Programming Introduction

By Deborah R. Fowler

VSFX 160 / 705

Programming

Linux/Bash

Houdini

Programming != Math != Proceduralism

Programming == Problem Solving

KEY CONCEPTS

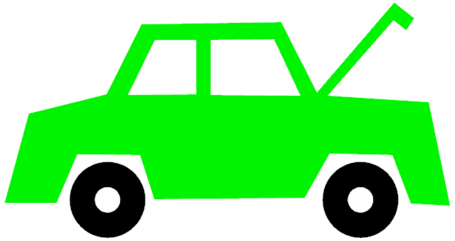
- variables
- truth statements
- looping
- functions
- I/O
- lists
- classes/objects
- OOP

Python

- interpreted
- “less” syntax
- all about format

How will we use it?

- IDLE on Windows
- Linux
- Tkinter/turtle
- Many libraries



Python Shell

How do I get one?

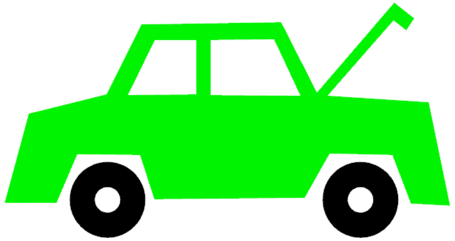
Version 3.X
On Windows:

Use IDLE (very basic interface or IDE – Integrated Developers Environment – Discuss)

At Home: Type IDLE in the start menu

At Monty: (if it is not in the start menu)

- right click any file with .py extension and select IDLE
- Even better – work on linux



On Linux:

