A Brief Python Tour

CS303E: Elements of Computers
and Programming

June 4, 2012

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PROGRAM: *n*. A magic spell cast over a computer allowing it to turn one's input into error messages. *tr.v*. To engage in a pastime similar to banging one's head against a wall, but with fewer opportunities for reward.

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Useful Definitions

- *Programming Language*: A notation for writing computer programs
- *Program*: A detailed set of instructions – written in a programming language – for a computer to perform
- *Program Execution* ("running" a program): the computer performs a program's instructions
- *Machine Language*: The low-level binary instructions that a given CPU can execute [0111011010101101]

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Python Tour:
What is it?

- A *high-level language* developed by Guido van Rossum in the Netherlands in the late 1980s, released in 1991
- Named after *Monty Python*
- Twice received recognition as the language with the largest growth in popularity for the year (2007, 2010)

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Python Tour: Why is it useful?

- Clean, concise syntax
  - Easy to learn
  - Can create powerful programs quickly
- Design is compact
  - Language constructs are easy to learn
  - Easy to remember

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Python Tour: How does it work?

- Python is interpreted
  - Each command is translated to machine language and executed *on the fly*
  - The other type is compiled:
    - Each command is translated
    - The resulting program is stored in a new file
    - Execute using new file

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Python Tour: How do I use it?

- Either interactively
  - Type one command at a time in the interpreter
- Or use a file
  - Type commands in a file (give it the extension ".py")
  - Invoke Python interpreter to translate and execute commands
    - Can use command line or IDLE

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Python Tour: "Hello, World!"

- Interactive example (IDLE)
- File example (called a *module*)
- Module with `main` example

- Another way (we won't discuss):
  - Create in any editor
  - Save as text
  - Run at command line/in IDLE

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Python Tour: Comments

- Explanations of code purpose in English
- Indicated by the # character
- Ignored by the interpreter
- The style guide for this class requires comments:
  - At the beginning of a module
  - At the beginning of a function
  - Before a chunk of related statements
- Example: Full-line and in-line comments

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iClicker Question: Expected Output

```
#python program example
def main():
    #Welcome people to class
    print "Welcome to CS303E!"

main()
```

A. Welcome to CS303E!

B. "Welcome to CS303E!"

C. welcome to class

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Python Tour: Repetition

- In programs, we may want the computer to repeat an instruction or set of instructions more than once
- To do that, we use *loops*

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Python Tour: Loop Structure

```
for i in [1,2,3]:
    print i
```
Output:

```
for i in range(3):
    print i
```
Output:

Indentation matters!

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Python Tour: Decisions

We may also want the computer to perform certain instructions only under certain conditions

- Test for the condition
- If condition met, perform the action
- If condition not met, skip the action

```
i = 5
if i < 10:
    print i, "is less than 10"
```

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iClicker Question: Expected Output

```
def main():
    for i in [2,4,6]:
        print i

main()
```

A. 1   B. 2   C. i
   2   4   i
   3   6   i

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Python Tour: Things to Remember

- Whitespace matters
  - Statements inside functions/loops/conditionals must be indented
    - Tells the interpreter which statements belong inside
  - 2 may be too few, 6 probably too many
    - IDLE indents automatically
- Line continuation
  - If an instruction must be continued to a new line, must use line continuation character (\)
- It is common to include the `main` function

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Python Tour: "Hello, World!"

- Experiment!
- What if we un-indent one of the lines inside main?
- What if we change the print statement format?
- What if we add a loop?
- What if we get the indentation wrong?

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Discussion Section Tomorrow

- In Painter 5.38N
- Bring a memory stick with you

- You'll learn how to use IDLE and turnin programs in the lab

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To use Python and IDLE from home

- Appendix B in your textbook describes how to download Python
  - URL is: python.org/download
  - The download includes IDLE
- Please download version 2.7
- Appendix B also provides instructions regarding programming with IDLE

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Announcements

This week *only*:
  - Discussion Sections meet in PAI 5.38N
  - Your TA will be there with a "quiz" for you
  - Find the TA, introduce yourself, get quiz

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Announcements

- Contact information, office hours, etc. are on the syllabus
- Office hours are also on the "Office Hours" link off the class home page

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