Classes and Objects II

Digging deeper

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EECS (http://eecs.fel.cvut.cz), BE5B33PRG (https://cw.fel.cvut.cz/wiki/courses/be5b33prg/start): Programming Essentials, 2015

Vectors

What do we need?

- Addition: $\mathbf{x} + \mathbf{y} = (x_0 + y_0, x_1 + y_1, \ldots, x_{n-1} + y_{n-1})$
- Magnitude: $\|\mathbf{x}\| = (x_0^2 + x_1^2 + \cdots + x_{n-1}^2)^{1/2}$
- Direction: $\mathbf{x}/\|\mathbf{x}\| = (x_0/\|\mathbf{x}\|, \ldots, x_{n-1}/\|\mathbf{x}\|)$
- Dot product: $\mathbf{x}^\top \mathbf{y} = x_0 y_0 + x_1 y_1 + \ldots x_{n-1} y_{n-1}$
- ...

mutable or immutable?

In [18]:

```
class Vector:
    def __init__(self,v):
        self._coords = v
```

In [26]:

```
a = [1,2]
v = Vector(a)
print(v._coords)
```

```
[1, 2]
```

In [27]:

```
a[0] = 3
print(a)
```

```
[3, 2]
```

In [28]:

```
print(v._coords)
```

```
[3, 2]
```

Why?
(http://www.pythontutor.com/visualize.html#code=class+Vector%3A%0A++++def+__init__(self,v%29%3A%(
frontend.js&cumulative=false&heapPrimitives=false&textReferences=false&py=3&rawInputLstJSON=%5B%5

How to combat?

- copy
- enforce immutability

immutable (mostly) better

Pros:

- safer (prevents unwanted changes)
- allows for hashing

Cons:

- more memory

Live coding ...

composing classes/objects

Supplemment slides and live coding

notebook config

ignore the cells below

In [15]:

```
from notebook.services.config import ConfigManager
cm = ConfigManager()
cm.update('livereveal', {
              'theme': 'White',
              'transition': 'None',
              'start_slideshow_at': 'selected',
              'width': 1024,
              'height': 768,
              'minScale': 1.0
})
```

Out[15]:

```
{'height': 768,
 'minScale': 1.0,
 'start_slideshow_at': 'selected',
 'theme': 'White',
 'transition': 'None',
 'width': 1024}
```

In [16]:

```
%%HTML
<style>
.reveal #notebook-container { width: 90% !important; }
.CodeMirror { max-width: 100% !important; }
pre, code, .CodeMirror-code, .reveal pre, .reveal code {
    font-family: "Consolas", "Source Code Pro", "Courier New", Courier, monospace;
}
pre, code, .CodeMirror-code {
    font-size: inherit !important;
}
.reveal .code_cell {
    font-size: 130% !important;
    line-height: 130% !important;
}
</style>
```