Functions in Python

…and how to do stuff with them

Language Design Philosophy

Languages have inbuilt functions e.g. for strings

Programming language shouldn't try to include everything
- It's impossible
- Would be impossible to learn

Perl! Comparison of Perl, Quorum and Randomo*
- Quorum: based on language usability research
- Randomo: designed by random no. generator
- How did Perl compare?

Python   *Andreas Stefik et al, "An Empirical Comparison of the Accuracy Rates of Novices   Python Functions
using the Quorum, Perl, and Randomo Programming Languages", PLATEAU 2011

Language Design Philosophy

Instead: allow people to create what they need to solve specific problems

Languages allow you to extend them by defining *functions* for higher-level operations

Programming can be regarded as the act of creating a mini-language specific to a problem

Python

Python Functions

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Python

Python Functions

Exercise 1

```
def greet(name):
    answer = 'Hello, ' + name
    return answer
```

In pairs

Create a new function named exclaim() that takes one argument and is called by greet()

exclaim(str) adds an exclamation mark to a string and returns it

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Exercise 2

```
def sign(num):
    if num > 0:
        return 1
    elif num == 0:
        return 0
    else:
        return -1
```

In pairs

rewrite sign() so that it only has one use of return

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Exercise 3 – pair programming

```
import sys
if (len(sys.argv) < 2):
    sys.exit("Missing file name")
filename = sys.argv[1]
print "File name", filename

source = open(filename, 'r')
count = 0
expected = None
# Count number of data records.
for line in source:
    if line.startswith('#'):
        pass
    elif line.startswith('D'):
        pass
    else:
        count += 1
source.close()
print "Actual number of data records:", count
```

count = countLines(filename)

With the intro.py program I showed you yesterday, take highlighted blue code above and move it into a new function that takes a filename parameter and returns the number of lines. It should display the line count at the end as before.e

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Exercise 4a

Assume we have a separate Python library functions.py that contains our greet, sign and double functions

Write a new Python program e.g. prog.py that

Greets you by name

Loops through the numbers 3, 0 and -9 and runs sign and double on them, printing each result

Do not use, rewrite or run the greet, sign or double functions until you have finished prog.py!

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Exercise 4b

Take greet, sign and double functions and put them in a separate functions.py file, and import them

Change prog.py to use them

Now you can run your prog.py!

Can also use 'from functions use fun_a, fun_b, fun_c' instead of import – don't need to use 'functions' prefix.

Change prog.py to use this method of importing functions

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Exercise 5

Add in another mathematical function of your choice to functions.py and use it in the same fashion on the array arr

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