

An Introduction to Python

MSTC Technical Sharing

November 4, 2013

Richard Tsai

Microsoft Student Technology Club,
Sun Yat-sen University

Agenda

What's Python?

Python the Language

Easy-to-read

Easy-to-write

Learn Python in 5 minutes

What can Python do?

Some applications

When (not) to use Python?

Drawbacks of Python

Accelerate Python

Resources

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What's Python?

Python is a programming language.



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¹Image from Python Software Foundation

An easy-to-read language

Python is an easy-to-read language.

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An easy-to-read language

Python is an easy-to-read language.

- Forced indentation

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An easy-to-read language

Python is an easy-to-read language.

- ▶ Forced indentation
- ▶ Less braces

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An easy-to-read language

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- ▶ Forced indentation
- ▶ Less braces
- ▶ etc.

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An easy-to-write language

Python is an easy-to-write language.

- Dynamic typing

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An easy-to-write language

Python is an easy-to-write language.

- ▶ Dynamic typing
- ▶ Useful built-in data types

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An easy-to-write language

Python is an easy-to-write language.

- ▶ Dynamic typing
- ▶ Useful built-in data types
- ▶ Lots of syntax sugars

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An easy-to-write language

Python is an easy-to-write language.

- ▶ Dynamic typing
- ▶ Useful built-in data types
- ▶ Lots of syntax sugars
- ▶ Lots of libraries

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An easy-to-write language

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- ▶ Dynamic typing
- ▶ Useful built-in data types
- ▶ Lots of syntax sugars
- ▶ Lots of libraries
- ▶ etc.

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A (kidding) example

Calculate $\sum_{n=1}^{10} n^n \dots$

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A (kidding) example

Calculate $\sum_{n=1}^{10} n^n \dots$

Python

```
print sum(n ** n for n in range(1, 11))
```

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A (kidding) example

Calculate $\sum_{n=1}^{10} n^n \dots$

Python

```
print sum(n ** n for n in range(1, 11))
```

C++11

```
int64_t seq[10], i = 0;  
std::generate_n(seq, 10,  
    [&i]() { ++i; return pow(i, i); });  
std::cout << std::accumulate(seq, seq + 10,  
    static_cast<int64_t>(0)) << std::endl;
```

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Loop

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

```
for i in [0, 1, 2]:  
    print i
```

```
while i < 3:  
    print i  
    i += 1
```

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```
while i < 3:  
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Condition

```
if a == b:  
    print 'a equals to b'
```

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```
while i < 3:  
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    i += 1
```

Condition

```
if a == b:  
    print 'a equals to b'
```

Function

```
def f(n):  
    return n + 1  
  
print f(1)
```

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Data types

```
l = ['one', 2, 3]
print l[0] # one
print l[1:3] # [2, 3]
```

```
t = ('one', 2, 3)
print l[1] # one
```

```
d = {'one': 1, 'two': 2}
print d['two'] # 2
```

```
s = {'one', 2, 3}
if 3 in s:
    print '3 is in s'
```

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Packages

```
import math
math.sin(math.pi / 2)
```

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    print '3 is in s'
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Packages

```
import math
math.sin(math.pi / 2)
```

Run a Python program

- Interactive interpreter (IPython recommended)
- Run as a script

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What can Python do?

Some applications

- As a shell script language

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What can Python do?

Some applications

- ▶ As a shell script language
- ▶ Web apps (WSGI, Flask, Django, Tornado...)

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What can Python do?

Some applications

- ▶ As a shell script language
- ▶ Web apps (WSGI, Flask, Django, Tornado...)
- ▶ Scientific calculations (Numpy, Scipy...)

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What can Python do?

Some applications

- ▶ As a shell script language
- ▶ Web apps (WSGI, Flask, Django, Tornado...)
- ▶ Scientific calculations (Numpy, Scipy...)
- ▶ Parallel computing (multiprocessing, pp, mpi4py...)

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What can Python do?

Some applications

- ▶ As a shell script language
- ▶ Web apps (WSGI, Flask, Django, Tornado...)
- ▶ Scientific calculations (Numpy, Scipy...)
- ▶ Parallel computing (multiprocessing, pp, mpi4py...)
- ▶ Many other things you can and cannot imagine...

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- Performance

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When (not) to use Python?

Drawbacks of Python

- ▶ Performance
- ▶ Fxxking GIL

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Drawbacks of Python

- ▶ Performance
- ▶ Fxxking GIL
- ▶ Hard to debug

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When (not) to use Python?

Drawbacks of Python

- ▶ Performance
- ▶ Fxxking GIL
- ▶ Hard to debug
- ▶ Suck documents (to some extent)

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Drawbacks of Python

- ▶ Performance
- ▶ Fxxking GIL
- ▶ Hard to debug
- ▶ Suck documents (to some extent)
- ▶ Odd support in functional programming (IMO)

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Pareto principle

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Pareto principle

Accelerate Python with other languages

- ▶ Third-party libraries
- ▶ Python C API
- ▶ SWIG, SIP...
- ▶ ctypes
- ▶ Cython

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Resources

- ▶ Python's official website: <http://www.python.org>
- ▶ Beginner's Guide to Python:
<https://wiki.python.org/moin/BeginnersGuide>

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