Server-Side Languages

Todd Smith
tbsmith@fullsail.com

Welcome to SSL!

We will learn to build websites with PHP and Python.

Day 1

About Me

Todd Smith

Course Director for SSL and ASL

tbsmith@fullsail.com | 407-679-0100 ext. 7937

Office Hours: http://goo.gl/RBfas

- Education:
  - Bachelor's, Applied Discrete Mathematics, Auburn University, 2004
  - Master's, Applied Mathematics, UCF, 2007
  - PhD, Mathematics, UCF, 2011
- Programming Experience: Perl, PHP, Java for Android, Mathematica, Python, JQuery
- Work Experience: Web Developer, System Admin and Math Teacher

Day 1

Server-Side Languages

About SSL

- Why might this class be taught simultaneously with the database class?
- How far will we get in this class?
- Next month is ASL- what will we do there?

Day 1

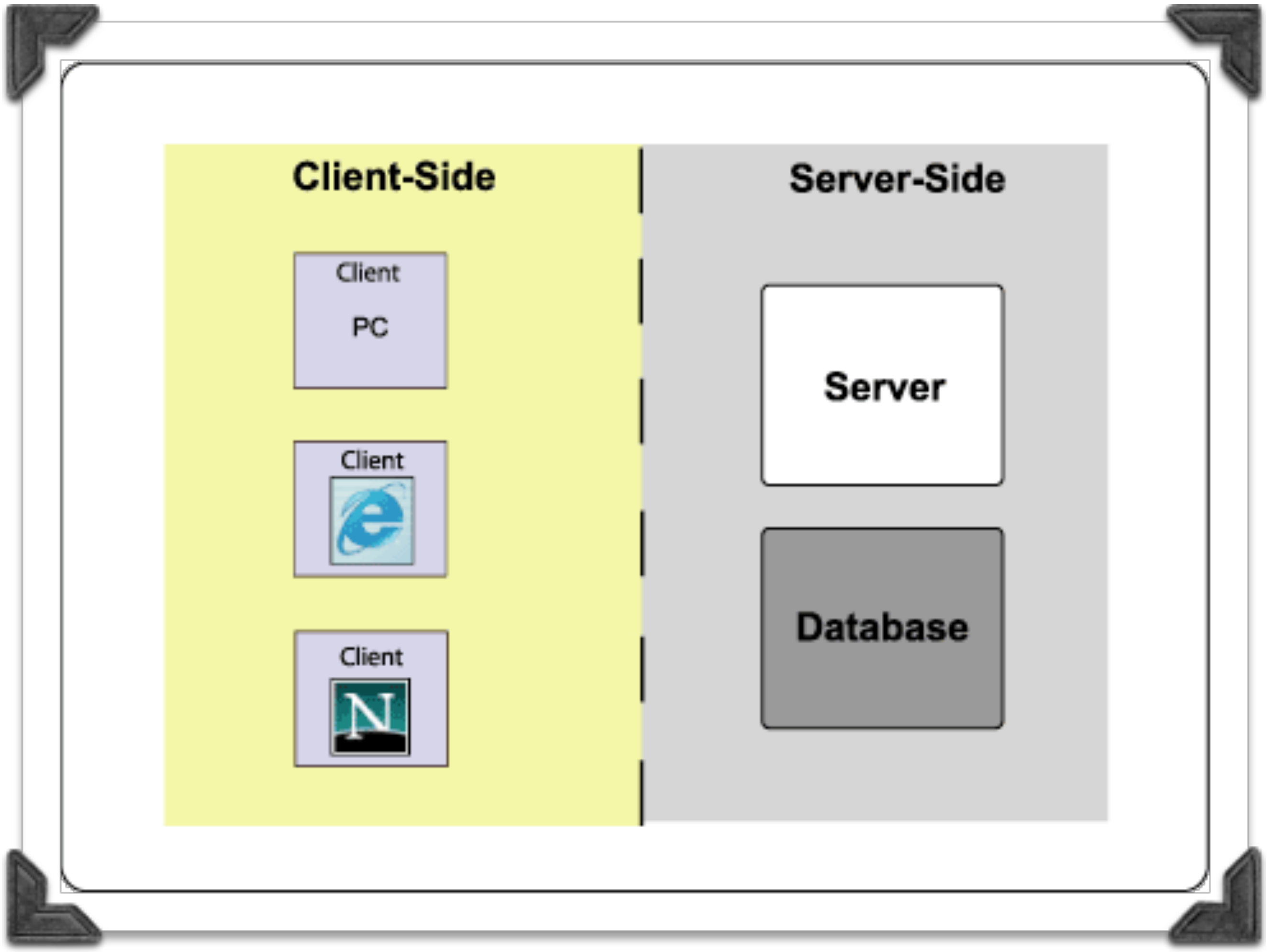
Server-side vs. Client-side

Basics

- Client (web browser) sends requests to the server-side script
- Script's code and the data it accesses are all on the server
- The script makes html dynamically to reply to the browser

Advantages

- Databases remain secure
- Content is customized for the client
- Can take advantage of software on or computing power of the server



Day 1

Server-Side Languages

Daily Calendar

Day 1

1. Server Configuration
2. Git Repository Setup
3. Includes
4. Views

Day 2

1. Controller Classes
2. Pretty URLs

Day 3

1. URL & Form Data
2. Validation

Day 4

1. Database Queries
2. Model Classes

Day 5

1. Hashing and Salting
2. PHP Sessions

Day 6

1. JSON
2. Services

Day 7

1. CodeIgniter
2. Django
3. Start 2-day projects

Day 8

1. Work on projects

Day 9

1. Present Projects
2. Review for Practical

Day 10

Practical Exam

Day 1

Screencasts

4% of your grade (like one lab)

You must make at least one.

They should demonstrate something you learned in class. Make your video instructive and useful for students in the next SSL class.

Day 1

SSL Rubric - http://goo.gl/F0BFo

Assignments	Points
Labs 1-7 and videos	32
Two-day project	28
Practical final	30
Professionalism	10

Day 1

Rules

- During Lecture and Lab, no FB or anything else.
- Phones should be on silent mode (not vibrate).
- No food or drinks.
- 10 day course, max 8 hours unexcused, 16 excused.
- 15 minutes late = 2 hours
- Contact me if you will miss class.

Day 1

Turning In Work

- All deadlines are final. No late work.
- Do not commit your videos! Instead, update a screencasts.txt file with a youtube link.
- Make a github.com account.
- Dump your database and website code inside the day# folder and tar it up as yourname-day#.tgz
- Push to https://github.com/tbsmithFS/SSL1308

Server-Side Languages

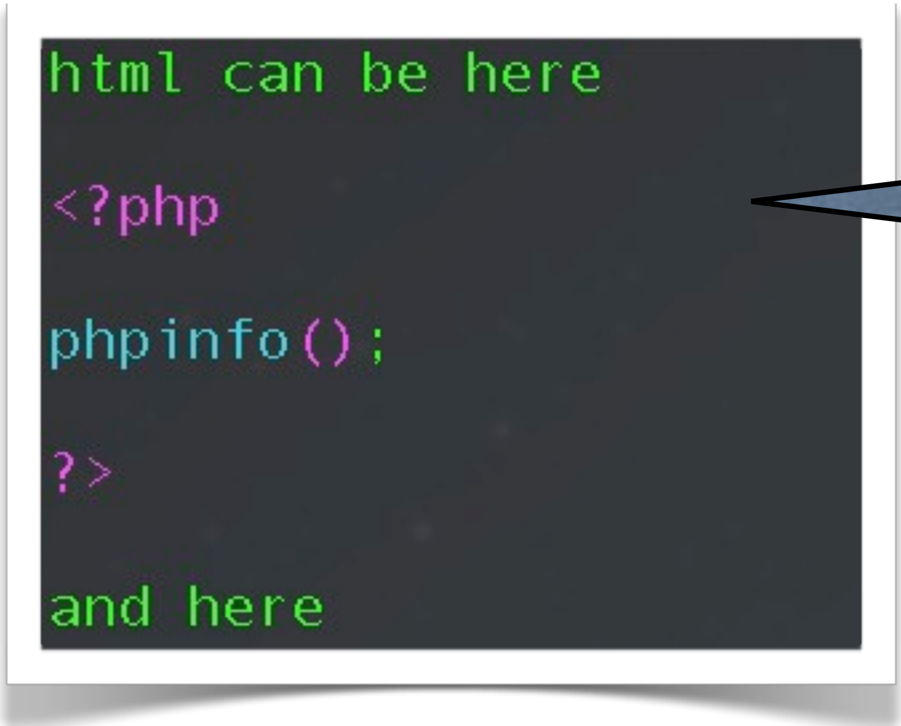
Our Languages of Choice

php	python™
•php.net •widely supported •open source •more symbols	•python.org •widely supported •open source •more english

Server-Side Languages

PHP and Python Scripts

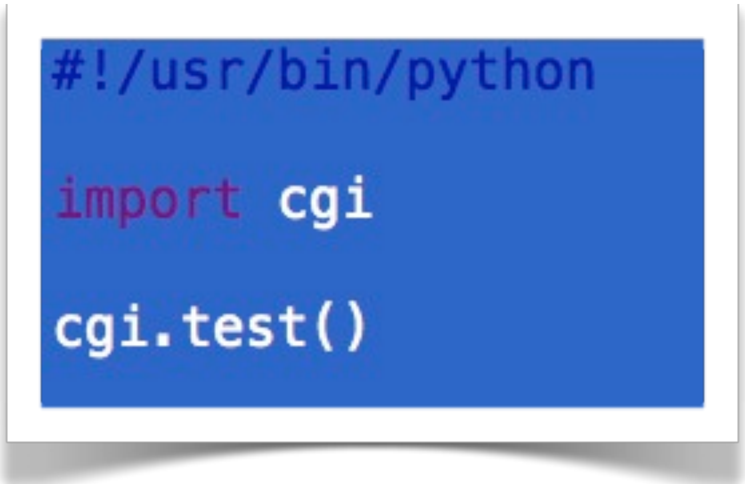
PHP:



```
html can be here

<?php

phpinfo();

?>

and here
```

PHP scripts start with <?php and end with ?>

Python:



```
#!/usr/bin/python

import cgi

cgi.test()
```

Python scripts start with a #! and the path to the Python interpreter, usually /usr/bin/python

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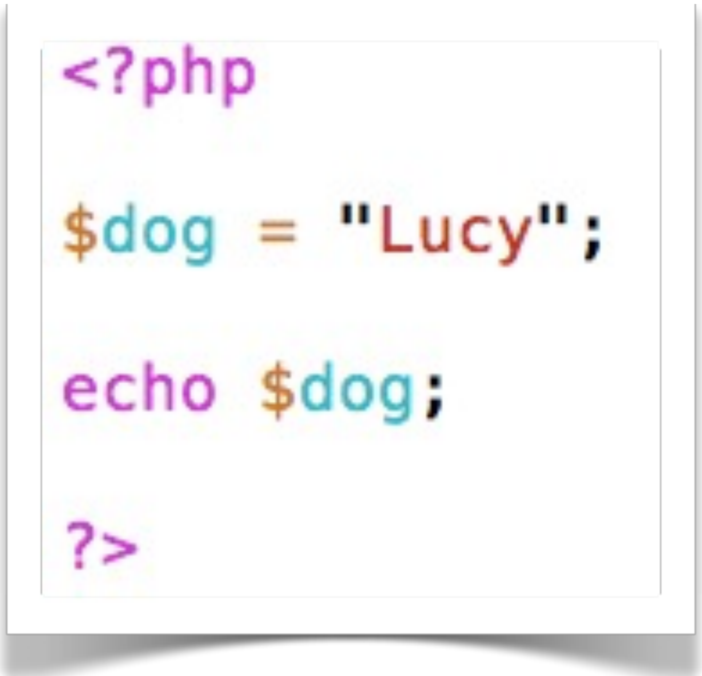
PHP Scalar Variables and Output

All PHP variables start with a dollar sign.

The echo() function will output text to the browser.

