

# Programming Introduction

By Deborah R. Fowler



Programming

VSFX 160

Linux/Bash

Houdini



Programming  $\neq$  Math  $\neq$  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 3.8

On Windows:

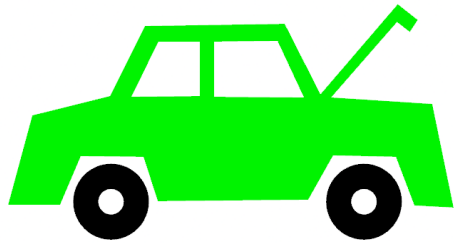
Use IDLE (very basic interface or IDE – Integrated Developers Environment – Discuss)

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

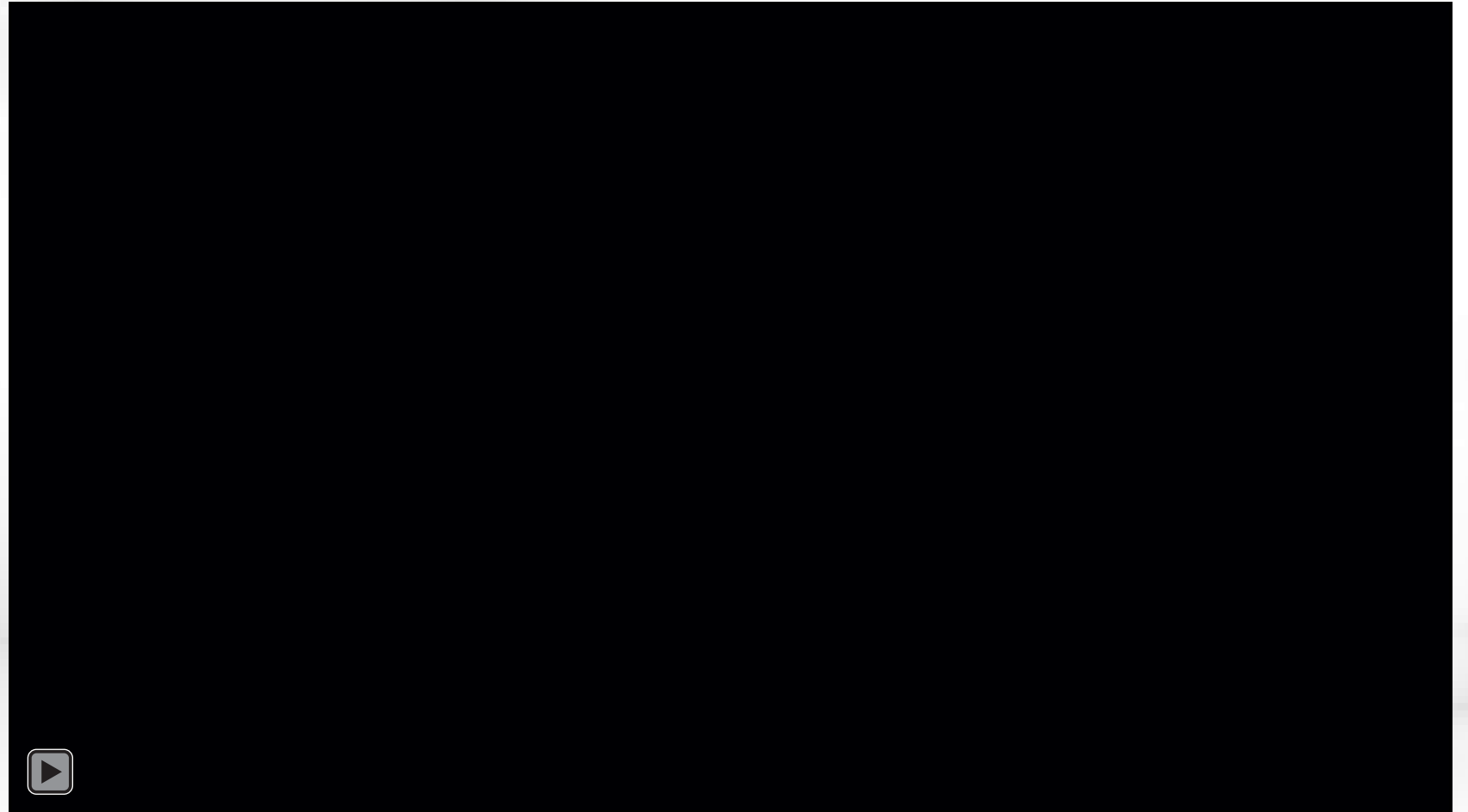
No official IDE is installed, you can use a text editor like gedit or geany

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)



variable literally means something that can change value



**variables**

**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 Shell
File Edit Shell Debug Options Window Help
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

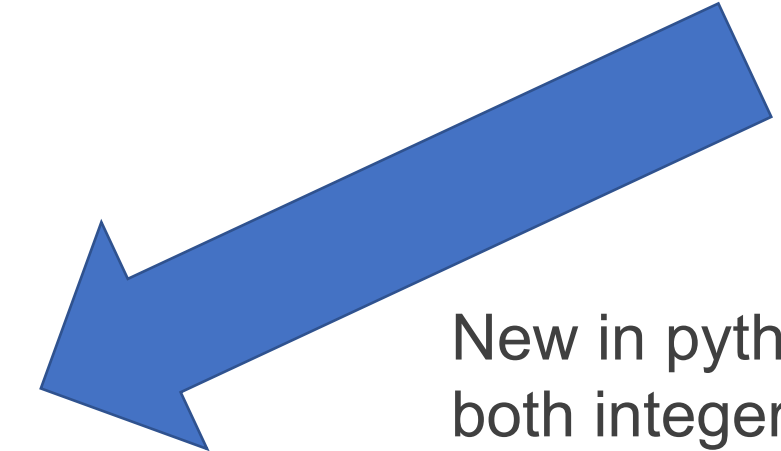
```
Python 3.6.8 Shell
File Edit Shell Debug Options Window Help
Python 3.6.8 (tags/v3.6.8:3c6b436a57, Dec 24 2018, 00:16
(AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for m
>>> x = 5
>>> x = 5.0
>>> print(x)
5.0
>>> x = "hello"
>>> print(x)
hello
>>> y = 3
>>> x + y
Traceback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



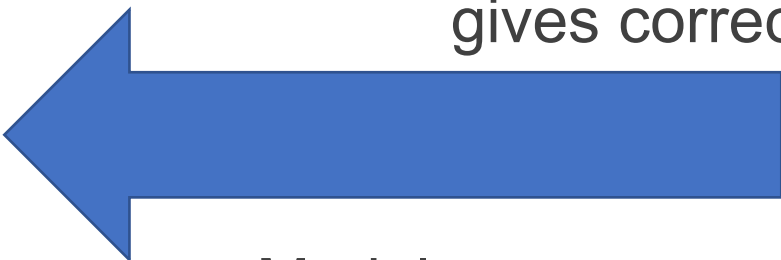


# Operator awareness

```
Python 3.6.8 Shell
File Edit Shell Debug Options Window Help
Python 3.6.8 (tags/v3.6.8:3c6b436a57, Dec 24 2019, 15:34:03) [AMD64] on win32
Type "help", "copyright", "credits" or "license()" for more
>>> 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