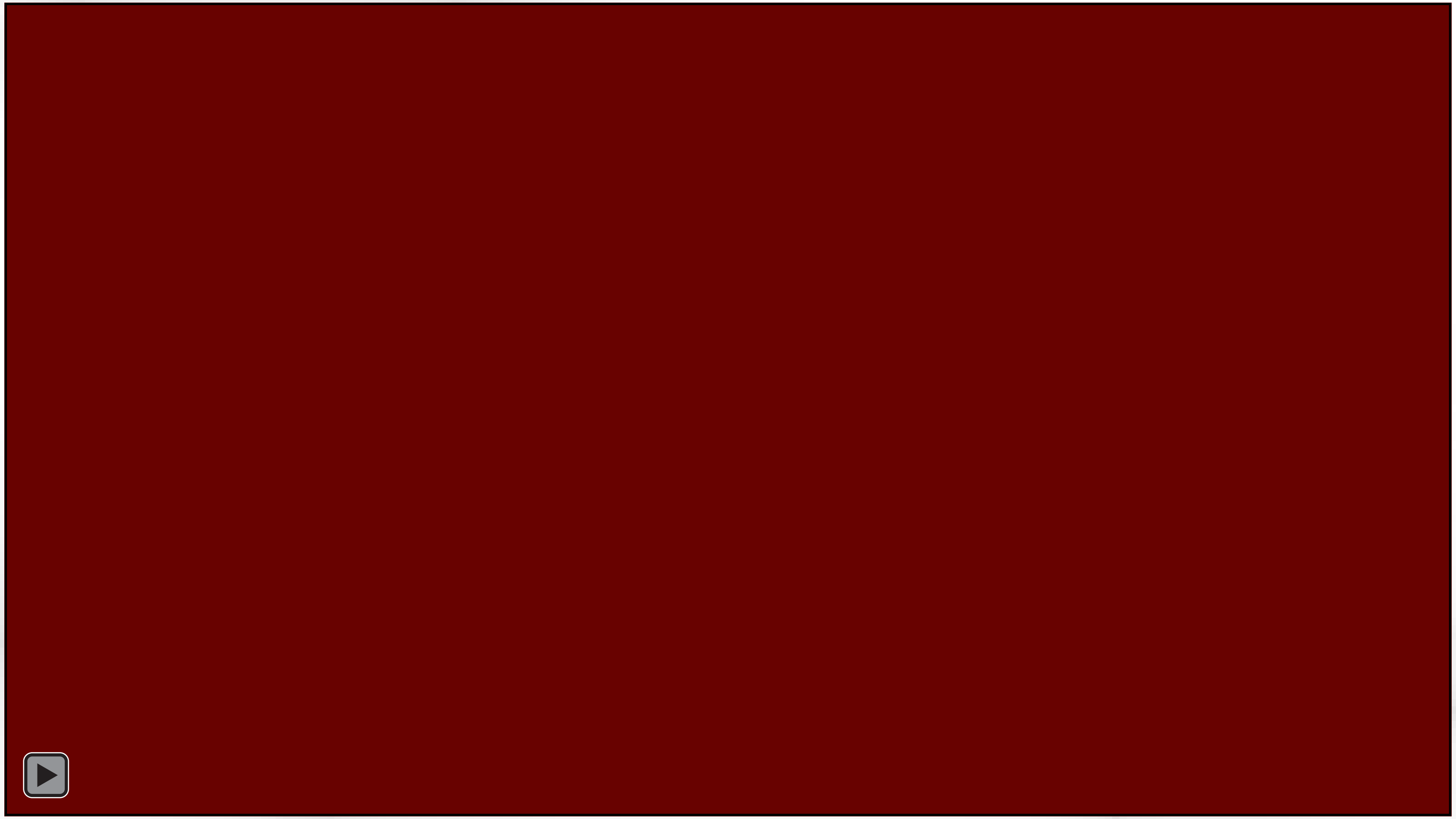
Type python

You can use a text editor like gedit or geany – idle is also available as well as pycharm

At home you might want to try sublime

To run a python program type
python filename.py

Introducing IDLE



We have introduced two concepts:

Variables and Operators

variables
for storing information

Python

```
x = 3
```

Operators

Most languages have built-in mathematical operations

+	addition
-	subtraction
*	multiplication
/	division (be careful with integers)
%	modulus (remainder on integer division)