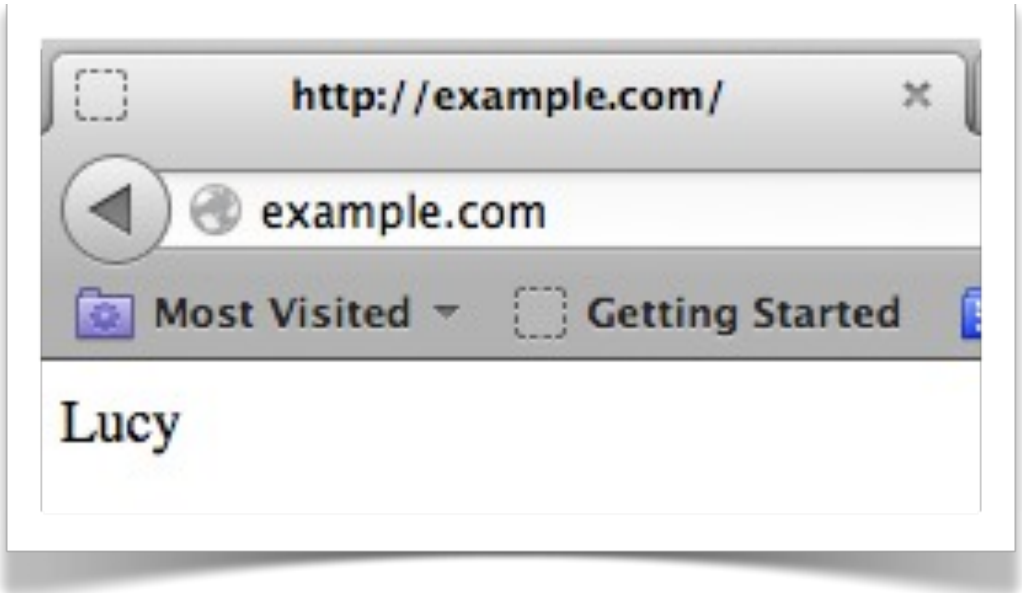


```
<?php

$dog = "Lucy";

echo $dog;

?>
```



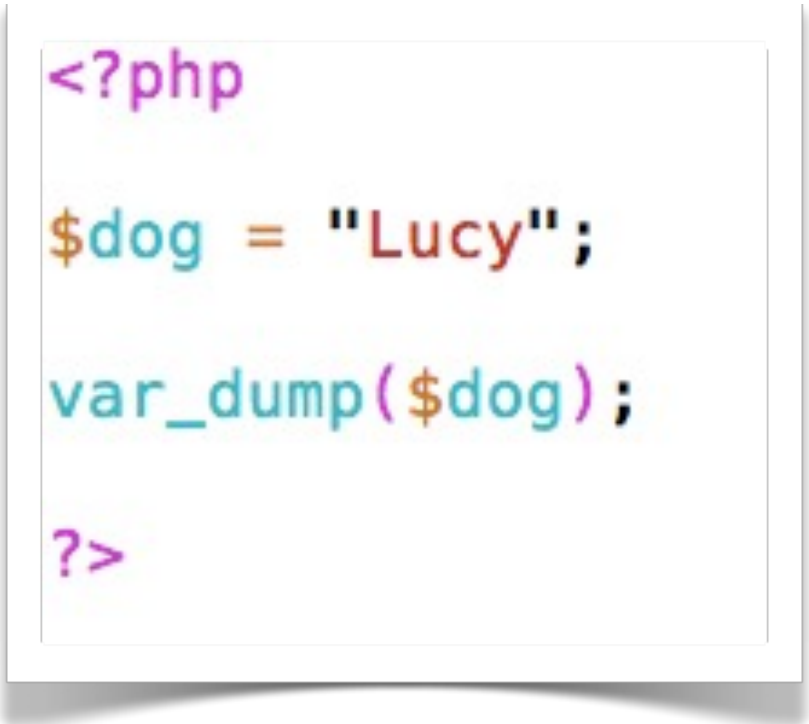
```
Lucy
```

Day 1

Server-Side Languages

PHP Debugging Tip #1

If your variable is not behaving as expected, use the var_dump() function to see exactly what's inside it.

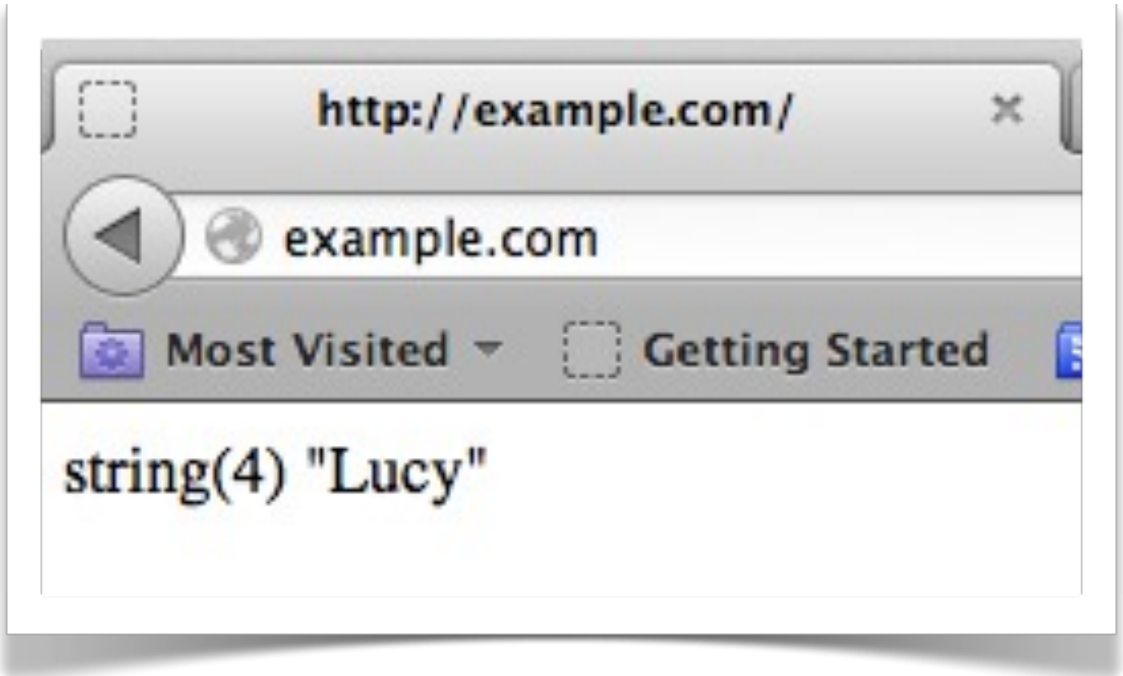


```php
<?php

$dog = "Lucy";

var_dump($dog);

?>
```



```
string(4) "Lucy"
```

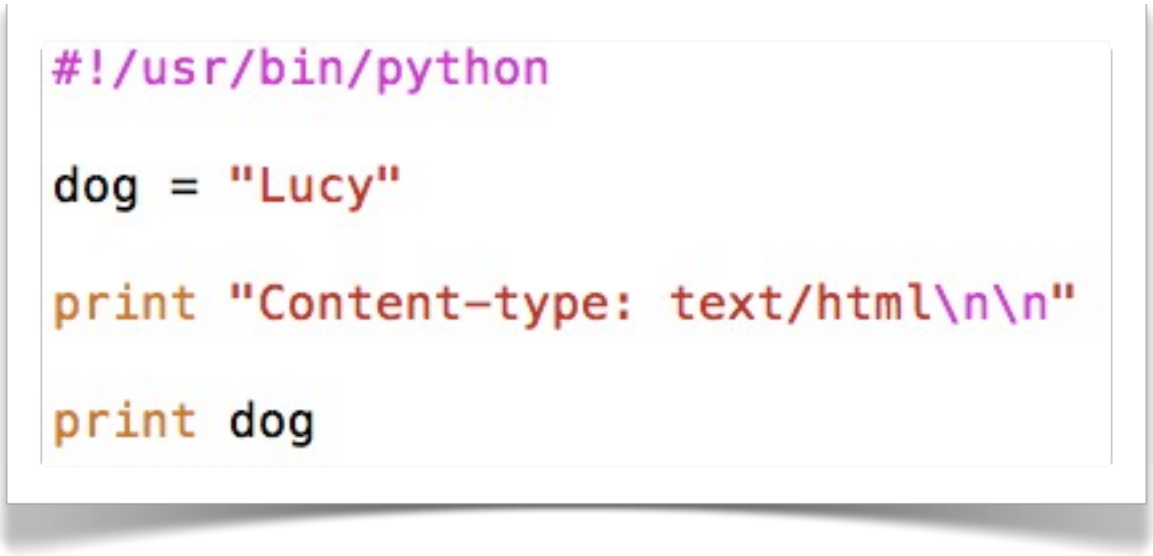
Day 1

Server-Side Languages

Python Scalar Variables and Output

All Python variables are just letters.

The print function will output text to the browser.

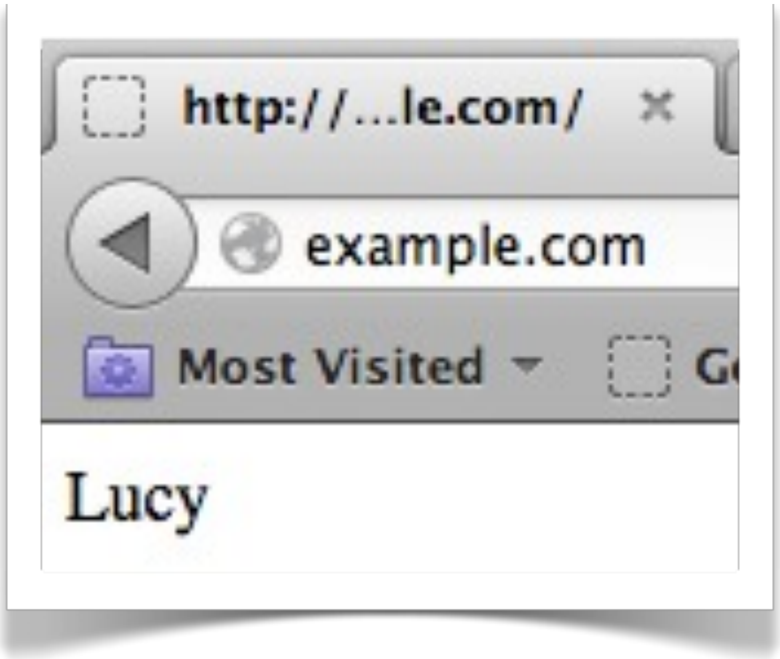


```
#!/usr/bin/python

dog = "Lucy"

print "Content-type: text/html\n\n"

print dog
```



Lucy

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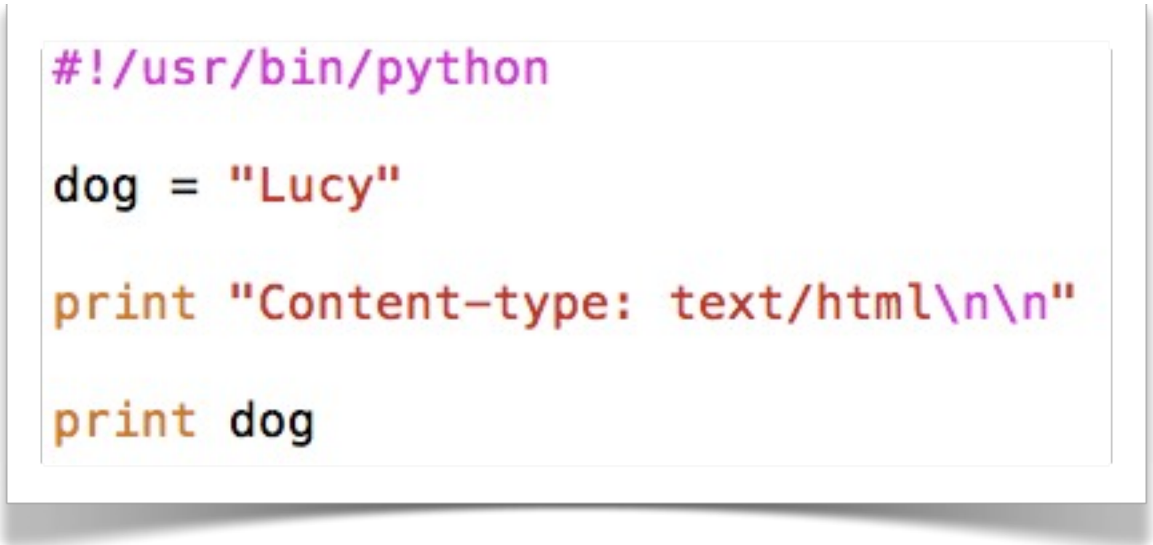
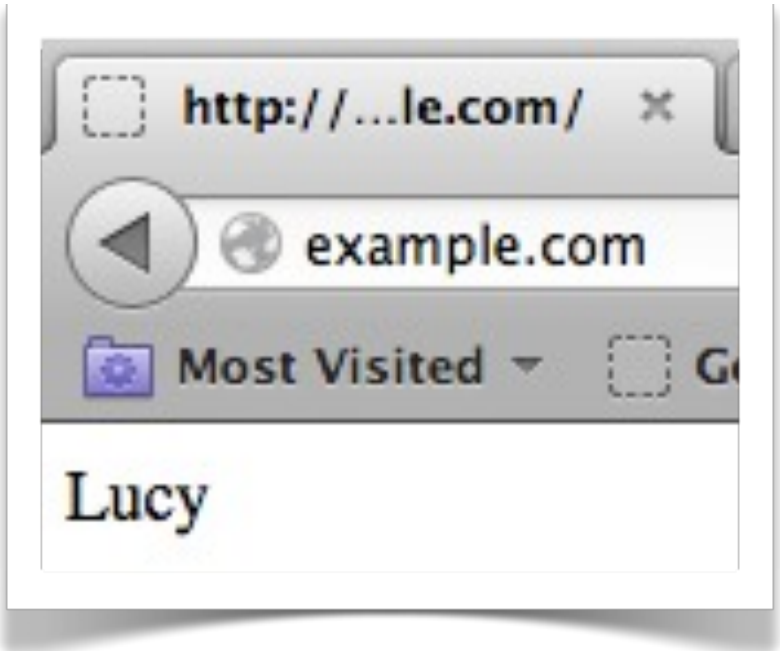
Python Scalar Variables and Output

All Python variables are just letters.

