

# Beginning Programming with Python

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Software Freedom Day  
19 September 2009  
Melbourne, Australia

# Understand your tools



# Examples of programs

- web browsers, e.g. Firefox, IE, Opera, Safari
- word processors, e.g. Abiword, OpenOffice, Word
- multimedia players, e.g. MPlayer, VLC
- document viewers, e.g. Acrobat Reader, evince, Foxit, okular
- email clients, e.g. Evolution, Outlook, Thunderbird
- webmail, e.g. Gmail, Hushmail, Windows Live, Yahoo!

# What's a program?

- a sequence of instructions
- written in a format a computer can understand
- .exe, .bat, .sh, .py, etc.

# Programming languages

- you can write in binary language: ones and zeros
- “A” might be represented as 01000001, “B” as 01000010, and “C” as 01000011
- ABC  $\longrightarrow$  010000010100001001000011

# Don't use binary language



# High-level languages

- C, C++
- Java, JavaScript
- Python, Ruby
- Perl, PHP

# Basic instructions

- **input:** Retrieve data from somewhere, e.g. the keyboard, a file, somewhere on the web, a device.
- **output:** Display data on the screen, send data to a file, over the web, or to a device.
- **math:** Perform basic mathematical operations such as addition, multiplication, subtraction, and division.
- **conditional execution:** Check for a condition. If it is true, then execute the sequence of instructions for that condition. If it is false, execute a different sequence of instructions.
- **repetition:** Perform a sequence of instructions repeatedly.



# What's Python?



**Figure:** <http://www.python.org>

```
Python 2.6.2 (r262:71600, Jul 10 2009, 10:49:45)
[GCC 4.2.4 (Ubuntu 4.2.4-1ubuntu3)] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

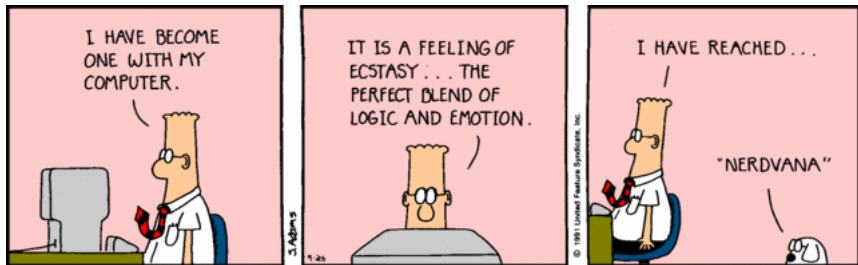
# Hello, World!

```
>>> print "Hello, World!"  
Hello, World!
```

# Desktop calculator

```
>>> 2 + 3 # addition
5
>>> 2 * 3 # multiplication
6
>>> 12 / 4 # division
3
>>> 10 - 5 # subtraction
5
```

# Put on your problem solving hat



## Syntax error

```
>>> print "Hello, World!  
File "<stdin>", line 1  
    print "Hello, World!  
                ^
```

SyntaxError: EOL while scanning string literal

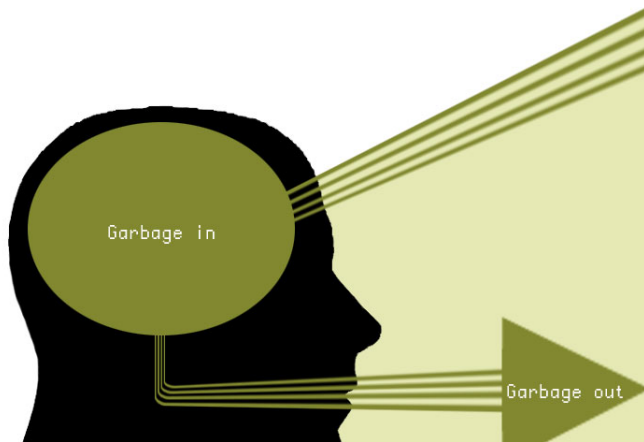
- US English: U.S.A., Ms., Mr., labor
- Australian English: USA, Ms, Mr, labour

# Runtime error

```
>>> print n
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'n' is not defined
```

- what is n?

## Semantic error



```
>>> name = "123"  
>>> print name  
123
```

## Using functions

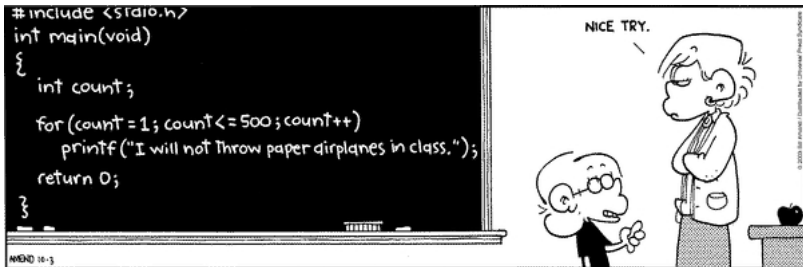
```
>>> def person(name, age):  
...     print "Name is", name  
...     print "Age is", age  
...  
>>> person("Wendy Smith", 23)  
Name is Wendy Smith  
Age is 23
```



## Functions without parameters

```
>>> def recite_poem():
...     print "It's a world of laughter and a world of tears"
...     print "It's a world of hope and a world of fears"
...
>>> recite_poem()
It's a world of laughter and a world of tears
It's a world of hope and a world of fears
```

# Repeat after me



## for loop

```
>>> for i in range(5):  
...     recite_poem()  
...  
It's a world of laughter and a world of tears  
It's a world of hope and a world of fears  
It's a world of laughter and a world of tears  
It's a world of hope and a world of fears  
It's a world of laughter and a world of tears  
It's a world of hope and a world of fears  
It's a world of laughter and a world of tears  
It's a world of hope and a world of fears  
It's a world of laughter and a world of tears  
It's a world of hope and a world of fears
```

## if this then that

```
>>> if 3 > 0:  
...     print "3 is positive"  
...  
3 is positive
```

## if this else that

```
>>> if -5 > 0:
...     print "-5 is positive"
... else:
...     print "-5 is negative"
...
-5 is negative
```

## if, else if, else

```
>>> def check_number(n):
...     if n > 0:
...         print n, "is positive"
...     elif n < 0:
...         print n, "is negative"
...     else:
...         print n, "is zero"
...
>>> check_number(13)
13 is positive
>>> check_number(-7)
-7 is negative
>>> check_number(0)
0 is zero
```

# Thank you!

- Any questions?