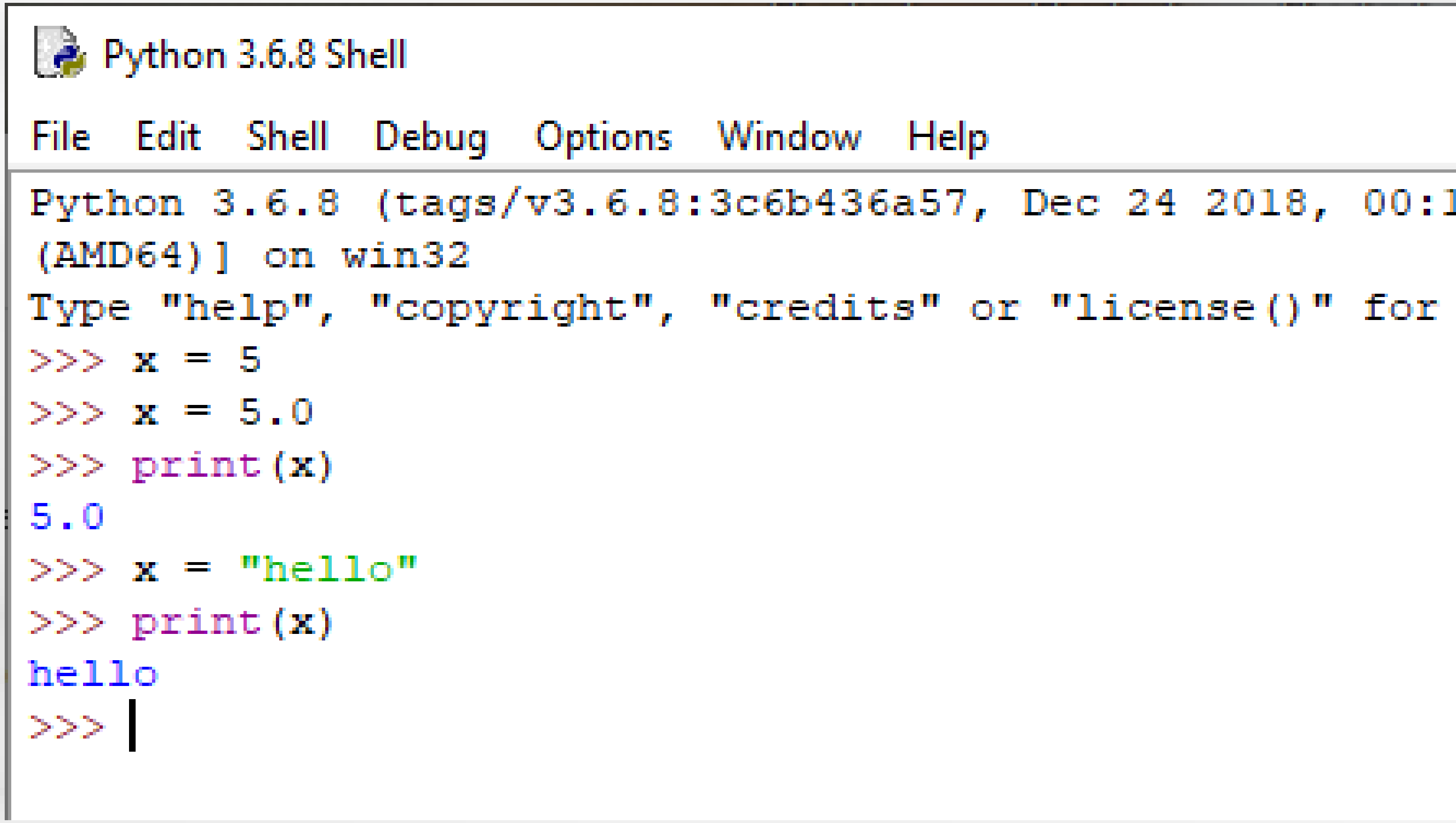
variables

variable literally means something that can change value

stores data – all kinds – names, numeric values, memory addresses etc.