The print function will output text to the browser.



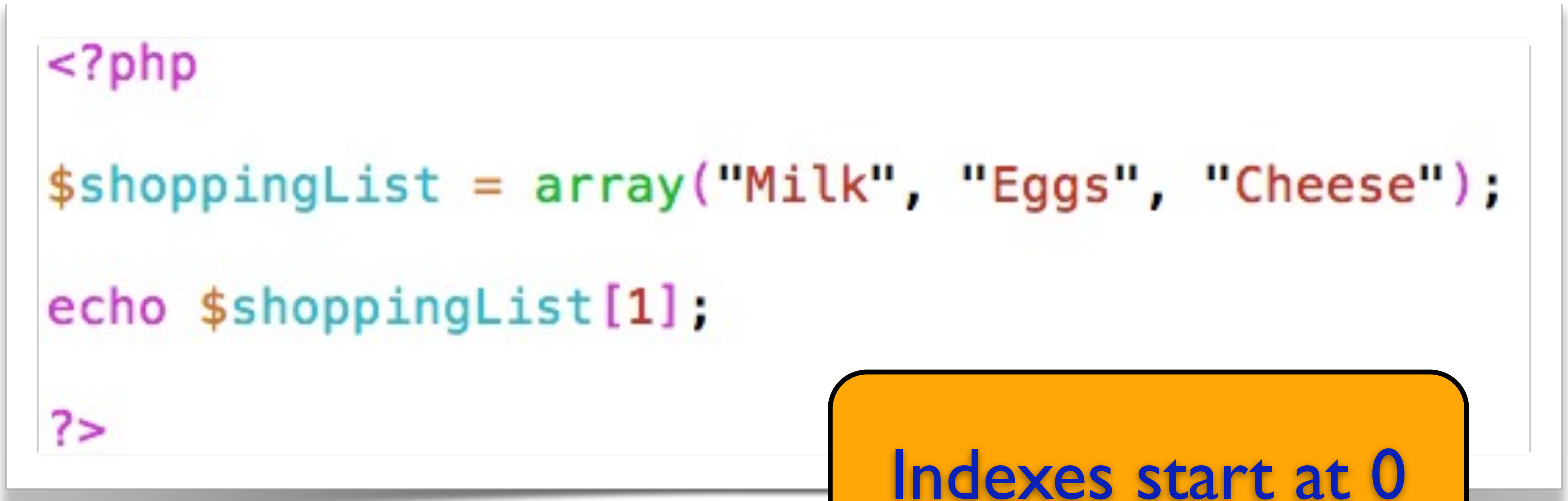
```
#!/usr/bin/python

dog = "Lucy"

print "Content-type: text/html\n\n"

print dog
```



```
Lucy
```

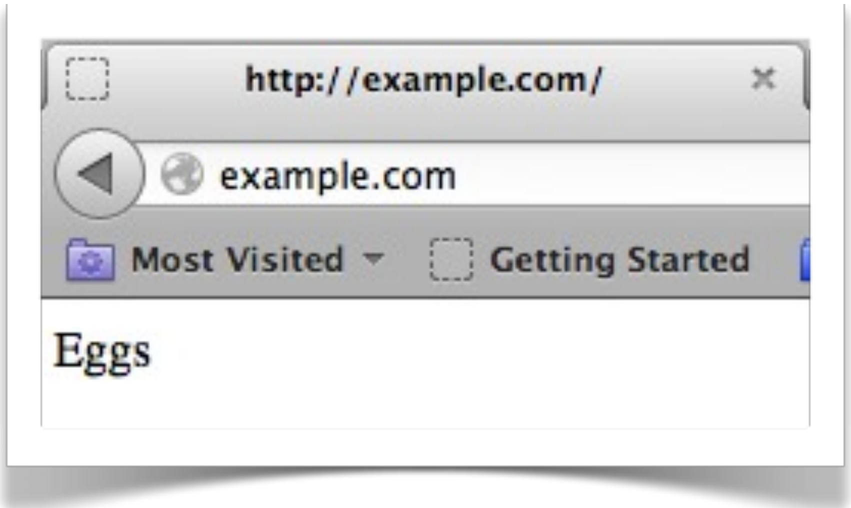
PHP Arrays

Arrays can be built with the array() function and can be accessed with the square brackets.



```
<?php

$shoppingList = array("Milk", "Eggs", "Cheese");

echo $shoppingList[1];

?>
```

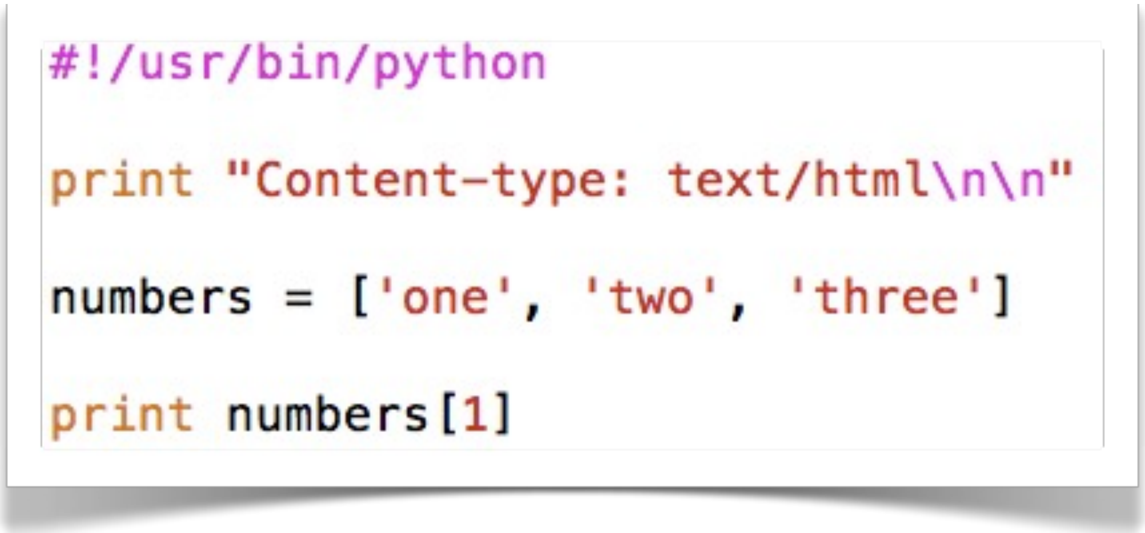
Indexes start at 0



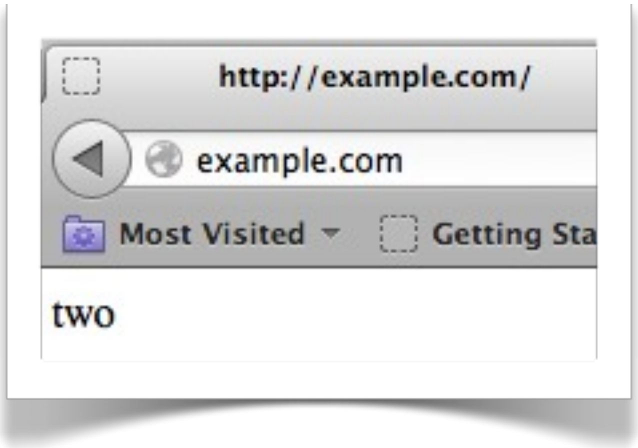
Eggs

Python Lists

Lists can be built and accessed with square brackets.



```
#!/usr/bin/python

print "Content-type: text/html\n\n"

numbers = ['one', 'two', 'three']

print numbers[1]
```



two

Indexes start at 0

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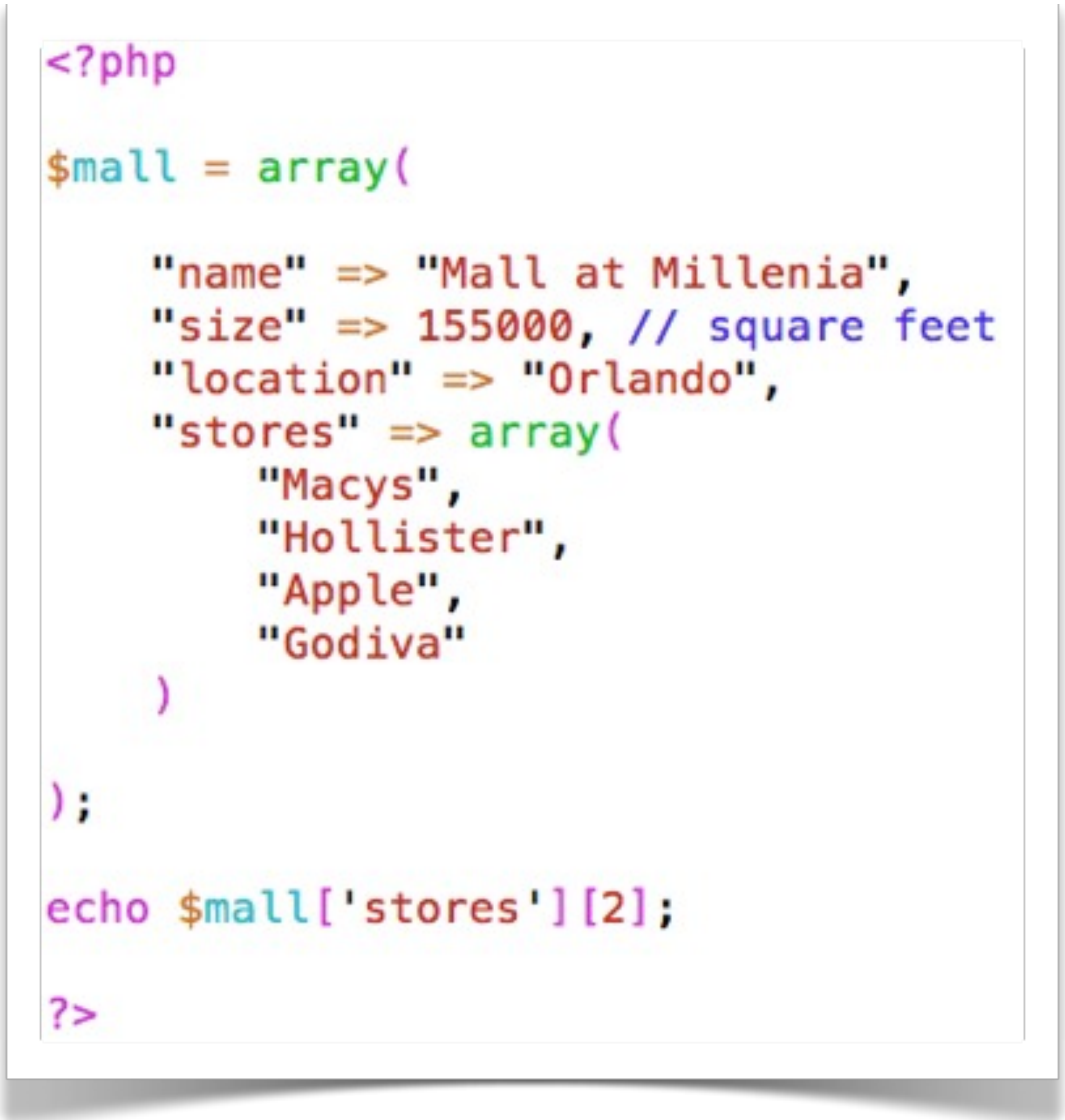
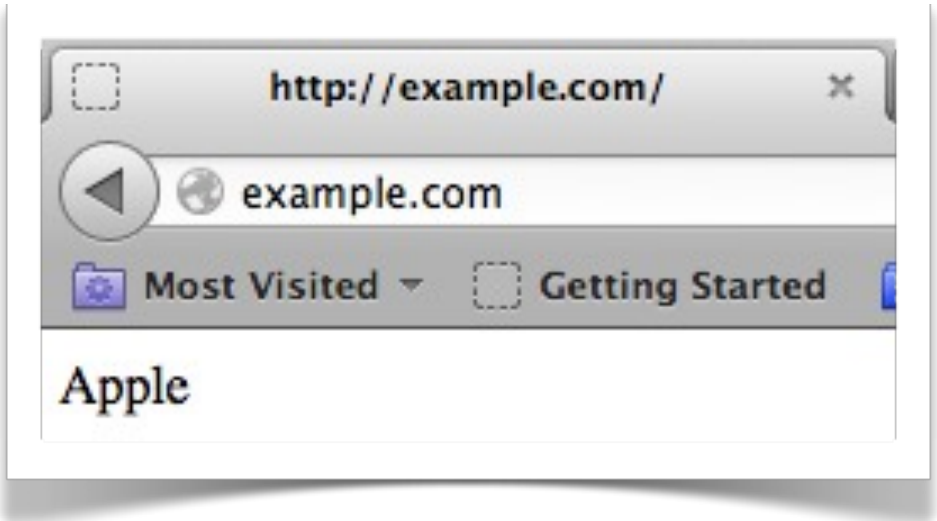
PHP Associative Arrays

Associative arrays can be built with the array() function and the => symbols, and can be accessed with square brackets.

