CS 160
CS Orientation

Expressions, Data Types, & Input/Output
Assignment 3: Semantics vs. Syntax

• What are these words?
• Why is this important?
Syntax

Penguin

Water bird
Syntax and Semantics...
Which is more important?
What does this have to do with CS?

• How is this like CS programs?
Data Types/Converting

• string - “string of text”
• character – ‘a’
• integer – 79
• boolean – True
• float – 79.0
Demo...
Python Operators and Their Computer Symbols

- +
- -
- *
- /
- //
- %
- **
Hierarchy of Operations

• Functions, i.e. `math.sqrt()`
• Power
• Mod
• Mult, Div
• Add, Sub
• Relational
• Logical
Python Examples

• 5 * 2 + 3 - 10
• 5 * (2 + 3) – 10
• 5/2
• 5//2
How about storing values?

- ch = ‘a’
- num = 79
- cont = True
- num = num + 1
- Can we mix types?
  - num = num + cont
  - num = num + ch
  - ch = ch + num
### Expressions and Equations

<table>
<thead>
<tr>
<th>Expressions</th>
<th>Equations</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A + B$</td>
<td>$C = A + B$</td>
</tr>
<tr>
<td>$A$ and $B$ are numeric. The resultant is numeric and is not stored.</td>
<td>$C$, $A$, and $B$ are numeric. The resultant is stored in $C$.</td>
</tr>
<tr>
<td>$A &lt; B$</td>
<td>$C = A &lt; B$</td>
</tr>
<tr>
<td>$A$ and $B$ are numeric, character, or string. The resultant is logical and is not stored.</td>
<td>$A$ and $B$ are numeric, character, or string. The resultant is stored in $C$; $C$ is logical.</td>
</tr>
<tr>
<td>$A$ OR $B$</td>
<td>$C = A$ OR $B$</td>
</tr>
<tr>
<td>$A$ and $B$ are logical. The resultant is logical and is not stored.</td>
<td>$C$, $A$, and $B$ are logical. The resultant is stored in $C$.</td>
</tr>
</tbody>
</table>
Sequential Logic Structure

<table>
<thead>
<tr>
<th>Algorithm</th>
<th>Flowchart</th>
<th>Pseudocode</th>
</tr>
</thead>
</table>
| 5. Instruction  
6. Instruction  
7. Instruction  
8. : |  
Instruction  
Instruction  
Instruction  
|  :  
Instruction  
Instruction  
Instruction  
|
Python Sequential Logic

print("   *   ")
print("  ***  ")
print(" ***** ")
print("*******")
print("********")
Demo...
## Decision Logic Structure

<table>
<thead>
<tr>
<th>Algorithm</th>
<th>Flowchart</th>
<th>Pseudocode</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. If (&lt;decision&gt;) then</td>
<td><img src="chart.png" alt="Flowchart Diagram" /></td>
<td>If (&lt;decision&gt;) then</td>
</tr>
<tr>
<td>Instruction</td>
<td></td>
<td>Instruction</td>
</tr>
<tr>
<td>6. :</td>
<td></td>
<td>else Instruction</td>
</tr>
<tr>
<td>:</td>
<td></td>
<td>Instruction</td>
</tr>
<tr>
<td>:</td>
<td></td>
<td>Endif</td>
</tr>
<tr>
<td>:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*OSU - Oregon State University*
Relational Operators and Symbols

- >
- >=
- <
- <=
- ==
- !=