in python they are not “typed” and do not need to be declared beforehand …

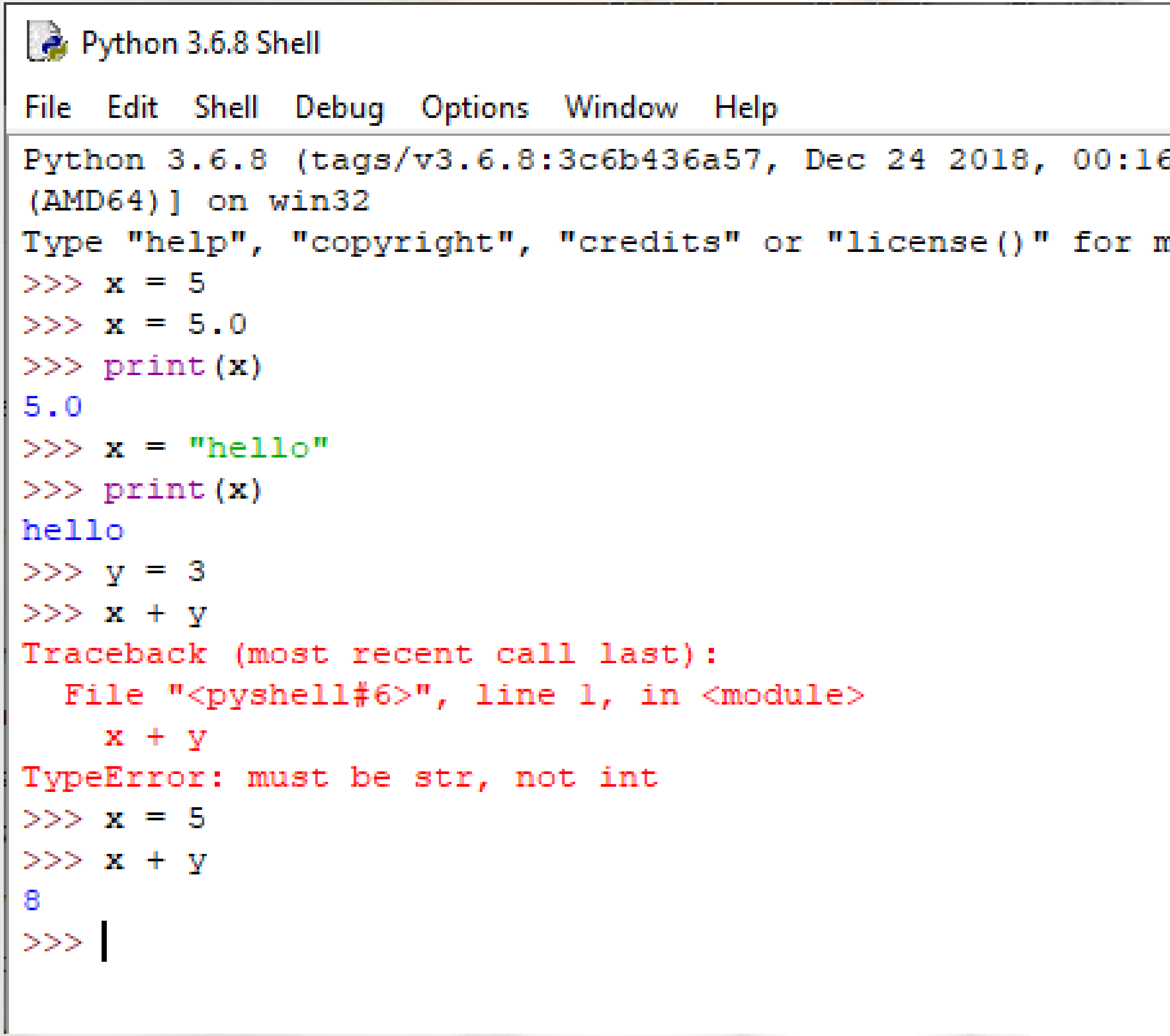
What does that mean in python?



```
Python 3.6.8 (tags/v3.6.8:3c6b436a57, Dec 24 2018, 00:1
(AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for
>>> x = 5
>>> x = 5.0
>>> print(x)
5.0
>>> x = "hello"
>>> print(x)
hello
>>> 
```

