

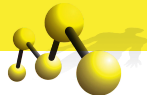
Introduction to Python Programming

Luis Pedro Coelho

Programming for Scientists

September 16, 2012





Let's digress for a moment discussing the language...

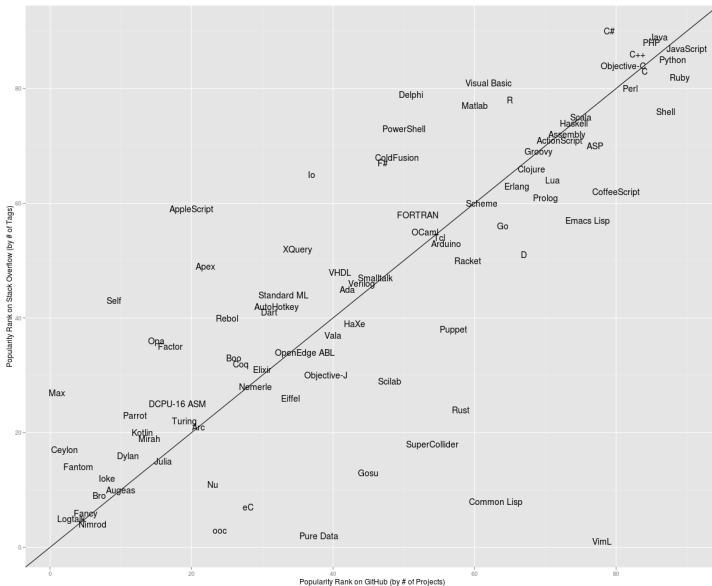


History

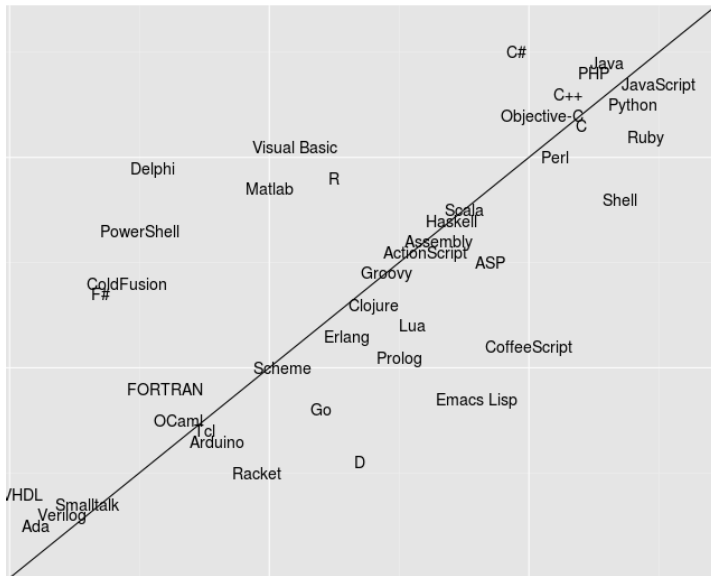
Python was started in the late 80's. It was intended to be both **easy to teach** and **industrial strength**.

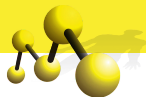
It is (has always been) open-source and has become one of the most widely used languages (top 10).

Popularity



Popularity

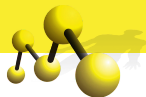




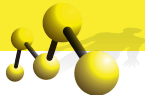
Python Versions

- The current versions of Python are 2.7 and 3.3
- This class assumes you have 2.6–2.7
- There are some small differences when compared to version 3.x

What is a Computer?

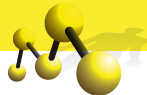


- ① Memory
- ② Processor
- ③ Magic



- ① Objects
- ② Operations on objects
- ③ Magic

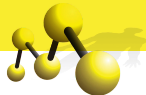
Python Example



```
print "Hello World"
```

Running Python

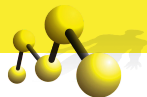
- ① From a file
- ② Interactively



```
helloworld.py
```

```
print 'Hello World'
```

Running a Program

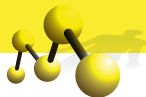


① Shell

② IDE

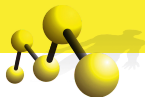
Let me show you a demonstration...

More Complex Example



What is $25 + 20\%$?

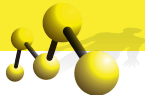
More Complex Example



What is $25 + 20\%$?

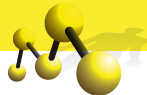
```
print 25 * 1.2
```

More Complex Example



```
name = 2
other = 3
yetanother = name + other
name = 5
print yetanother + name
```


Blackboard demonstration



Conditionals



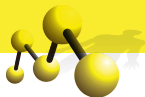
```
if <condition>:  
    <statement 1>  
    <statement 2>  
else:  
    <statement 3>
```



```
students = [ 'Luis ', 'Mark ', 'Rita ' ]
```

```
print students[0]  
print students[1]  
print students[2]
```

Loops



```
students = [ 'Luis ', 'Mark ', 'Rita ', ... ]
```

```
for st in students:  
    print st
```

Example



```
values = [0.11, 0.23, 0.16, 0.18, 0.23, 0.19]
```

```
sum = 0.0
```

```
sum2 = 0.0
```

```
for v in values:
```

```
    sum = sum + v
```

```
    sum2 = sum + v * v
```

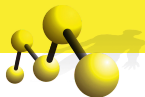
```
mu = sum/len(values)
```

```
mu2 = sum2/len(values)
```

```
print 'Average: {0}'.format(mu)
```

```
print 'Std Dev: {0}'.format(mu2 - mu*mu)
```

Example



```
values = [0.11, 0.23, 0.16, 0.18, 0.23, 0.19]
```

```
sum = 0.0
```

```
sum2 = 0.0
```

```
for v in values:
```

```
    sum += v
```

```
    sum2 += v * v
```

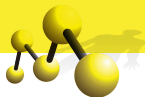
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print 'Average: {0}'.format(mu)
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Example



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values = [0.11, 0.23, 0.16, 0.18, 0.23, 0.19]
```

```
mu = 0.0
```

```
mu2 = 0.0
```

```
for v in values:
```

```
    mu += v
```

```
    mu2 += v * v
```

```
mu /= len(values)
```

```
mu2 /= len(values)
```

```
print 'Average: {0}'.format(mu)
```

```
print 'Std Dev: {0}'.format(mu2 - mu*mu)
```

Example



```
values = [0.11, 0.23, 0.16, 0.18, 0.23, 0.19]
```

```
mu = 0.0
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```
mu2 = 0.0
```

```
for v in values:
```

```
    mu += v
```

```
    mu2 += v * v
```

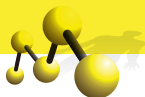
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mu /= len(values)
```

```
mu2 /= len(values)
```

```
print 'Average: {0}'.format(mu)
```

```
print 'Std Dev: {0}'.format(mu2 - mu*mu)
```


Loops (II)



```
students = [ 'Luis' , ... ]

looking_for = 'Anna'

i = 0
while students[i] != looking_for:
    i += 1

if students[i] == looking_for:
    print 'Found her'
else:
    print "Sorry, she's not registered!"
```



- Install Python(x,y)
(or the equivalent on your platform)