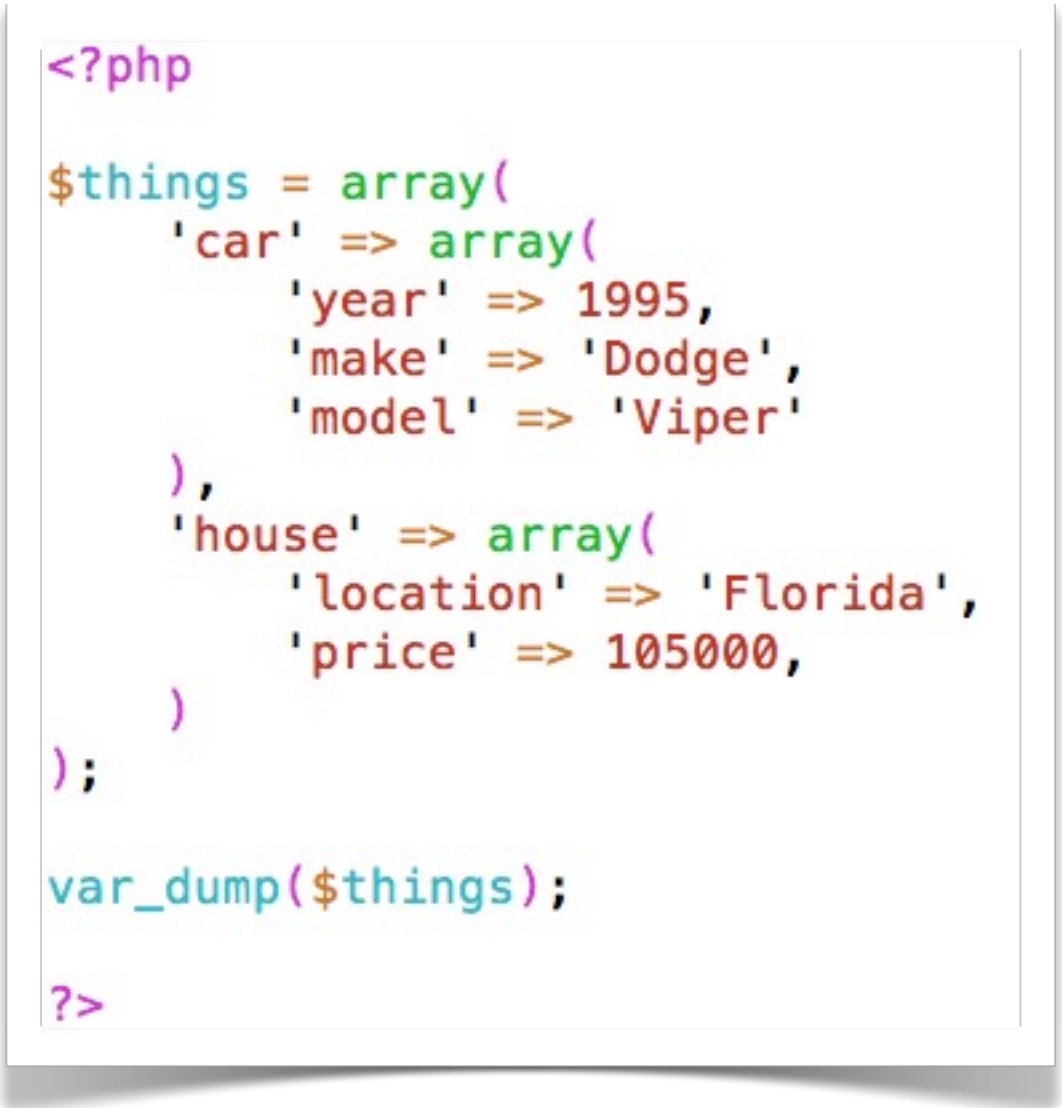


```php
<?php

$mall = array(

    "name"  => "Mall at Millenia",
    "size"  => 155000, // square feet
    "location"  => "Orlando",
    "stores"  => array(
        "Macys",
        "Hollister",
        "Apple",
        "Godiva"
    )

);

echo $mall['stores'][2];

?>
```

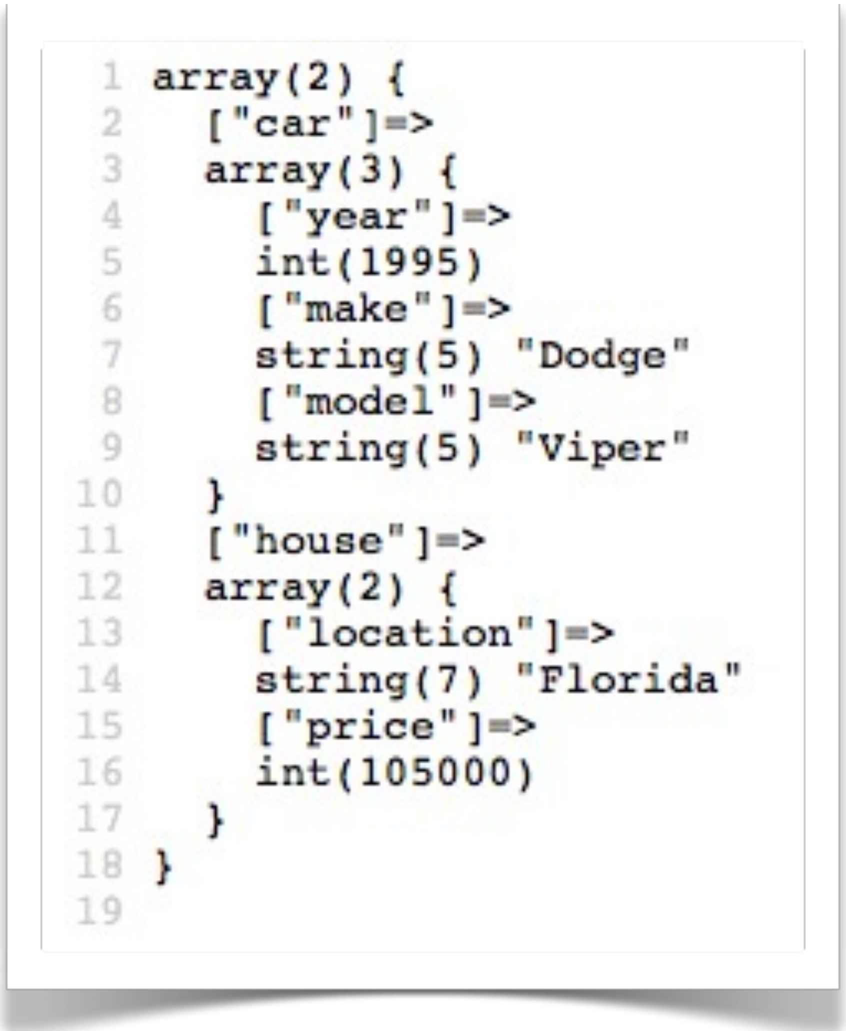


Apple

PHP Debugging Tip #1 example



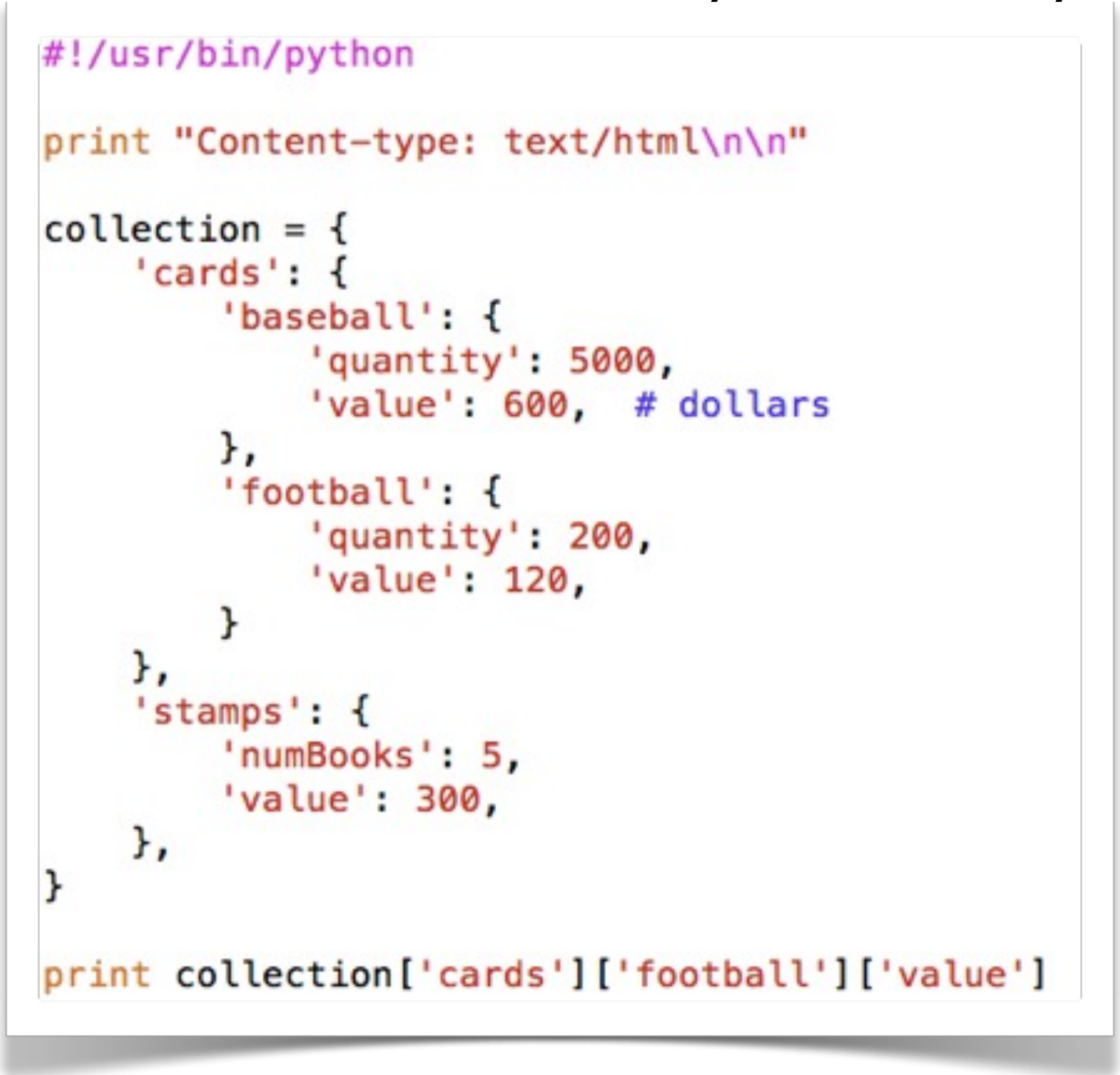
```php
<?php

$things = array(
    'car' => array(
        'year' => 1995,
        'make' => 'Dodge',
        'model' => 'Viper'
    ),
    'house' => array(
        'location' => 'Florida',
        'price' => 105000,
    )
);

var_dump($things);

?>
```



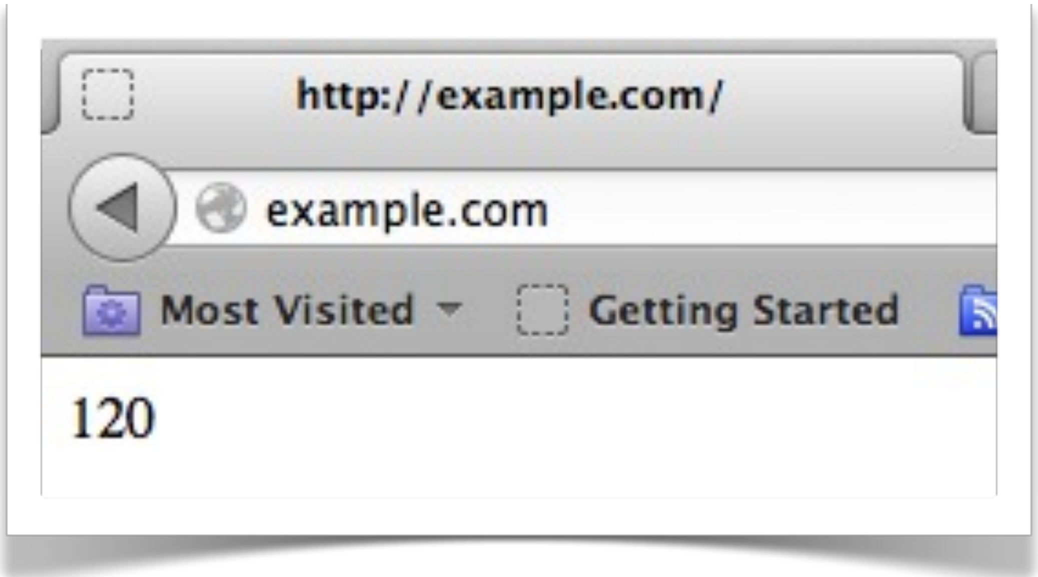
```
array(2) {
  ["car"]=>
  array(3) {
    ["year"]=>
    int(1995)
    ["make"]=>
    string(5) "Dodge"
    ["model"]=>
    string(5) "Viper"
  }
  ["house"]=>
  array(2) {
    ["location"]=>
    string(7) "Florida"
    ["price"]=>
    int(105000)
  }
}
```

Python Dictionaries

Dictionaries can be built with curly braces and colons.
The syntax is exactly the same as JSON.