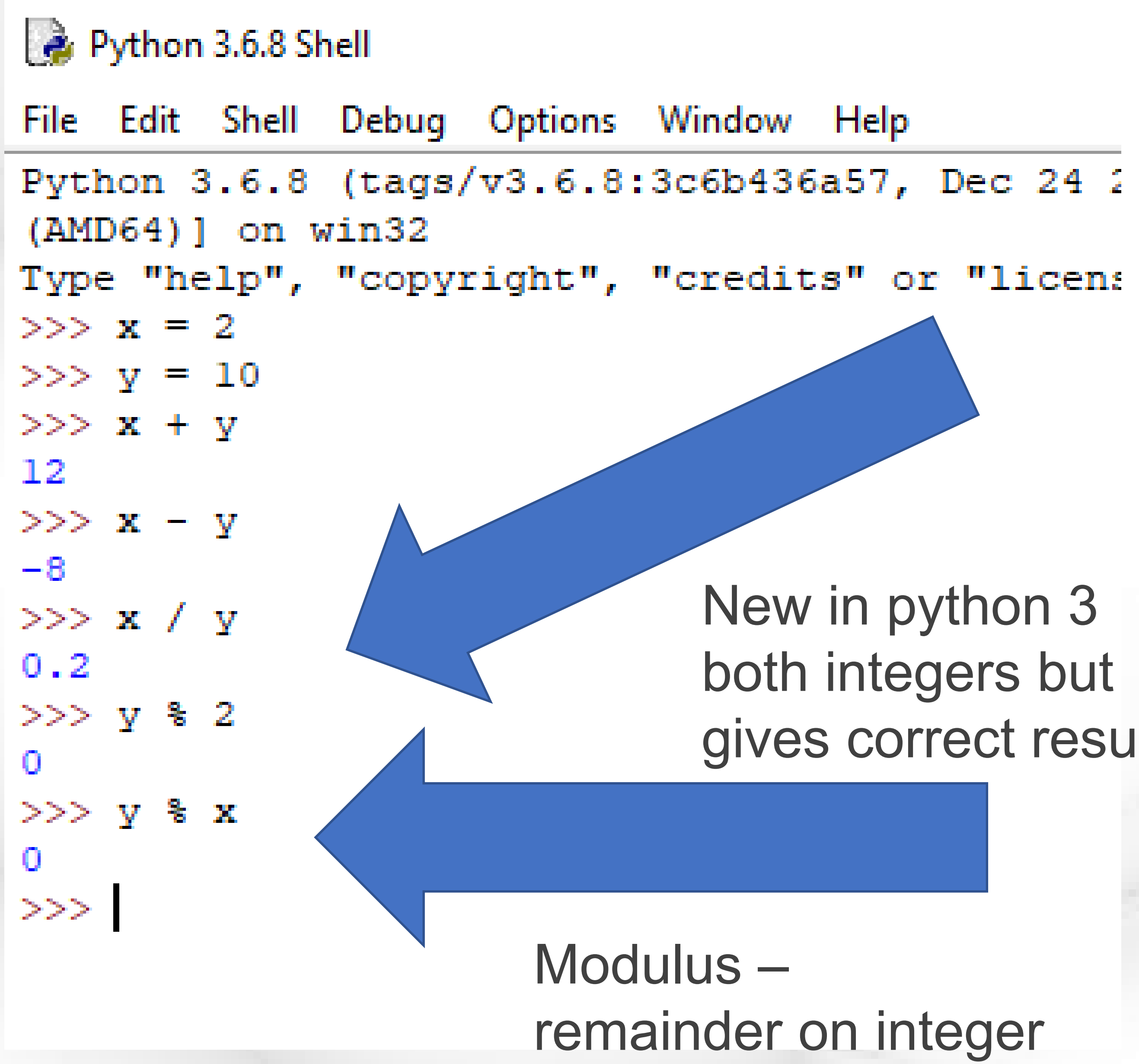
You still must know what you are doing:

x + y will not work if x is a string



```
Python 3.6.8 (tags/v3.6.8:3c6b436a57, Dec 24 2018, 00:16
(AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for m
>>> x = 5
>>> x = 5.0
>>> print(x)
5.0
>>> x = "hello"
>>> print(x)
hello
>>> y = 3
>>> x + y
Traceback (most recent call last):
  File "<pyshell#6>", line 1, in <module>
    x + y
TypeError: must be str, not int
>>> x = 5
>>> x + y
8
>>> 
```

Operator awareness



```
Python 3.6.8 (tags/v3.6.8:3c6b436a57, Dec 24 2
(AMD64)] on win32
Type "help", "copyright", "credits" or "licens
>>> x = 2
>>> y = 10
>>> x + y
12
>>> x - y
-8
>>> x / y
0.2
>>> y % 2
0
>>> y % x
0
>>> 
```

New in python 3 both integers but gives correct result

Modulus – remainder on integer division

Relational Operators

==	equals
!=	not equal
<	less than
>	greater than
>=	greater than or equal to
<=	less than or equal to

