The if Statement and Comparison Operators

CSC 116 – Section 002
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The if Statement

• Used to make decisions in a program
• Specifies what code to execute based on evaluating a test condition (boolean expression)
• Be careful using doubles! Roundoff error
• Syntax:
  
  if ( <boolean expression> )
  
  <then block>

  else
  
  <else block>
Relational Operators

<table>
<thead>
<tr>
<th>Relational Operator</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;</td>
<td>Greater than</td>
</tr>
<tr>
<td>&gt;=</td>
<td>Greater than or equal</td>
</tr>
<tr>
<td>&lt;</td>
<td>Less than</td>
</tr>
<tr>
<td>&lt;=</td>
<td>Less than or equal</td>
</tr>
<tr>
<td>==</td>
<td>Is equal</td>
</tr>
<tr>
<td>!=</td>
<td>Is not equal</td>
</tr>
</tbody>
</table>

The if Statement (2)

- Example:
  
  ```
  if(amt <= balance)
      balance = balance – amt;
  ```

- Example 2:
  
  ```
  if(amt <= balance)
      balance = balance – amt;
  else
      balance = balance – OVERDRAFT_PENALTY;
  ```
The if Statement (3)

- If the then block or else block requires more than one line of code, enclose the code using curly braces ({ })
- Example:
  
  ```
  if(amt <= balance) {
    double newBalance = balance – amt;
    balance = newBalance;
  }
  ```

Selection Operator

- Syntax:
  ```
  value = test ? true : false;
  ```
- Example:
  ```
  y = x >= 0 ? x : -x;
  ```
- … is the same as:
  ```
  if(x >= 0)
    y = x;
  else
    y = -x;
  ```
Comparing Strings

• The .equals method checks to see if strings are the same
• Example:
  if(s1.equals(s2)) {
    System.out.println("s1 and s2 are the same.");
  }

Comparing Strings (2)

• Use .compareTo() to compare the order of Strings
• Example:
  if(s1.compareTo(s2) < 0) {
    System.out.println("s1 comes before s2 in the dictionary");
  }
  if(s1.compareTo(s2) > 0) {
    System.out.println("s1 comes after s2 in the dictionary");
  }
Comparing Objects

• Use .equals() to compare like objects (objects of the same type)
• Common problems:
  – Using == instead of .equals
  – Comparing dissimilar objects

Comparing Objects (2)

• Example:
  Rectangle r1 = new Rectangle(5,10,20,30);
  Rectangle r2 = new Rectangle(5,10,20,30);
  Rectangle r3 = r1;
  if(r1.equals(r2)) {
      System.out.print(“The contents of r1 and r2 are the”);
      System.out.println(“ same.”);
  }
  if(r1 == r2) {
      System.out.println(“r1 and r2 refer to the same object”);
  }
References

• Jason Schwarz’s Lecture 8 slides: http://courses.ncsu.edu/csc116/