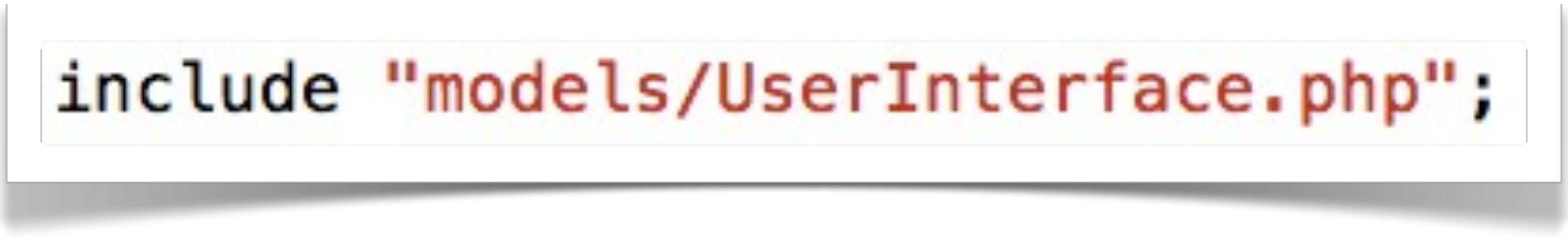
```
#!/usr/bin/python

print "Content-type: text/html\n\n"

collection = {
    'cards': {
        'baseball': {
            'quantity': 5000,
            'value': 600,  # dollars
        },
        'football': {
            'quantity': 200,
            'value': 120,
        }
    },
    'stamps': {
        'numBooks': 5,
        'value': 300,
    },
}

print collection['cards']['football']['value']
```



```
120
```

Server-Side Languages

PHP Includes/Imports



```
include "models/UserInterface.php";
```

Read about the PHP *include* and *require* functions:

http://www.w3schools.com/php/php_includes.asp

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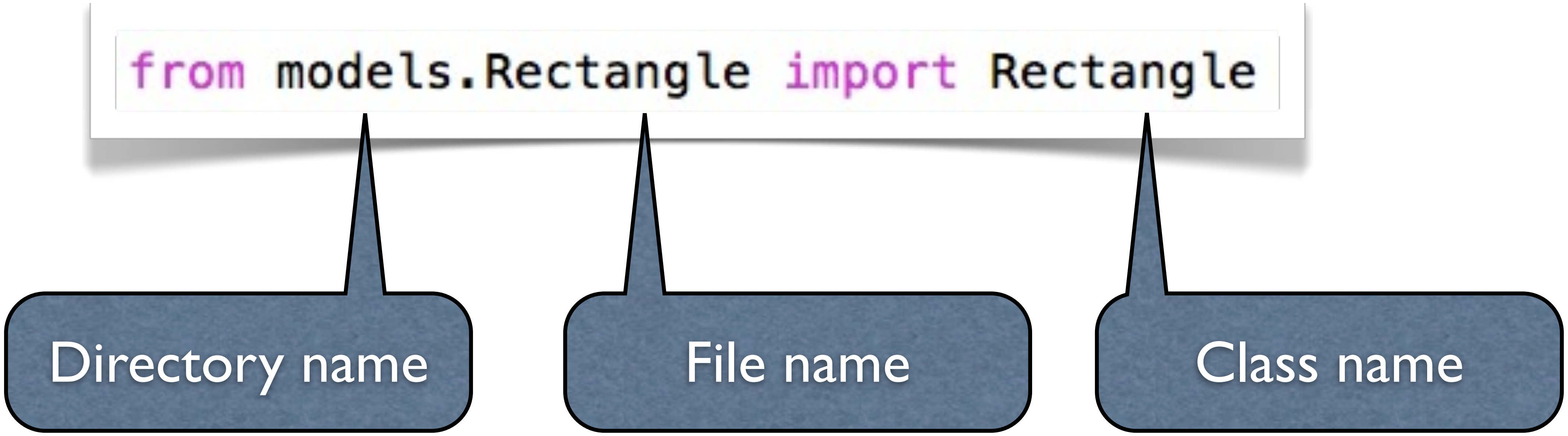
Python Includes/Imports



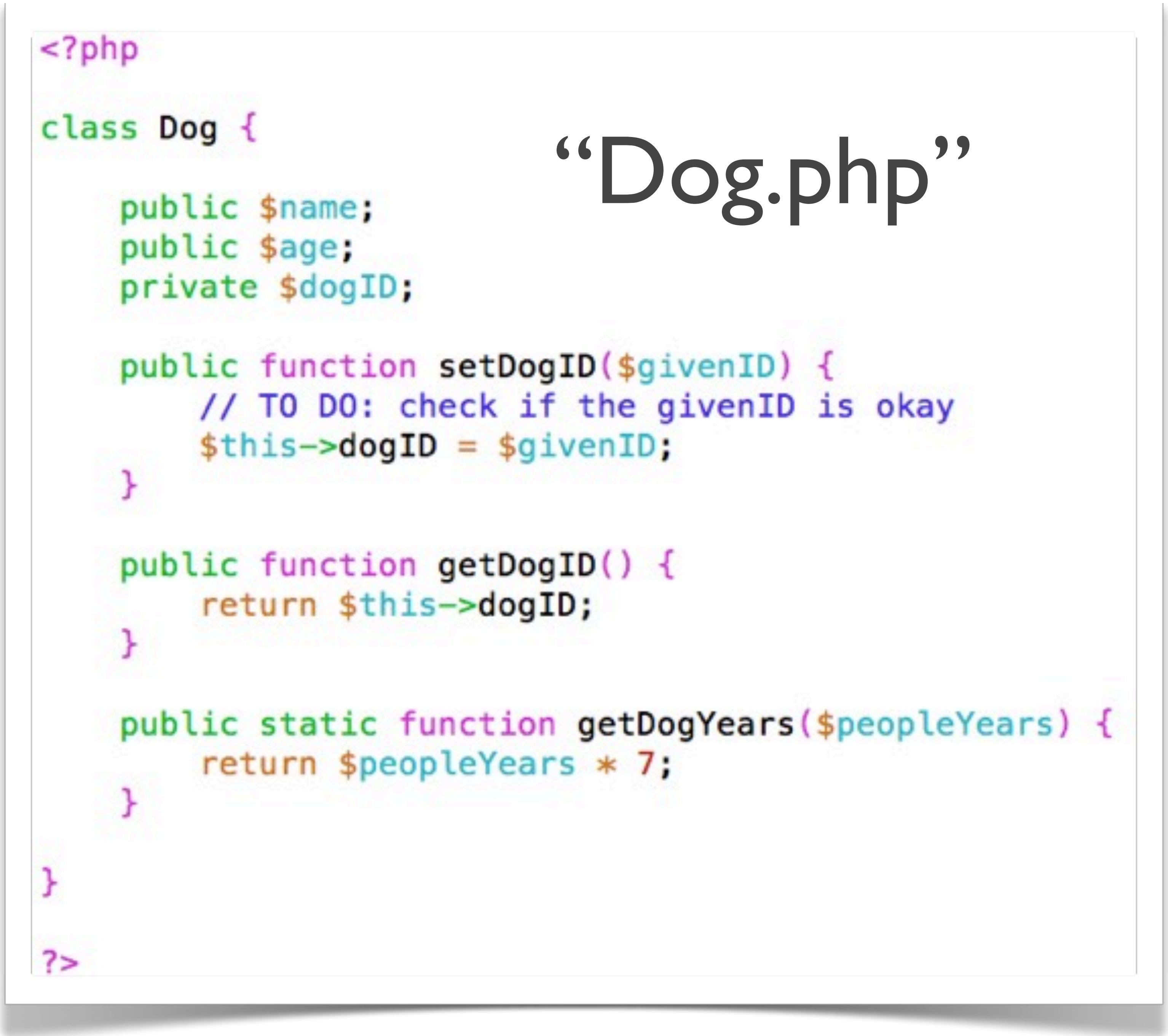
```
from models.Rectangle import Rectangle
```

Directory name

File name

Class name

PHP OOP



“Dog.php”

```
<?php

class Dog {

    public $name;
    public $age;
    private $dogID;

    public function setDogID($givenID) {
        // TO DO: check if the givenID is okay
        $this->dogID = $givenID;
    }

    public function getDogID() {
        return $this->dogID;
    }

    public static function getDogYears($peopleYears) {
        return $peopleYears * 7;
    }

}

?>
```

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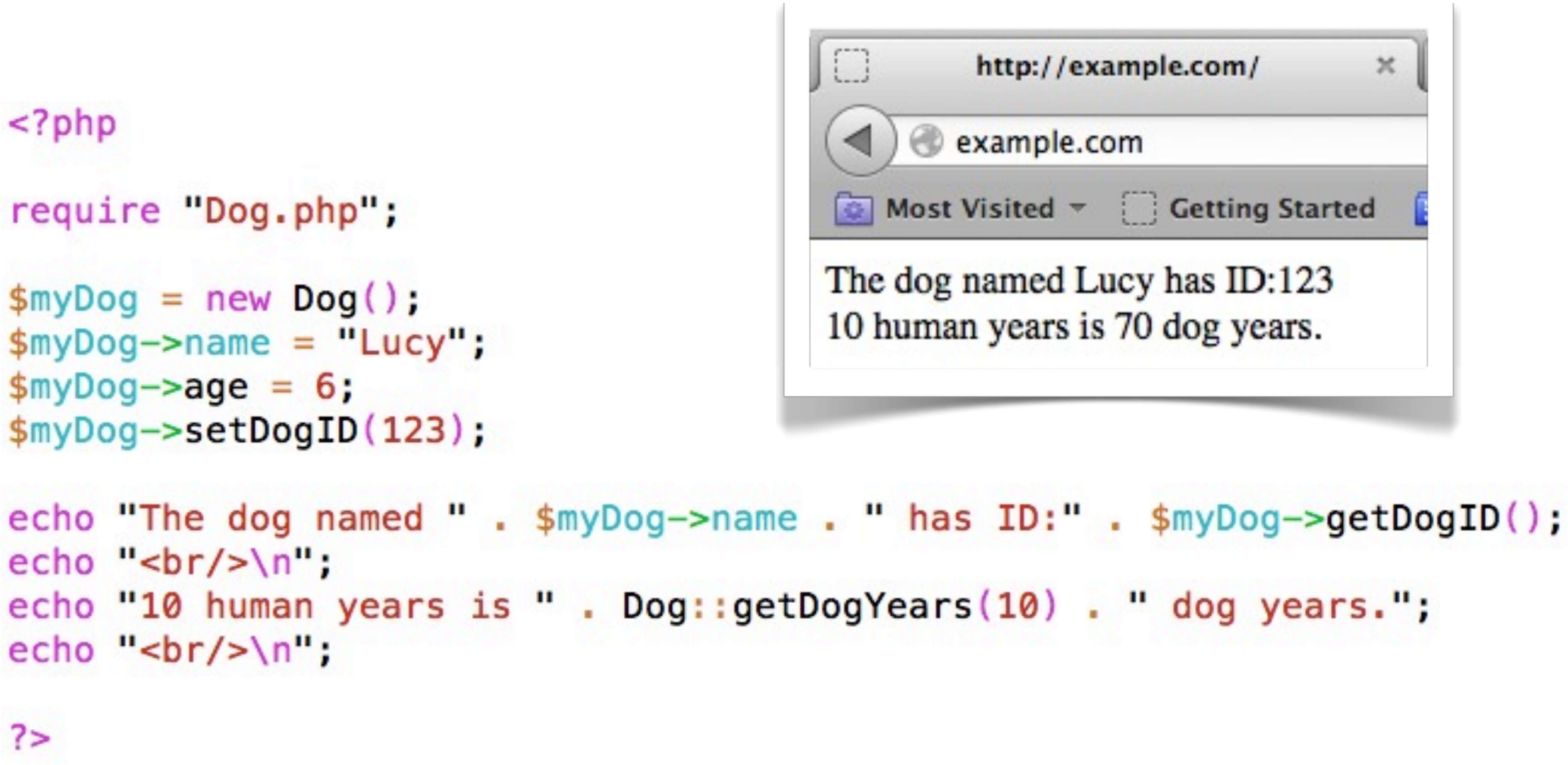
PHP OOP



```php
<?php

require "Dog.php";

$myDog = new Dog();
$myDog->name = "Lucy";
$myDog->age = 6;
$myDog->setDogID(123);

echo "The dog named " . $myDog->name . " has ID:" . $myDog->getDogID();
echo "<br/>\n";
echo "10 human years is " . Dog::getDogYears(10) . " dog years.";
echo "<br/>\n";

?>
```

```
The dog named Lucy has ID:123
10 human years is 70 dog years.
```

Server-Side Languages

In-class assessment: PHP OOP

Make a class with private and public methods.

Include it in the index file and instantiate it.

Use its methods and get and set its values.

