just like a regular variable declaration/initialization, except…
    - Special term `final`
    - Necessity of initial value
    - Any valid variable name will work, but convention is to use all capitals
- If you are not using constants then you have "magic numbers"
- Difference from non-final variables: assignment attempt leads to error!
- literals (= named values)

e.g.

```
if (temp >= 212 || temp <= 32) …
if (temp >= BOILING || temp <= FREEZING)
```

e.g.

```
System.out.print ("Enter integer:  ");
System.out.print (PROMPT);
```

Style for Projects

- You must use meaningful variable names
  - It must tell the purpose of that variable → what it is meant to hold
  - It can not have so much abbreviation that only you can read it
- You must use Java convention indenting and brace placement
  - Indentation → **4 spaces, do not use tabs**
- Java convention of capitalization of identifiers
  - Variables and methods start with lower case
  - Classes and interfaces start with upper case
  - Variables, methods, classes and interface use camel case
  - Constants are all uppercase with underscores between words
- You must have “Fully Blocked” if statements and looping structures
- You must have all lines less than or equal to 80 columns of text
- You must use "named constants" for any literal values that will not change during program execution
- Please see the style guide we have provided at:

  http://www.cs.umd.edu/class/spring2011/cmsc131-020x/resources/styleGuide/styleGuide.html

Checkling Eclipse Line Max is 80

- To draw vertical line in editor to indicate 80th column:
  - Window→Preferences→General→Editors→Text Editors
  - Check the box “Show print margin” and enter 80 in “Print margin column”

Meaningful Variable Names

- Choose names for your variables to reflect their purpose not their type
- Make it readable to someone else
- Help prevent mistakes in order of the relational operators
- Avoid names that start with $ (usually reserved for "system level" variables)

Bad	Good
`typedValue == 5`	`menuOption == 5`
`integer > 13`	`age > 13`
`input1 > 45 && input2 > 100`	`height > 45 && weight > 100`
`val1 < 100 || val1 > 999`	`non3dgt < 100 || non3dgt > 999`

Suggestions for Writing Programs

- **Design** → Make sure you first come up with a plan/design for your code (e.g., using pseudocode)
- **Do not wait until the last minute** → Code implementation can be unpredictable
- **Incremental code development** → Fundamental principle in computer programming. Write a little bit of code, and make sure it works before moving forward
- **Don't make assumptions** → If you are not clear about a language construct, write a little program to familiarize yourself with the construct
- **Good Indentation** → From the get-go use good indentation as it will allow you to understand your code better

Suggestions For Writing Programs

- **Good variable names** → Use good variable names from the beginning (do not use x and y and then change them to meaningful names before submitting the project)
- **Testing**
  - Test your code with simple cases first
  - Test as you develop your code
- **Keep backups** → As you make significant progress in your development, make the appropriate backups
- Trace your code
- Use a debugger or specialized tools
  - Findbugs → http://findbugs.sourceforge.net/
- **Take breaks** → If you cannot find a bug take a break and come back later