Basic Python Concepts

Just enough Python

Time to learn Python

- ❖ Learning:
  - ❖ Enough Python and programming concepts to get you started
- ❖ Not learning:
  - ❖ All of Python
  - ❖ All of programming language theory

Prerequisites

❖ Python installed

❖ Terminal window

❖ Text editor

❖ Directory to put code into

❖ Git installed

Strings, Printing & your first program

❖ Create a directory to put your Python code in.

❖ Open a terminal window, and use "cd" to move to that directory.

❖ Open your editor, and type this in the editor:

print('Hello World!')

❖ Save to file "helloworld.py" in your Python code directory

❖ Go into your terminal window again, and type:

python helloworld.py

* NB: Beware the quote characters! If you cut and paste the above code, you might see this error message:

  "SyntaxError: Non-ASCII character '\xe2' in file helloworld.py on line 1"

❖ This happens because the symbols " and " above aren't the same as the ones in your code editor. It's annoying, but easily fixed: just delete them and type " and " in the right places in the editor. And if you're in sublimetext, notice how the code changes color when you do this…

That was your first program…

❖ Python filenames end in ".py"

❖ **"Hello World!"** is a "string"

❖ **print("Hello World!")** prints "Hello World!" to your terminal

Comments

❖ Add a line starting with "#" to your helloworld.py file, e.g.

#This is a comment

❖ Add text starting with "#" to the end of your "print" line, e.g.

print("Hello World!") #English

❖ And type "python helloworld.py" again

Magic Comments

#!/usr/bin/python

 # -*- coding: utf-8 -*-

❖ "Shebang" at start of every Python program

❖ Tells the interpreter which type of file this is (python), and which character set you used in it (utf-8 is a very common character set)

Variables

my_string = "Hello World!"

print(my_string)

my_boolean = True

my_number = 10

print(my_number)

my_number = 15.523

print("My number is {}".format(my_number))

❖ NB beware the quote characters again!

String formatting

my_number = 15.523

print("My number is {}. It's not {}".format(my_number, "nothing"))

Python Interpreter

❖ Type "python" in your terminal window

❖ Try out some Python commands

❖ Type "exit()" to leave the python interpreter

>>> print("Give me text")

NB ipython is a prettier, friendlier version of the python interpreter
type "ipython" in your terminal window to start it

Getting help

❖ Online, there's:

 ❖ docs.python.org

❖ In the interpreter, you can use:

 ❖ help()

 ❖ type "q" to leave a help page

 ❖ dir(str)

 ❖ help(str.rjust)

Getting Input from the User

```python
user_text = raw_input("Give me some text>")

lower_text  = user_text.lower()

text_length = len(user_text)

print("Your text is {}, its length is {}".format(user_text, text_length))

print("In lowercase, that's {}".format(lower_text))
```

Collections : Dictionary

❖ You'll meet two types of collection in Python: lists and dictionaries

❖ Dictionary:

iso3166 = {

**'SLE': "Sierra Leone", **

**'NGA': "Nigeria", **

'LBR': "Liberia" }

iso3166['LBR']

iso3166.keys()

Collections: List

❖ List:

rowvals = [1, 3, 5, 6, 4, 7, 3, 1, 3]

rowvals[3]

max(rowvals)

rowvals.sort()

rowcols = [['a','b','c'], ['d','e',1]]

rowcols[0][2]

Iterators

❖ Iterators allow you to use every item in a list, in turn:

```
alist = [1,2,3,4]
for item in enumerate(alist):
        print(item)
for index, item in enumerate(alist):
        print(item)


iso3166 = {
   'SLE': 'Sierra Leone', \
   'NGA': 'Nigeria', \
   'LBR': 'Liberia' }
for code in iso3166:
        print('the code for {} is {}'.format(iso3166[code], code))
```

NB INDENTS! Python is an indented language - spaces mean something…

Getting input from a file

❖ Libraries are your friends!

```
import csv

csvfilename = 'data/ebola-data-db-format.csv';

fin = open(csvfilename, "rb");

csvin = csv.reader(fin);
```

❖ You just created a link to a CSV file. Now take a look at it:

```
print("Headers:");

headers = csvin.next();

for header in headers:

        print(header);

for row in csvin:

        print("New row:");

        for col in range(0,len(row)):

                print(row[col]);

fin.close();
```

Getting serious now: using libraries, loops, and indents!

Conditionals

```
import csv

csvfilename = 'data/ebola-data-db-format.csv';

fin = open(csvfilename, "rb");

csvin = csv.reader(fin);

headers = csvin.next();


#Find all the rows about Liberia

for row in csvin:

        if row[1]  == "Liberia":

                print("Liberiaaa!");

                for col in range(0,len(row)):

                        print(row[col]);

fin.close();
```

NB You might need to convert from strings to other data types. Conversion methods include str(anumber), int(astring), float(astring)

Libraries

❖ Libraries are pieces of code that somebody else wrote to do something you need

❖ You already used one when you typed **import 'csv'**

❖ Places to look for libraries include:

   ❖ https://docs.python.org/2/library/ (you already have these)

   ❖ https://pypi.python.org/pypi

   ❖ github

That's enough Python to get started

❖ For more, see sites including:

    ❖ Learn python the hard way

    ❖ Writing idiomatic Python

    ❖ IcanHaz python courses list