PYTHON: CLASSES & VARIABLE SCOPE

9.4.2020

ANACONDA INSTALL?!?

PROBLEM SET 1

* Your first homework is assigned!

* It is due in 2 weeks (before class on Sept. 18)

* Find it in the course git repository

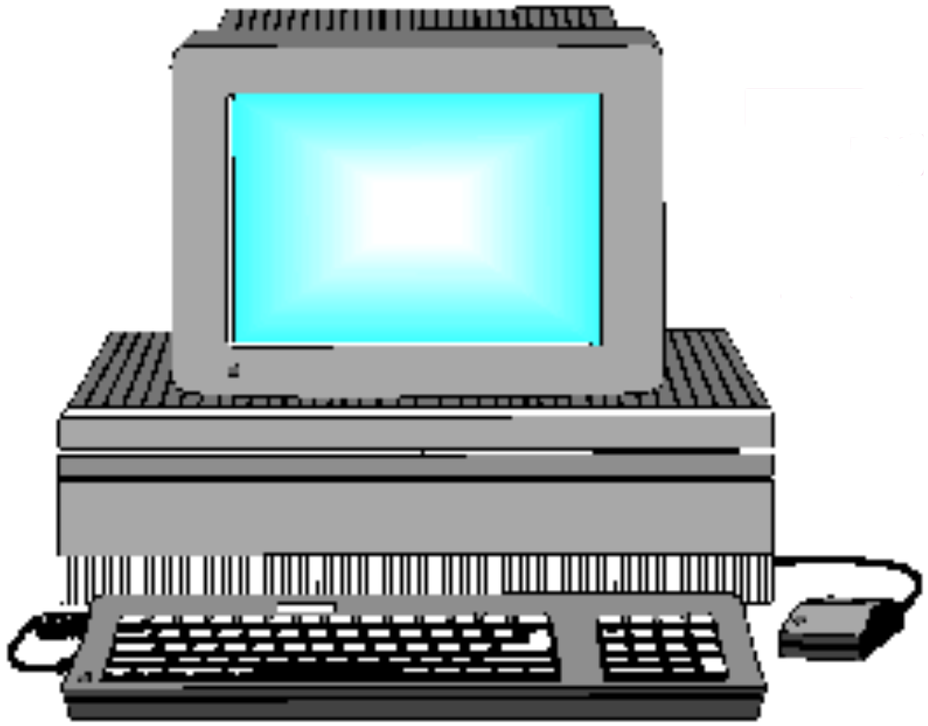
* Turn it in through **Canvas**

GITHUB REVIEW

* The right workflow for this class:

1. Clone the course github repo (*ONLY ONCE*)

2. Each time you want updated content, use **git pull** inside that repo



TYPES

* Everything in python has a **type**

* >>> type([“w”,“h”,“a”,“t”])
  <class ‘list’>

* >>> type(5)
  <class ‘int’>

* >>> type(“lol”)
  <class ‘str’>

* >>> def func(): pass
  >>> type(func)
  <class ‘function’>

TYPES

* A **type** is a blueprint for an object
  * It can have functions (aka methods) *(like* .split() *with strings)*
  * It can have variables (aka class attributes)
* Each **instance** of a type can also have its own variables (aka data attributes)

TYPES

* A type can be called like a function:
  >>> some_instance = some_type()

* This is called **instantiation**, since it creates a new **instance** of the type

  * *You've already seen this! (dict(…))*

CLASSES

* You can create your own types!

* But when you do, they're called **classes** for some reason!

* What's the difference between classes and types? There is none! There are just two names to slightly confuse and infuriate you!

CLASSES

* You may never need to write a class

* But you will use classes other people have written ***ALL THE TIME***

* So you need to learn about classes

CLASSES

```
* class Line(object):
      def __init__(self, m, b):
          self.m = m
          self.b = b

      def compute(self, x):
          return self.m * x + self.b
```

CLASSES

class name

superclass

```
* class Line(object):
      def __init__(self, m, b):
          self.m = m
          self.b = b

      def compute(self, x):
          return self.m * x + self.b
```

initializer

method

CLASSES

```
* >>> my_line = Line(3.5, 0)
  >>> print(my_line.compute(12))
  >>> print(my_line.m)
```

VARIABLE SCOPE

```
* s = “some dumb string”
  def func():
      print(s)
  func()

* def func():
      s = “some dumb string”
  func()
  print(s)
```

VARIABLE SCOPE

```
* s = “some dumb string”
  def func():
      print(s)
  func()
```

RIGHT AND GOOD

```
* def func():
      s = “some dumb string”
  func()
  print(s)
```

WRONG AND BAD

VARIABLE SCOPE

* The **scope** of a variable is the set of places in your code where that variable is available

* Scope propagates **inward**, not **outward**:

  * Vars defined outside a function are available inside, but

  * Vars defined inside a function are NOT available outside

VARIABLE SCOPE

```
* s = “some dumb string”
  def func():
      print(s)
  func()
```

INWARD

```
* def func():
      s = “some dumb string”
  func()
  print(s)
```

OUTWARD

VARIABLE SCOPE

* What defines a scope?
  * Modules (files)
  * Functions
  * Classes (kinda but not totally!)

VARIABLE SCOPE

* How do we get variables from an “inner” scope to an “outer” one?

  * **Modules & Classes:** using the dot . *(e.g.* blah.stuff*)*

  * **Functions:** return

    * *what if i didn’t return it? lol it’s gone*

BYE