# Funcy Funk

## Exploring Functional Programming in Python

*by matt lebrun*

# Hello, there! :)

- I'm **Matt Lebrun**
- PyClub Ring Leader at **Save22, Inc.**
- Trustee of **Python.PH**
- Been in love with **Python** since 2012
- *#peanutbutterlife*

IF SOMEONE EVER TELLS YOU THAT YOU'RE PUTTING TOO MUCH PEANUT BUTTER ON YOUR BREAD,

STOP TALKING TO THEM. YOU DON'T NEED THAT KIND OF NEGATIVITY IN YOUR LIFE.

Tonight, let's explore some lesser known Python standard libraries that enables us to code in a *"functional"* paradigm.

Then let's solve some problems with our new found friends! :)

# Functional Programming

# Functional Programming

Python is not a pure functional programming language *(duh)*

# Functional Programming

Python only provides a functional-looking interface but will use non-functional features internally.

# Functional Programming

...but functional programming is a paradigm

# Functional Programming

- Decompose a problem into a set of functions
- Each function operates on an input and produces an output
- Think in terms of data transformations vs controlling states

# Functional Programming

- Modularity
- Ease of debugging and testing
- Composability

# FP – Modularity

Forces you to break the problem into smaller pieces

# FP – Ease of debugging and testing

Small and clear functions that do one thing is easier to test and debug

# FP – Composability

Creating generalized functions are easier to bring into new projects. Treat your functions like a toolkit.

# Standard Libs

# Standard Libs

- Functools
- Itertools
- Operator

# Functools

# Higher-order functions and operations on callable objects

# Functtools

## functions that act on or return other functions

# Functools - reduce

```
functools.reduce(func, iter[, initializer])
```

Apply function of **two arguments** cumulatively to the items of sequence, from left to right, so as to **reduce the sequence to a single value**.

# Functools - partial

```
functools.partial(func, *args, **kwargs)
```

Return a **new partial object** which **when called will behave** like func called with the positional arguments args and keyword arguments keywords.

# Itertools

## Functions creating iterators for efficient looping

# Itertools

Standardizes a core set of **fast**, **memory efficient tools** that are useful by themselves or in combination.

Together, they form an "iterator algebra" making it possible to construct specialized tools succinctly and efficiently in pure Python.

# Itertools - starmap

itertools.**starmap**(func, iter)

Make an **iterator that computes the function** using arguments **obtained from the iterable**.

The **difference between map()** and **starmap()** parallels the distinction between **function(a,b)** and **function(*c)**.

Operator

Standard operators as functions

# Operator

Exports a set of efficient functions corresponding to the **intrinsic operators** of Python.

The functions fall into categories that perform **object comparisons**, **logical operations**, **mathematical operations** and **sequence operations**.

# Operator - truth

```
operator.truth(obj)
```

Return True if obj is true, and False otherwise.
This is **equivalent to using the bool constructor**.

# Operator - add

`operator.`**`add`**`(a, b)`

`Return a + b, for a and b numbers.`

# Exercises

# Exercise: Mutual Anagrams

Problem description: https://goo.gl/5Xwdsw
Solution: https://goo.gl/H8lqz2

| Input | Output |
|---|---|
| pear<br>amleth<br>dormitory<br>tinsel<br>dirty room<br>hamlet<br>listen<br>silnet | amleth,hamlet<br>dirty room,dormitory<br>listen,silnet,tinsel<br>pear |

# Exercise: Delta Encoding

Problem description: https://goo.gl/TBqiyc
Solution: https://goo.gl/0ClYy4

| Input | Output |
| --- | --- |
| 25626 25757 24367 24267 16 100 2 7277 | 25626 -128 131 -128 -1390 -100 -128 -24251 84 -98 -128 7275 |

# Exercise: Hotel Sort

Problem description: https://goo.gl/xKd0rV
Solution: https://goo.gl/AQ4UPz

| Input | Output |
|---|---|
| breakfast beach citycenter location metro view staff price<br>5<br>1<br>This hotel has a nice view of the citycenter. The location is perfect.<br>2<br>The breakfast is ok. Regarding location, it is quite far from the citycenter but price is cheap so it is worth.<br>1<br>Location is excellent, 5 minutes from citycenter. There is also a metro station very close to the hotel.<br>1<br>They said I couldn't take my dog and there were other guests with dogs! That is not fair.<br>2<br>Very friendly staff and good cost-benefit ratio. Its location is a bit far from citycenter. | 2 1 |

# Q & A

# Resources

- FuncyFunk source
- Functional Programming How-to

# You guys are awesome!

Let's keep in touch ;)

email: **matt@lebrun.org**
social: **cr8ivecodesmith**

Looking for internship?
`http://goo.gl/forms/m0Q39cm3Gy`