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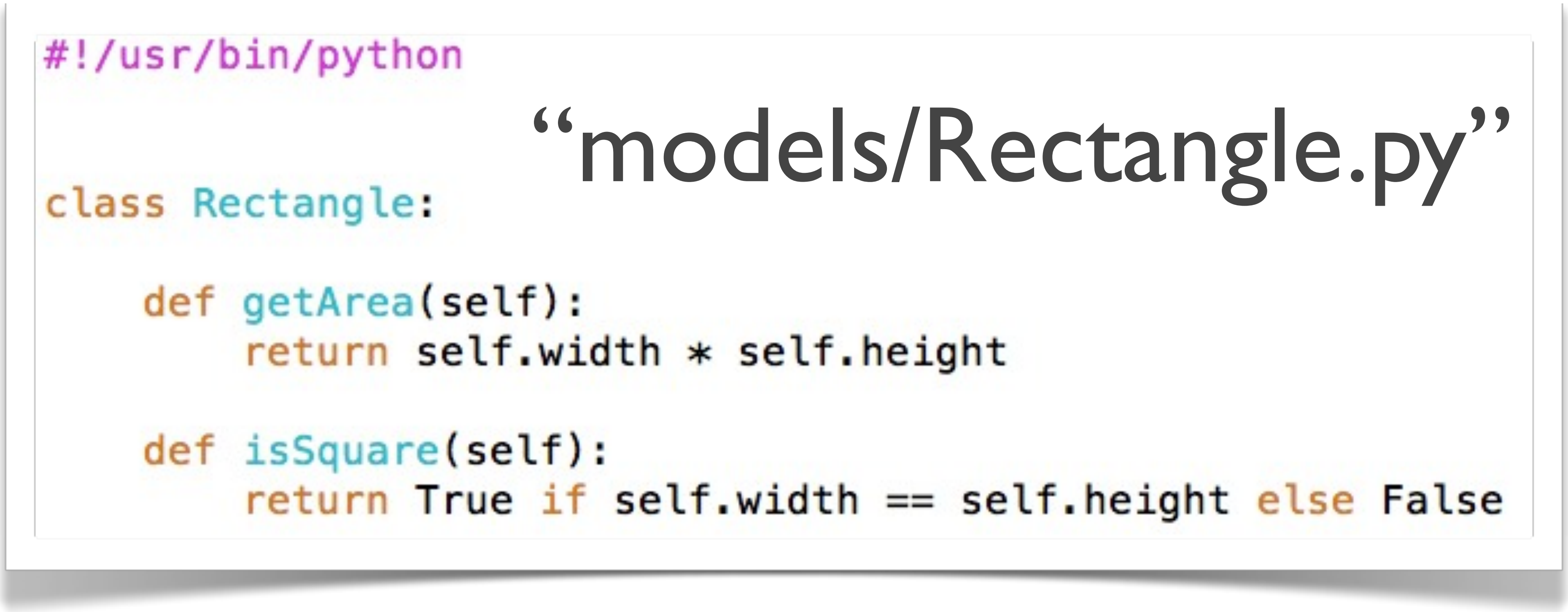
Python OOP



“models/Rectangle.py”

```
#!/usr/bin/python

class Rectangle:

    def getArea(self):
        return self.width * self.height

    def isSquare(self):
        return True if self.width == self.height else False
```

Python OOP

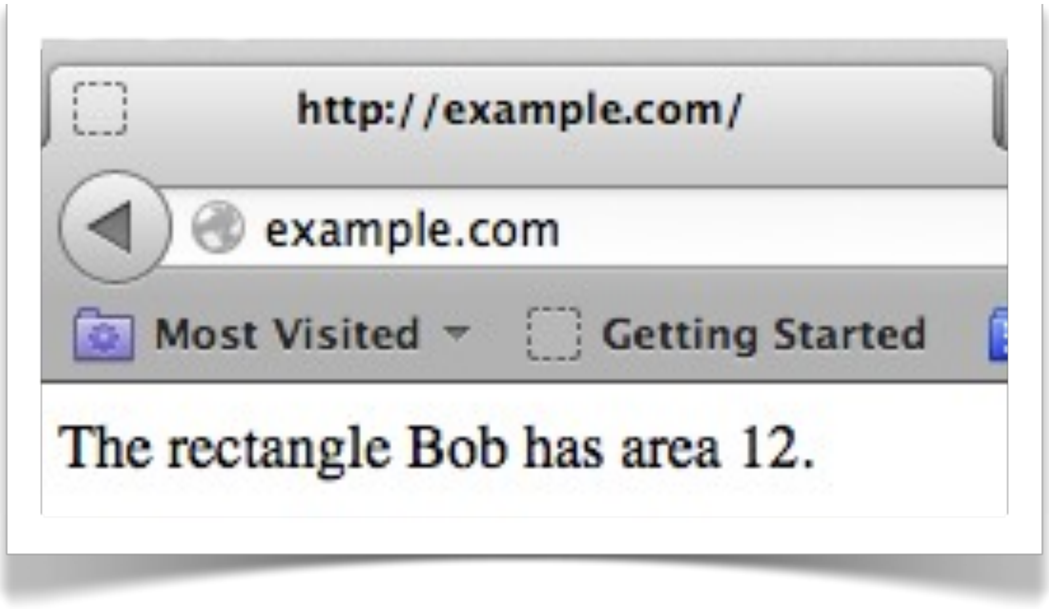
```
#!/usr/bin/python

print "Content-type: text/html\n\n"

from models.Rectangle import Rectangle

rect = Rectangle()
rect.name = "Bob"
rect.height = 3
rect.width = 4

print "The rectangle {} has area {}.".format(rect.name, rect.getArea())
```



The rectangle Bob has area 12.

In-class assessment: Python OOP

Make a class with several methods.

Import it into the index file and instantiate it.

Use its methods and get and set its values.

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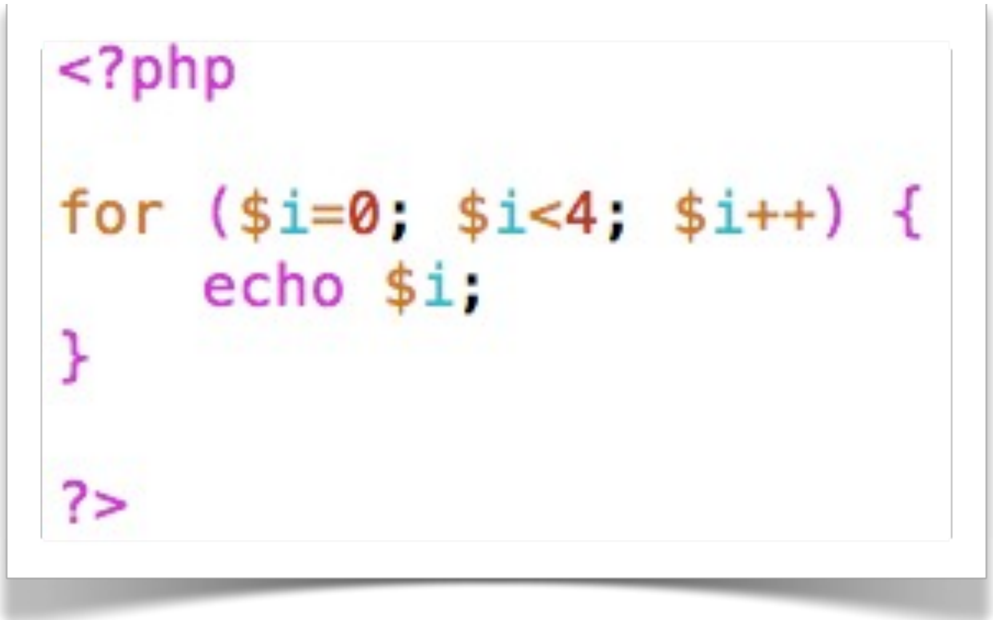
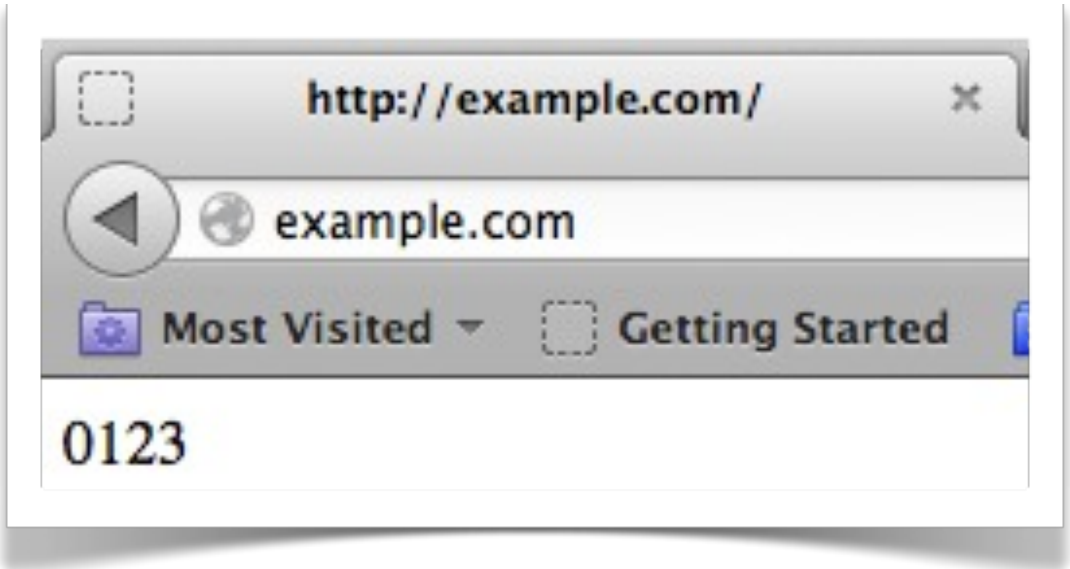
PHP For Loops

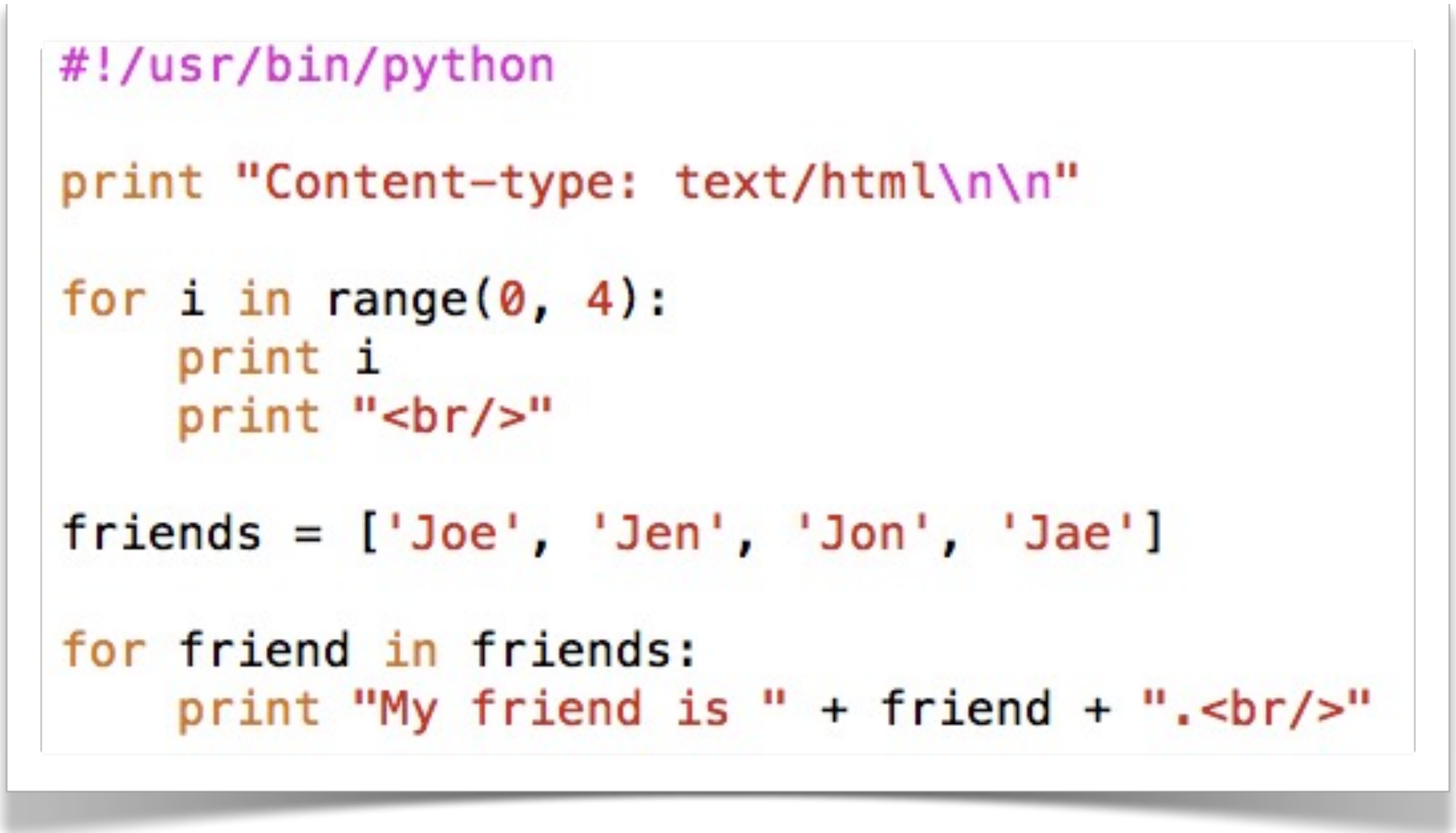


```
<?php

for ($i=0; $i<4; $i++) {
    echo $i;
}

?>
```

