Ling 555 — Programming for Linguists

Python - instant hacking

Robert Albert Felty

Speech Research Laboratory
Indiana University

Sep. 15, 2008

Why Python?

Features

interpreted	No compiling necessary. Don't need to worry about memory.
object-oriented	Object-oriented by design, without unnecessary baggage (like Java)
clean syntax	Syntax is very simple, and forces you to use a clean style.
open source	Python is free, you can view the source, and it is actively maintained.
extensible	It is easy to add functionality via modules and packages, and many people share these.
popular	You will be able to collaborate with many people.

Algorithms

What is an algorithm?

Definition

An algorithm is a set of instructions or a recipe for a computer to carry out.

Numbers

Division

By default, `1 / 2` yields `0` in python. This is integer division.

Solution: `from __future__ import division`

Variables

What is a variable?

Definition

A variable is a name that refers to some value (could be a number, a string, a list etc.)

Practice

1. Store the value 42 in a variable named *foo*

   ```
   foo = 42
   ```

2. Store the value of foo+10 in a variable named bar

   ```
   bar = foo + 10
   ```

Statements

What is the difference between an expression and a statement?

Definition

An expression *is* something, and a statement *does* something.

User input

Practice

1. Ask the user to input a number, and store it as the variable *foo*

   foo = input("enter a number: ")

2. What is the value of foo now?

3. Add foo and bar together

   foo + bar

4. Calculate the average of *foo* and *bar*, and save it as a variable named *avg*

   avg = (foo + bar)/2

Functions

What is a function?

Definition

A function is a mini-program. It can take several *arguments*, and *returns* a value.

Modules

What is a module?

Definition

Python is easily *extensible*. Users can easily write programs that extend the basic functionality, and these programs can be used by other programs, by loading them as a *module*

Practice

1. load the math module

   ```
   import math
   ```

2. Round 35.4 to the nearest integer

   ```
   round(35.4)
   ```

3. Round the quotient of foo and bar down to the nearest integer

   ```
   math.floor(foo/bar)
   ```

Saving and executing programs

Example

Script File: hello.py

```
#!/usr/bin/env python
# this script prints 'hello, world', to stdout
print "hello, world"
```

Save your file, then, in the shell:

Add executable permission:

```
chmod a+x hello.py
```

Run the program:

```
./hello.py
```

String Basics

- Strings must be enclosed in quotes (double or single)
- Strings can be concatenated using the + operator

String multiplication

It might be a bit surprising that you can use the multiplication operator to repeat strings. For example, Monty Python and the Flying Circus was broadcast on this channel:

```
channel = 2 * 'B' + 'C'
print channel
```

More Strings

long Multi-line strings can be created by using triple quotes `'''`

raw Special characters do not need to be escaped in raw strings

unicode Unicode strings can represent any character in any language