Truth statements

For selecting code

```
if condition:
        do something
```

truth statements – for selecting in Python

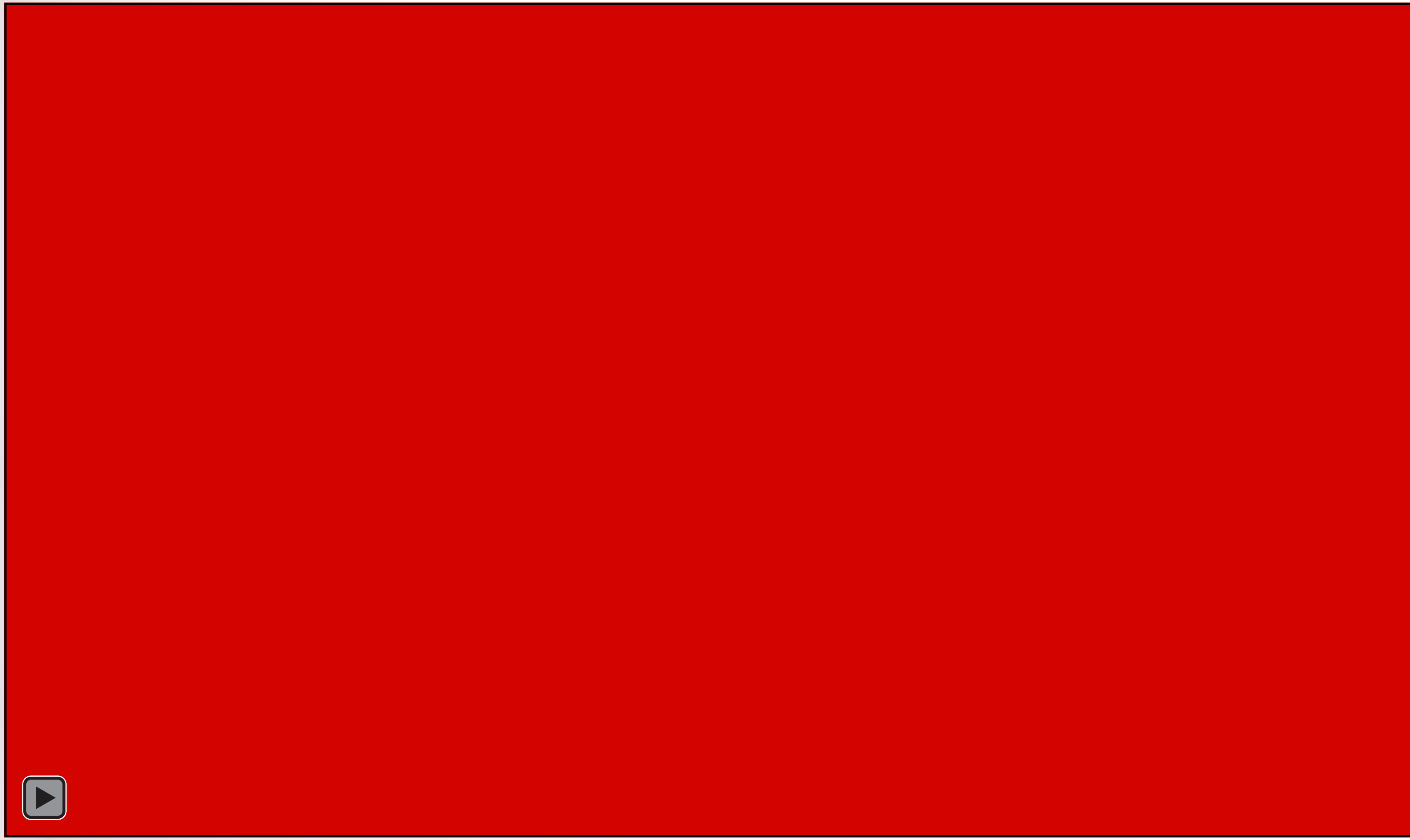
```
if x == 3:
        y = 1
else:
        y = 2
```

truth statements – add another line in else?

```
if x == 3:
        y = 1
else:
        y = 2
        x = 4
```

Test in IDLE

(don’t be fooled by the prompt when indenting)



