

LUGers Intro to Python Programming

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Outline

- 1 Introduction
- 1 Why People use Python
- 1 Getting started with Python

Intoduction

Python is:

- a scripting language
- an objected oriented programming language

Python is a simple yet powerful programming language with excellent functionality for doing lots of simple (and complex) jobs such as linguistic processing, network tasks, web programming, and mobile programming.

Why People use Python

- High quality software is produced because of Simplicity and ease of use
- Developer Productivity is Increased

Quick look

```
for line in open("file.txt"):
    for word in line.split():
        if word.endswith('ing'):
            print word
```

This piece of code prints words that end with 'ing'. The words come from a file named 'file.txt'

Rolling with Python

Python is installed by default in most Linux and Mac distros.
Start Python by typing the word "python" in your shell

```
$ python
```

This Gives You

```
Python 2.6.5 (r265:79359, Mar 24 2010, 01:32:55)
[GCC 4.0.1 (Apple Inc. build 5493)] on darwin
Type "help", "copyright", "credits" or "license" for more informatio
>>>
```

I did this on my Mac, for Linux or Windows, an appropriate message will show up

Python as a calculator

You can do math with Python.

Addition

```
>>> 1 + 3
4
>>>
```

Subtraction

```
>>> 4 - 1
3
>>>
```

Multiplication

```
>>> 4 * 3
12
>>>
```

Try other kinds of math

The Art of the Program

Programs manipulate data, data gets stored, crunched, messed up and refined

How is it stored?

Variables store data in the computer's memory

Variables are like addresses: They tell us where some piece of data has been stored

Programs are instructions

Data structures

Data structures help to just "structure" data

They are used to efficiently store and retrieve data in cases where just one variable can't store more than one piece of data

Examples:

- suppose you want to store the name, age and sex of a person: You can store it in the following ways
 - `person = ('victor', 21, 'male')`
 - `person = {name="victor", age:21, sex="male"}`
- storing addresses of a network
 - `mtn_mbale = ("192.157.2.0", "255.255.255.255", "switch")`
 - `mtn_mbale = \{subnet:"192.157.2.0", mask:"255.255.255.255", dev_type:"switch"\}`

Data structures

In Python there are about 3 major data structures and numerous inbuilt/custom data structures

- Lists:

[], [1, 2, 3], ['victor', 'richard']

- Tuples:

(), (2,3)

More Info

<http://docs.python.org/tutorial/datastructures.html>

<http://bit.ly/93NoLn>

Operations on Data

When you store data in data structures, you do certain operations on that data

Sorting a list of numbers

Sorting a list of names i.e. alphabetical orders, descending, etc.

```
>>> x = [3,2,1,5,4]
```

```
>>> x.sort()
```

```
>>> x
```

```
[1, 2, 3, 4, 5]
```

```
>>>
```

Resources:

Previous slide listed a couple of web resources you can use

Common Programming concepts

- Iteration (repetition)
- Looping
- conditionals

Iteration and looping

This is repeating of task. There are many things we do in life that require repeating.

- Wake up
- Wash up
- Eat up
- Work
- Sleep
- ...

Conditionals

Programs are written with "directions" or "control" in mind

What do you do when there's a lot of traffic hitting your server? Write a script?

Shut the server? etc.

More info:

http://en.wikibooks.org/wiki/Python/ugana_Programming/Conditional_Statements

```
# example of conditions and functions
```

```
def factorial(x):  
    if x > 0:  
        return x * factorial(x-1)  
    else:  
        return 1
```

Take a look at the tutorial

Advanced concepts in Python

- Object Oriented Programming
- Exceptions and Exception handling
- Modular programming and using libraries

What you can do with Python

- Web Design (with Django, Appengine, Plone, Turbogears)
- Natural Language processing (NLTK)
- Game Programming (PyGame, OpenGL, Blender API)
- Scientific computation (numpy, scipy, numarray)
- Animations and graphics
- etc.

More resources

- <http://python.org>
- <http://www.freenet.org.nz/python/>
- <http://oreilly.com/python/>
- <http://www.diveintopython.org>

It takes quite some time to learn the language

Good news: *it takes a shorter time with Python*