

Objectives

- Wrap up random module
- Code Readability
- Intro to conditional statements
- Broader Issue: IBM Watson

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VA Lottery: Pick 4

- To play: you pick 4 numbers between 0 and 9
- To win: select the numbers that are selected by the magic ping-pong ball machine
- Your job: Simulate the magic ping-pong ball machines
 - Revision: display number as #-#-#-#

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`pick4.py`

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VA Lottery: Mega Millions

- Modify Pick 4 to simulate Mega Millions
- To play: you pick 5 numbers between 1 and 56
 - Ignoring rule: 1 Mega Ball number between 1 and 46
- Your job: Simulate the result of the magic ping-pong ball machines, displayed as #-#-#-#-#
 - How difficult to modify the last program?
 - What could we do to make easier?

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Improving Code Readability

- Comments
 - Describe blocks of code at a high level
- Output/Display
 - Descriptive, explains what program outputs
- Constants
 - Change one value (at top of program) to change value everywhere in program
 - Flexible programs
 - Gets rid of "magic numbers"
 - Give a clear name and purpose to values

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Improving Code Readability/Usability

- What does this program do?
 - How would you figure it out?
- What would you do to improve the program's readability and usability?

`program_before.py`
`program_after.py`

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Comparing Programs

- `constant_compare.out`
- Note good use of comments
 - Define sections of code
- Compare with and without constants

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Parts of an Algorithm

- Input, Output
- Primitive operations
 - What data you have, what you can do to the data
- Naming
 - Identify things we're using
- Sequence of operations
- Conditionals
 - Handle special cases
- Repetition/Loops
- Subroutines
 - Call, reuse similar techniques

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Making Decisions

- Sometimes, we do things only if some other condition holds (i.e., "is true")
- Examples
 - If the PB is new (has a safety seal)
 - Then, I will take off the safety seal
 - If it is raining and it is cold
 - Then, I will wear a raincoat
 - If it is Saturday or it is Sunday
 - Then, I will wake up at 10 a.m.
 - Otherwise, I wake up at 7 a.m.
 - If the shirt is purple or the shirt is on sale and blue
 - Then, I will buy the shirt

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Conditionals

- Sometimes, we only want to execute a statement in certain cases
 - Example: Finding the absolute value of a number
 - $|4| = 4$
 - $|-10| = 10$
 - To get the answer, we multiply the number by -1 *only if it's a negative number*
 - Code:


```
if x < 0 :
    abs = x*-1
```

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Typical Execution

```
fahr = input("...")
celsius = (5/9.0)*(fahr-32)
print "celsius=", celsius
```

So far, we've thought of programs as a *sequence* of statements.

Statements execute *in order*.

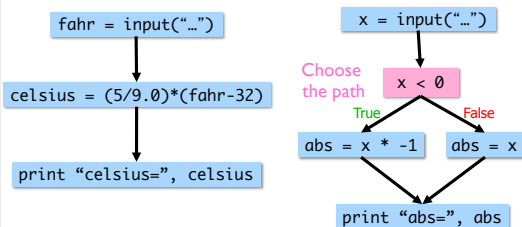
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if Statements

- Change the *control flow* of the program



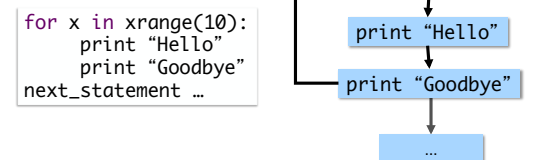
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Other "Things" That Change Control Flow

- **for** loops
 - Repeats a loop body a fixed number of times before going to the next statement after the **for** loop



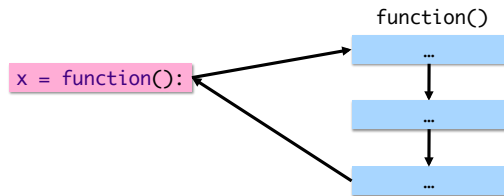
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Other “Things” That Change Control Flow

- Function calls
 - “Go execute some other code and then come back with the result”



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Syntax of **if** statement: Simple Decision

if condition :
statement1
statement2
...
statementn

keyword

“then” Body
• Note indentation

English Examples:
if it is raining :
 I will wear a raincoat
if the PB is new :
 Remove the seal

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Conditions

- Syntax:
 - <expr> <relational_operator> <expr>
- Evaluates to either True or False
 - Boolean type

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Relational Operators

- Syntax:
 - <expr> <relational_operator> <expr>

	Relational Operator	Meaning
Low precedence	<	Less than?
	<=	Less than or equal to?
	>	Greater than?
	>=	Greater than or equal to?
	==	Equals?
	!=	Not equals?

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Use Python interpreter 16

Examples: Using Conditionals

- Determine if a number is even or odd

```
x = input("Enter a number: ")
remainder = x%2
if remainder == 0 :
    print x, "is even"
if remainder == 1:
    print x, "is odd"
```

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IBM’s Watson/Jeopardy! Challenge

February 14, 15 and 16, 2011

Jean Paul
Nick
Ola
Lida
Yates

Anh
Callie
Minh
Colin
Will

CSCI250: Robotics – Spring term

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Discussion Questions

- What challenges did the Watson developers have to overcome?
 - How did they solve them?
 - Which were the hardest?
 - Were they what you expected?
- Any questions that you think would be particularly difficult for Watson?
- How can IBM/we/others use this new technology?
 - Anything you would not trust to Watson?
- What would you like to see added to Watson or how to improve it?

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Questions

- Had anyone heard about this before reading the article?
- Any Jeopardy! fans?
- What are your thoughts/opinions of IBM before and after reading the article?
- Could the development of Watson go horribly, horribly wrong?

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Extra Credit: TBD

- An analysis of the Jeopardy! games

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