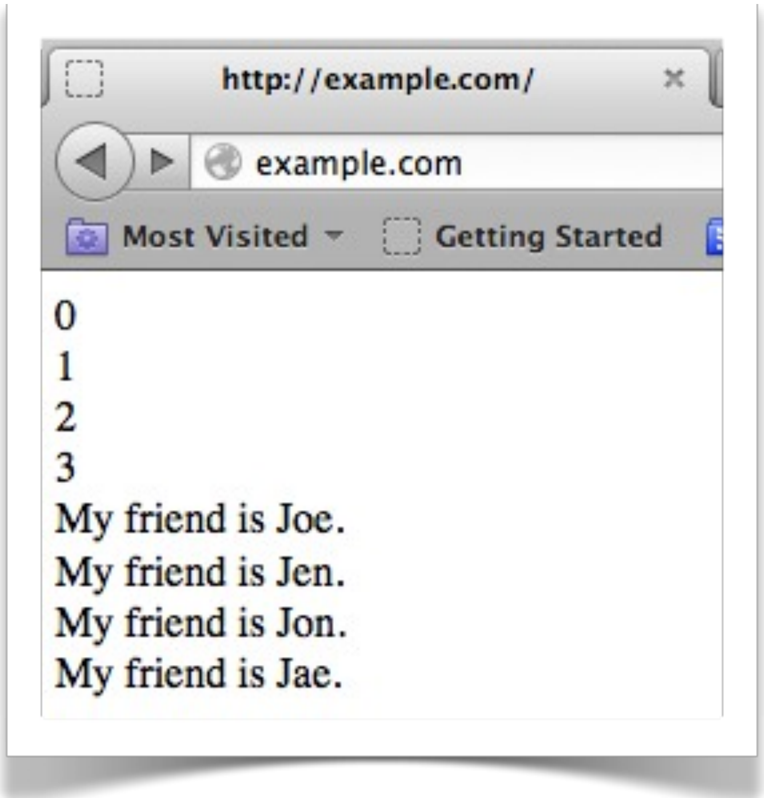


```
0123
```

Python For Loops

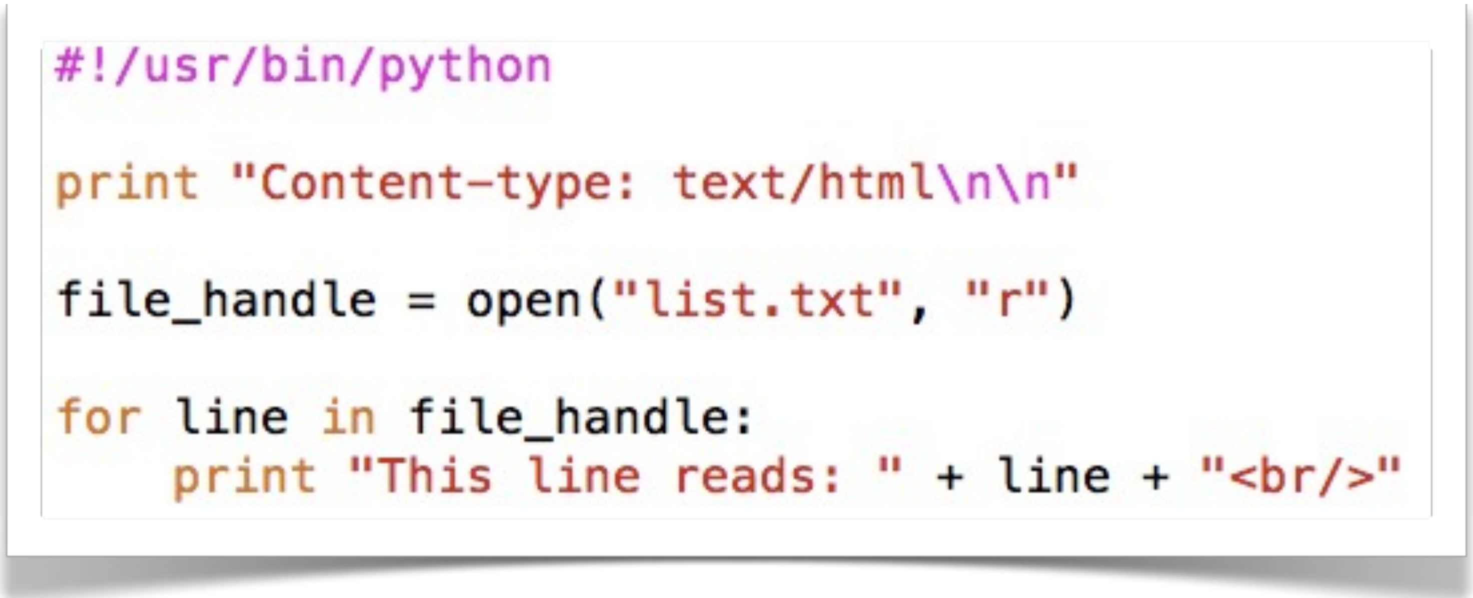


```
#!/usr/bin/python

print "Content-type: text/html\n\n"

for i in range(0, 4):
    print i
    print "<br/>"

friends = ['Joe', 'Jen', 'Jon', 'Jae']

for friend in friends:
    print "My friend is " + friend + ".<br/>"
```

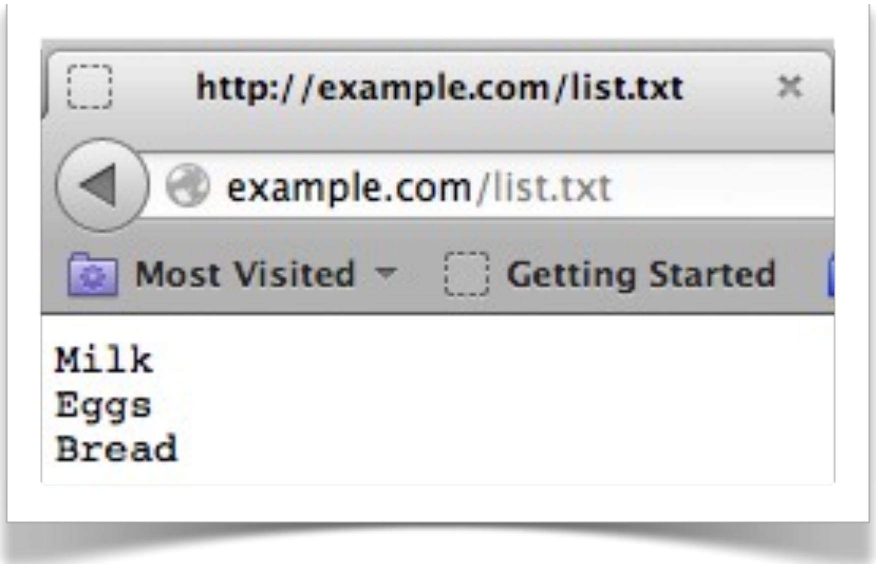


```
0
1
2
3
My friend is Joe.
My friend is Jen.
My friend is Jon.
My friend is Jae.
```

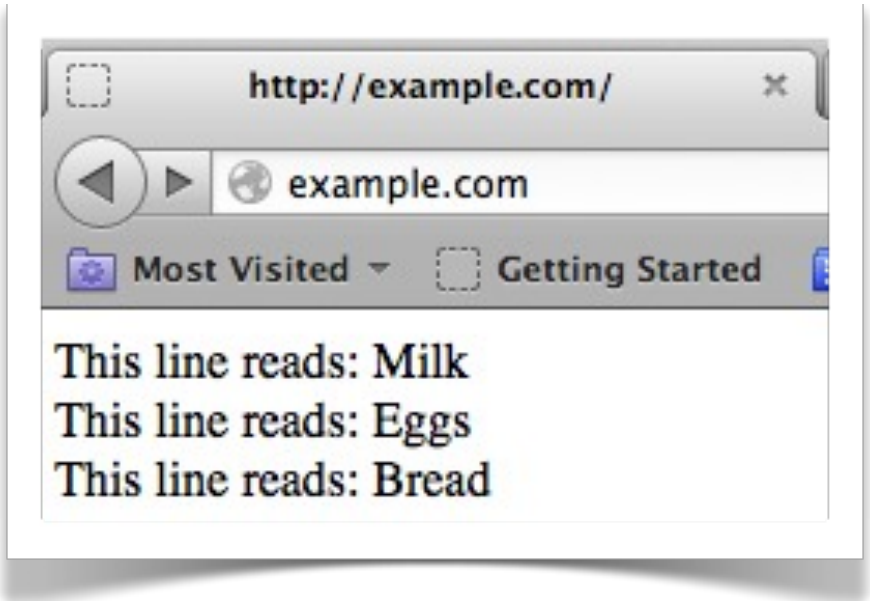
Python File Handling



```
#!/usr/bin/python

print "Content-type: text/html\n\n"

file_handle = open("list.txt", "r")

for line in file_handle:
    print "This line reads: " + line + "<br/>"
```



