Python Tutorial

Part I

Greg (mastergreg) Liras and John (nemo) Giannelos

foss.ntua

December 18, 2011

Outline

What is Python?

Python is an easy to learn, powerful programming language. It has efficient high-level data structures and a simple but effective approach to object-oriented programming. Pythons elegant syntax and dynamic typing, together with its interpreted nature, make it an ideal language for scripting and rapid application development in many areas on most platforms.

Python Tutorial

In a few words, Python,

- is *Scripting Language*

Python Tutorial

In a few words, Python,

- is *Scripting Language*
- is *Strongly Typed*

Python Tutorial

In a few words, Python,

- is *Scripting Language*
- is *Strongly Typed*
- is *Dynamic*

Python Tutorial

In a few words, Python,

- is *Scripting Language*
- is *Strongly Typed*
- is *Dynamic*
- is *Portable*

Python Tutorial

In a few words, Python,

- is *Scripting Language*
- is *Strongly Typed*
- is *Dynamic*
- is *Portable*
- is *Object Oriented*

Python Tutorial

In a few words, Python,

- is *Scripting Language*
- is *Strongly Typed*
- is *Dynamic*
- is *Portable*
- is *Object Oriented*
- has *Vast Libraries*

Python Tutorial

In a few words, Python,

- is *Scripting Language*
- is *Strongly Typed*
- is *Dynamic*
- is *Portable*
- is *Object Oriented*
- has *Vast Libraries*
- is *Simple and non-obtrucive*

Why?

- It is easy to remember

Why?

- It is easy to remember
- You can develop rapidly

Why?

- It is easy to remember
- You can develop rapidly
- Interface with C libraries

Must and Must Not

- Search first code less

Must and Must Not

- Search first code less
- Import only what you need

Must and Must Not

- Search first code less
- Import only what you need
- Run pychecker on your code

Outline

Numeric types

- int (up to 10^{308}!!!!)

Numeric types

- int (up to 10^{308}!!!!)
- float (53 bits precision)

Numeric types

- int (up to 10^{308}!!!!)
- float (53 bits precision)
- complex $(1 + 2j)$

Operators

- $+$ (add)

Operators

- + (add)
- - (subtract)

Operators

- + (add)
- - (subtract)
- * (multiply)

Operators

- + (add)
- - (subtract)
- * (multiply)
- / (divide)

Operators

- + (add)
- - (subtract)
- * (multiply)
- / (divide)
- % (modulo)

Operators

- + (add)
- - (subtract)
- * (multiply)
- / (divide)
- % (modulo)
- = (assign)

Strings

- Strings are not lists! Strings are immutable!

Strings

- Strings are not lists! Strings are immutable!
- Simple concatenation:

```
>>> 'Hello' + 'World'
'HelloWorld'
```

Strings

- Strings are not lists! Strings are immutable!
- Simple concatenation:

```
>>> 'Hello' + 'World'
'HelloWorld'
```

- Slicing:

Strings

- Strings are not lists! Strings are immutable!
- Simple concatenation:

```
>>> 'Hello' + 'World'
'HelloWorld'
```

- Slicing:
  -
```
>>> 'HelloWorld'[0]
'H'
```

Strings

- Strings are not lists! Strings are immutable!
- Simple concatenation:

```
>>> 'Hello' + 'World'
'HelloWorld'
```

- Slicing:
  - `>>> 'HelloWorld'[0]`
    `'H'`
  - `>>> 'HelloWorld'[6:]`
    `'orld'`

Strings

- Strings are not lists! Strings are immutable!
- Simple concatenation:

```
>>> 'Hello' + 'World'
'HelloWorld'
```

- Slicing:
  - `>>> 'HelloWorld'[0]`
    `'H'`
  - `>>> 'HelloWorld'[6:]`
    `'orld'`
- Unicode Strings:

```
>>> ur'Hello\u0020World !'
u'Hello World !'
```

Lists

- ```
  >>> a = ['spam', 'eggs', 100, 1234]
  >>> a
  ['spam', 'eggs', 100, 1234]
  ```
  ```

Lists