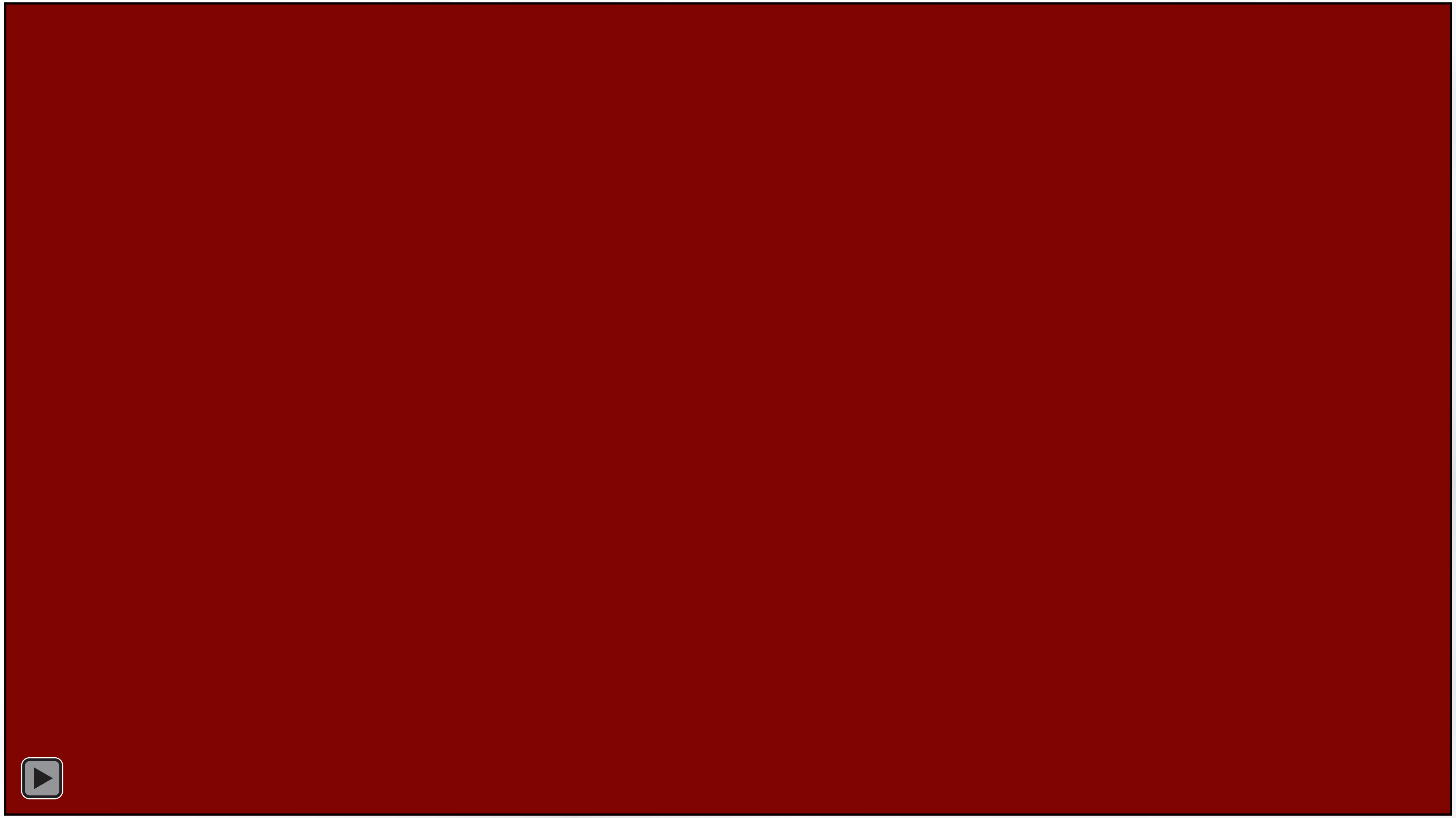
```
x = 4
if x == 3:
        y = 1
else:
        y = 2
```

NOTES to explain:

- Formatting delineates blocks
- python code is saved in a .py file
- IDLE is an interactive shell
- python is an interpreted language

Python file

test.py



IMPORTANT DISTINCTION between Python file versus an interactive python shell

File saves your work, you can run it again and again

Shell is temporary – interactive session. Goes away once you close the shell

Never be afraid/ashamed to look up syntax

Your brain is needed for problem solving, not for memorizing rules

As you use it daily, it will become familiar

in-class exercise:

Write a program that prints “Hello World” in a .py file in IDLE

KEY CONCEPTS

- ✓ variables
- ✓ truth statements
- looping
- functions
- I/O
- lists
- classes/objects
- OOP

homework:

http://deborahrfowler.com/

pointers to information

documentation/resources

exercise instructions