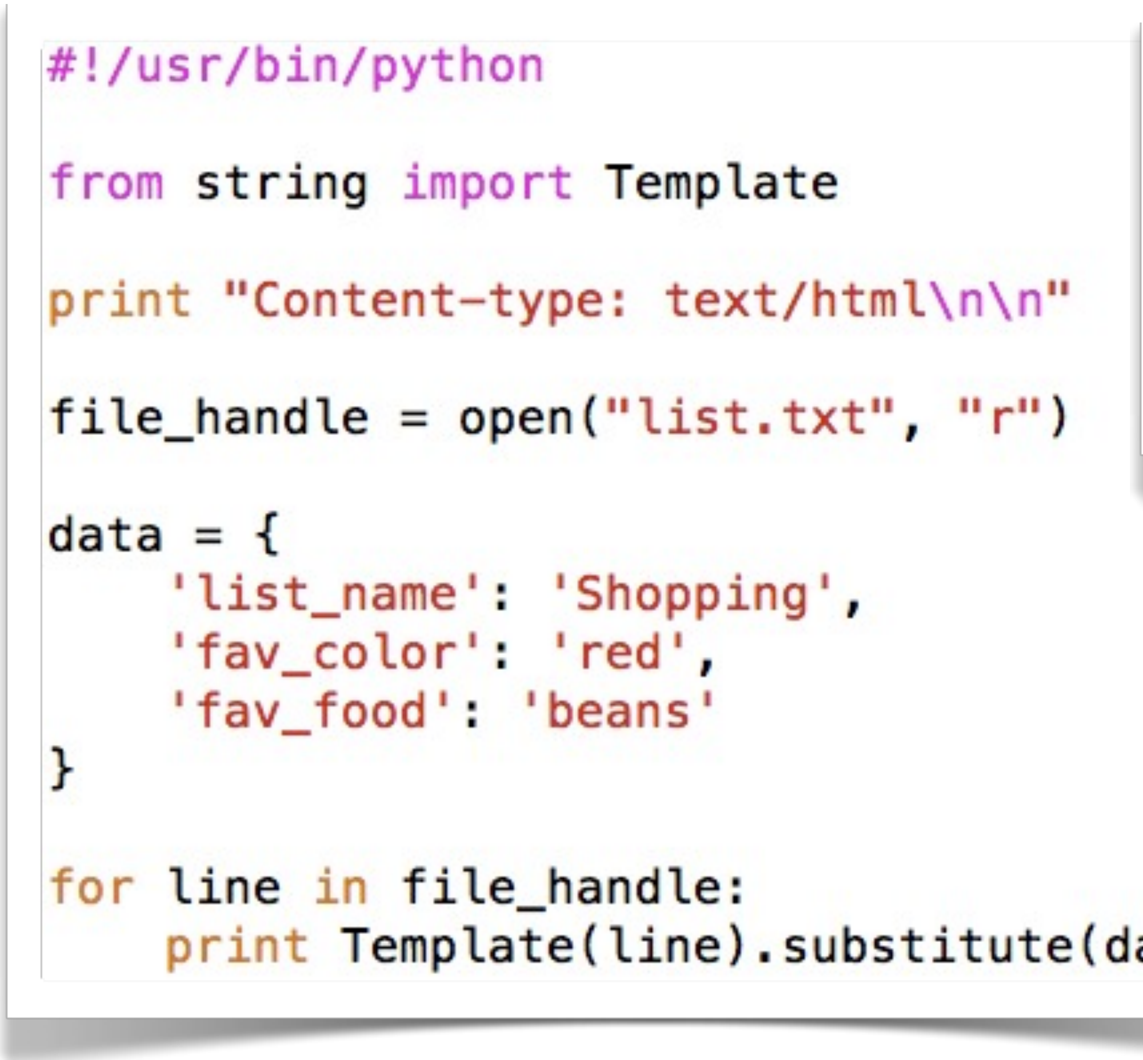
```
Milk
Eggs
Bread
```



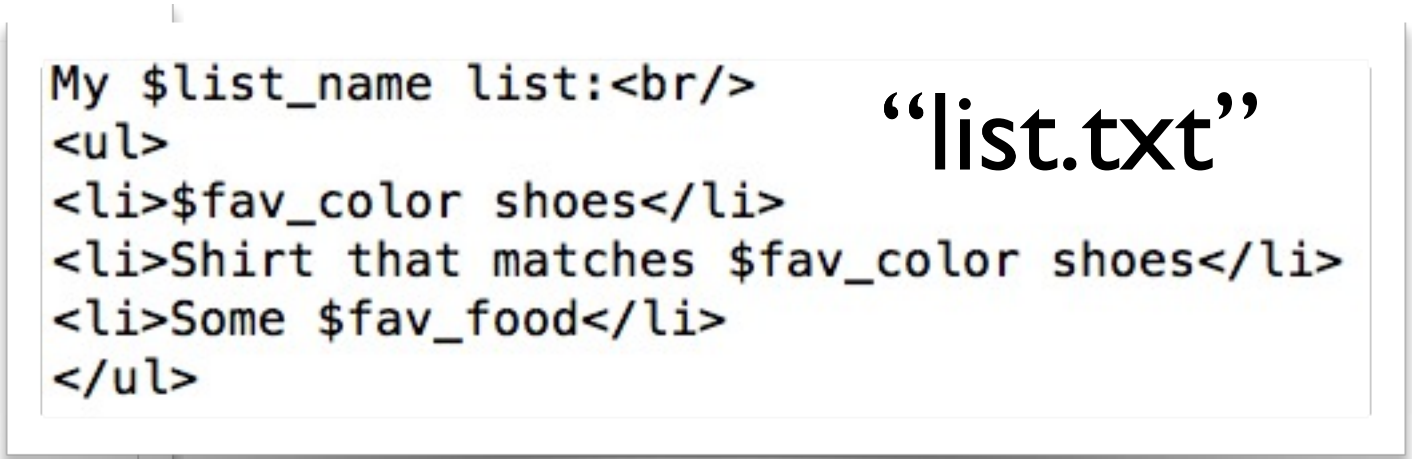
This line reads: Milk
This line reads: Eggs
This line reads: Bread

Server-Side Languages

Python Templating

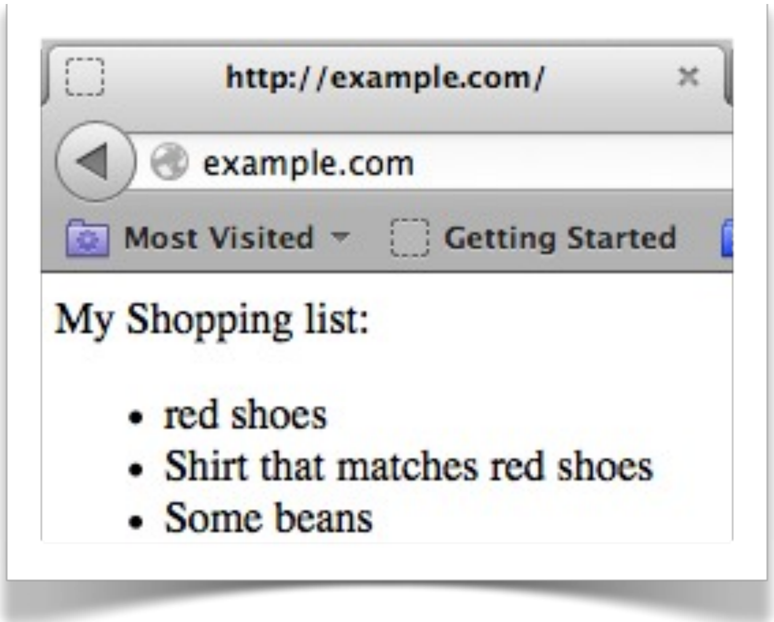


```
#!/usr/bin/python

from string import Template

print "Content-type: text/html\n\n"

file_handle = open("list.txt", "r")

data = {
    'list_name': 'Shopping',
    'fav_color': 'red',
    'fav_food': 'beans'
}

for line in file_handle:
    print Template(line).substitute(data)
```



“list.txt”

```
My $list_name list:<br/>
<ul>
<li>$fav_color shoes</li>
<li>Shirt that matches $fav_color shoes</li>
<li>Some $fav_food</li>
</ul>
```



My Shopping list:

- red shoes
- Shirt that matches red shoes
- Some beans

Day 1

In-class assessment: Python Templating

Make a view with several template variables.

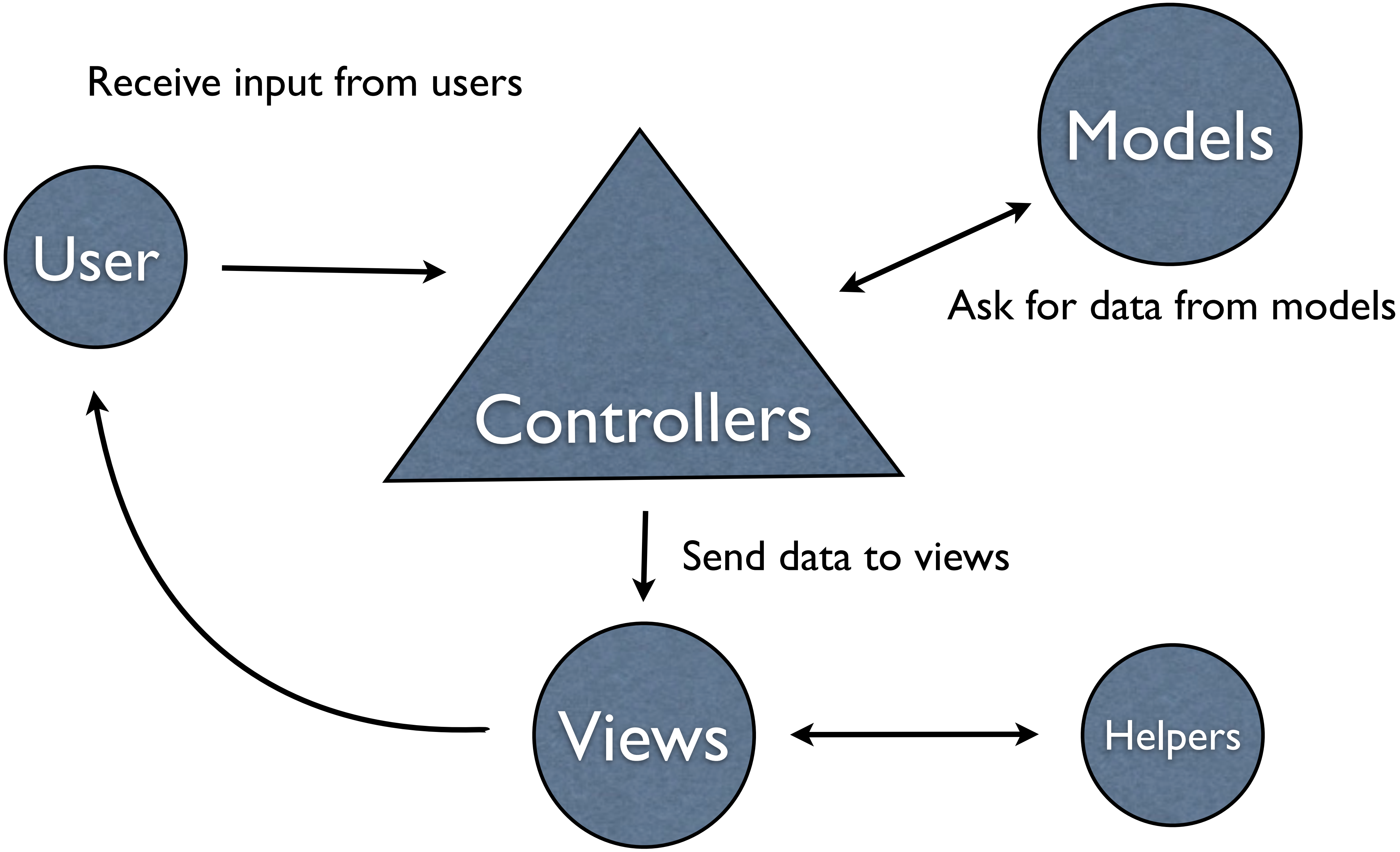
Create a dictionary with keys that match the variables.

Use the Template class to print the view to the browser.

Day 1

Server-Side Languages

MVC



Receive input from users

User

Controllers

Models

Ask for data from models

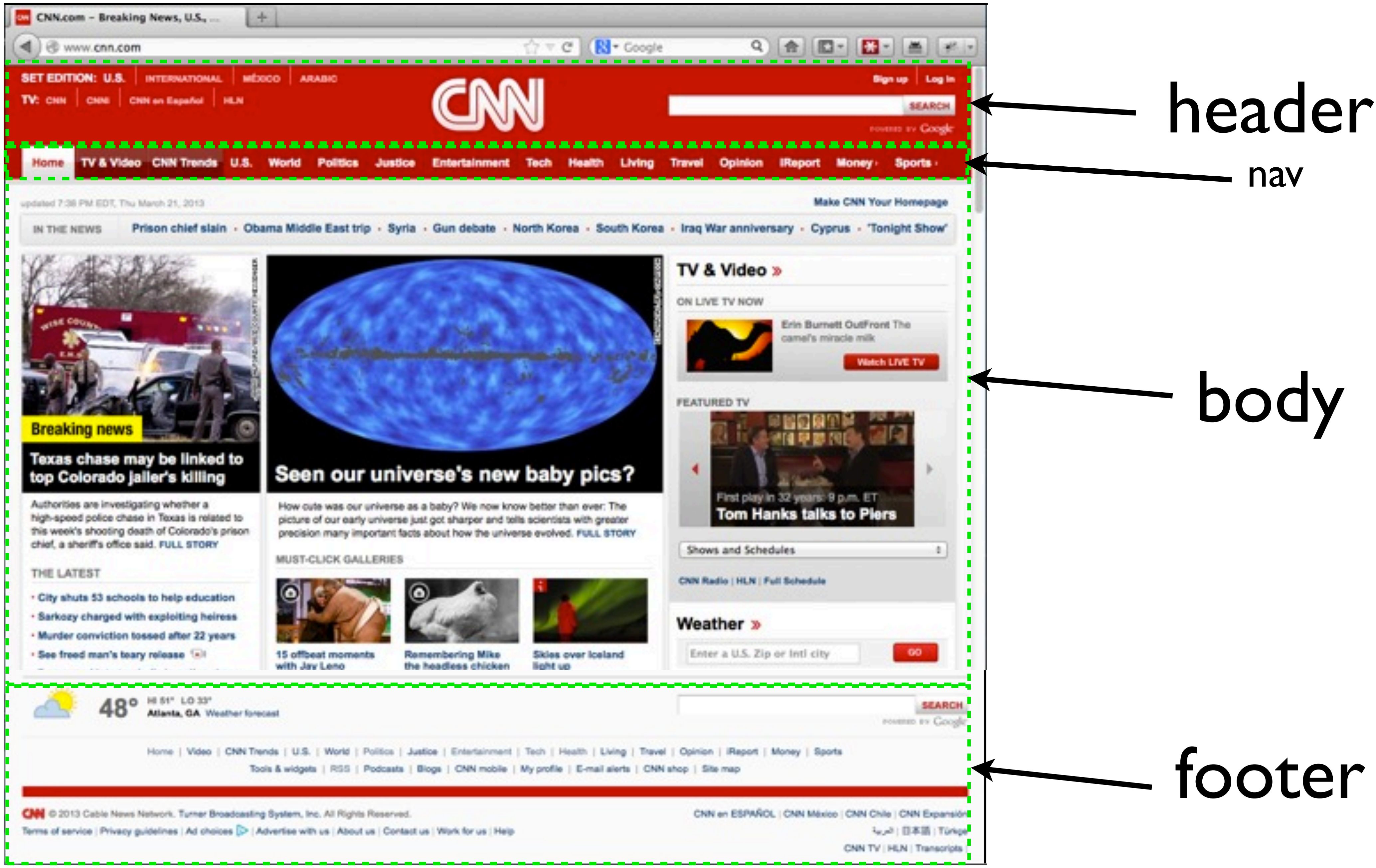
Send data to views

Views

Helpers

Day 1

Basic Website Structure



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header

nav

body

footer

Using a model and views

In-class assessment:

- Make a file in the models directory called UserInterface.php
- Define a class called UserInterface
- Define a public static method called printHeader that takes no arguments and prints “Content-type: text/html\n\n”
- Define a public static method called getView that will:
  - take two arguments: the file(view) to include, and an associative array
  - Include the view
  - Displays information from the array in the view
- Include the model in the index.php file
- Make a header, body, and footer view that uses information from the passed-in associative array
- In the index file, construct an associative array and pass it to the model for the header, body, and footer views

Day 1

Lab 1: Make two simple websites

- One website will use PHP
- One website will use Python
- Make a favicon.ico
- Include a css folder with a different style for each site