- ```
  >>> a = ['spam', 'eggs', 100, 1234]
  >>> a
  ['spam', 'eggs', 100, 1234]
  ```
- Negative indices:

  ```
  >>> a[-2]
  100
  ```
  ```

Lists

- ```
  >>> a = ['spam', 'eggs', 100, 1234]
  >>> a
  ['spam', 'eggs', 100, 1234]
  ```
- Negative indices:
  ```
  >>> a[-2]
  100
  ```
- Concatenation:
  ```
  >>> a[:2] + ['bacon', 2*2]
  ['spam', 'eggs', 'bacon', 4]
  ```
  ```

Lists

- ```
  >>> a = ['spam', 'eggs', 100, 1234]
  >>> a
  ['spam', 'eggs', 100, 1234]
  ```
- Negative indices:
  ```
  >>> a[-2]
  100
  ```
- Concatenation:
  ```
  >>> a[:2] + ['bacon', 2*2]
  ['spam', 'eggs', 'bacon', 4]
  ```
- Comprehension:
  ```
  for i in a:
      print i
  ```
  ```

Tuples

- Immutable (just as strings)

Tuples

- Immutable (just as strings)
- Indexed

Tuples

- Immutable (just as strings)
- Indexed
- Nested

Sets

A set is an unordered collection with no duplicate elements.

Sets

A set is an unordered collection with no duplicate elements.

```
>>> basket = ['apple', 'orange', 'apple', 'pear', 'orange', 'banana']
>>> set(basket)
set(['orange', 'pear', 'apple', 'banana'])
```

Sets

A set is an unordered collection with no duplicate elements.

- ```
  >>> basket = ['apple', 'orange', 'apple', 'pear', 'orange', 'banana']
  >>> set(basket)
  set(['orange', 'pear', 'apple', 'banana'])
  ```
- Operators:
  ```

Sets

A set is an unordered collection with no duplicate elements.

- ```
  >>> basket = ['apple', 'orange', 'apple', 'pear', 'orange', 'banana']
  >>> set(basket)
  set(['orange', 'pear', 'apple', 'banana'])
  ```
- Operators:
  - a - b (in a but not in b)
  ```

Sets

A set is an unordered collection with no duplicate elements.

- ```
  >>> basket = ['apple', 'orange', 'apple', 'pear', 'orange', 'banana']
  >>> set(basket)
  set(['orange', 'pear', 'apple', 'banana'])
  ```
- Operators:
  - a - b (in a but not in b)
  - a | b (in a or in b)
  ```

Sets

A set is an unordered collection with no duplicate elements.

- ```
  >>> basket = ['apple', 'orange', 'apple', 'pear', 'orange', 'banana']
  >>> set(basket)
  set(['orange', 'pear', 'apple', 'banana'])
  ```
- Operators:
  - a - b (in a but not in b)
  - a | b (in a or in b)
  - a & b (in a and in b)
  ```

Sets

A set is an unordered collection with no duplicate elements.

- ```
  >>> basket = ['apple', 'orange', 'apple', 'pear', 'orange', 'banana']
  >>> set(basket)
  set(['orange', 'pear', 'apple', 'banana'])
  ```
- Operators:
  - a - b (in a but not in b)
  - a | b (in a or in b)
  - a & b (in a and in b)
  - a ^b (in a or b but not in both)
  ```

Dictionaries

Maps of objects

Dictionaries

Maps of objects

- Easy to create

```
>>> dict([('sape', 4139), ('guido', 4127), ('jack', 4098)])
{'sape': 4139, 'jack': 4098, 'guido': 4127}
```

Dictionaries

Maps of objects

- Easy to create

```
>>> dict([('sape', 4139), ('guido', 4127), ('jack', 4098)])
{'sape': 4139, 'jack': 4098, 'guido': 4127}
```

- Simple to use

```
>>> tel = dict([('sape', 4139), ('guido', 4127), ('jack', 4098)])
>>> tel['jack']
4098
```