

## Week 1 - Summary

## Where Do You Start?

The ideal way to start coding is through web applications. Every application has a front-end and back-end.

Web applications are applications  
that are accessible over the internet



# Front-End of Applications

Front-end applications, which are visible on a web page are created via three languages:

- HTML
- CSS
- JavaScript

For example,

The boy kicks the red ball.

Boy

Noun

HTML: Functions as the noun of the web

Red

Adjective

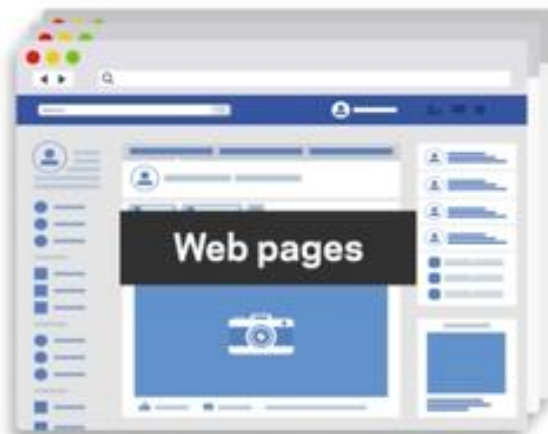
CSS: Controls the appearance of the webpage

Kicks

Verb

Javascript: Controls behavior/actions on a website

## Back-End of Applications



### Rules

Identify, organize,  
and display  
information from  
the database

Accept various  
languages like PHP,  
Python, Ruby,  
Java, and C



## Differences in Programming Languages

**PHP**

**echo "Hello World";**



**Hello World**

**Python**

**print("Hello World")**



**Hello World**

**Ruby**

**puts "Hello World"**



**Hello World**

Different programming languages use different code,  
but to generate the same output

# Evolution of Programming Languages (1/4)

## Example in Binary

Print "Winter is coming."

```

00000000 7f 45 4c 46 01 01 01 00 00 00 00 00 00 00 00 00 00 |.ELF.....|
00000010 02 00 03 00 01 00 00 00 80 80 04 08 34 00 00 00 |.....4..|
00000020 c8 00 00 00 00 00 00 00 34 00 20 00 02 00 28 00 |.....4....|
00000030 04 00 03 00 01 00 00 00 00 00 00 00 00 80 04 08 |.....|
00000040 00 80 04 08 9d 00 00 00 9d 00 00 00 05 00 00 00 |.....|
00000050 00 10 00 00 01 00 00 00 a0 00 00 00 a0 90 04 08 |.....|
00000060 a0 90 04 08 0e 00 00 00 0e 00 00 00 06 00 00 00 |.....|
00000070 00 10 00 00 00 00 00 00 00 00 00 00 00 00 00 00 |.....|
00000080 ba 0e 00 00 00 b9 a0 90 04 08 bb 01 00 00 00 b8 |.....|
00000090 04 00 00 00 cd 80 b8 01 00 00 00 cd 80 00 00 00 |.....|
000000a0 57 69 6e 74 65 72 20 69 73 20 63 6f 6d 69 6e 67 |Winter is coming|
000000b0 73 68 73 74 72 74 61 62 00 2e 74 65 78 74 00 2e |shstrtab..text...|
000000c0 64 61 74 61 00 00 00 00 00 00 00 00 00 00 00 00 |data.....|
000000d0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 |.....|
.
000000f0 0b 00 00 00 01 00 00 00 06 00 00 00 80 80 04 08 |.....|
00000100 80 00 00 00 1d 00 00 00 00 00 00 00 00 00 00 00 |.....|
00000110 10 00 00 00 00 00 00 00 11 00 00 00 01 00 00 00 |.....|
00000120 03 00 00 00 a0 90 04 08 a0 00 00 00 0e 00 00 00 |.....|
00000130 00 00 00 00 00 00 00 00 04 00 00 00 00 00 00 00 |.....|
00000140 01 00 00 00 03 00 00 00 00 00 00 00 00 00 00 00 |.....|
00000150 ae 00 00 00 17 00 00 00 00 00 00 00 00 00 00 00 |.....|
00000160 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 |.....|

```

## Evolution of Programming Languages (2/4)

### Example in Assembly

Print "Winter is coming."

```
section .text
    global _start

_start:

    mov edx, len
    mov ecx, msg
    mov ebx, 1
    mov eax, 4
    int 0x80

    mov eax, 1
    int 0x80

section .data
msg db 'Winter is coming.' ,0xa
len equ $ - msg
```

# Evolution of Programming Languages (3/4)

## Example in Java

Print "Winter is coming."

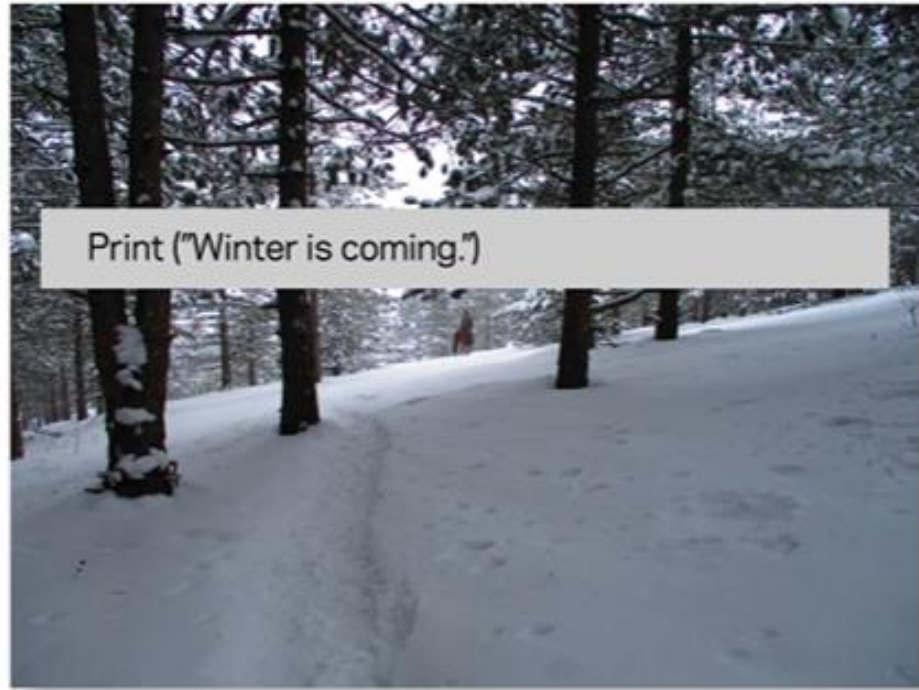
```
Public class HelloWorld {  
    public static void main (string[] args) {  
        System.out.println("Winter is coming.");  
    }  
}
```



# Evolution of Programming Languages (4/54)

## Example in Python

Print "Winter is coming."



## Python: Some Facts (1/2)

- Python is a high-level programming language
- Guido Van Rossum created a white paper using Python codes in 1991
- Google hired the person who invented Python and, as a result, anyone who wanted to learn Python joined Google

Random fact:

Python is named after Monty Python, the comedy troupe, not the snake

## Python: Some Facts (2/2)

Almost all the companies  
use Python

Python is useful for people in  
business-oriented roles, not  
just for developers



# Characteristics of Python

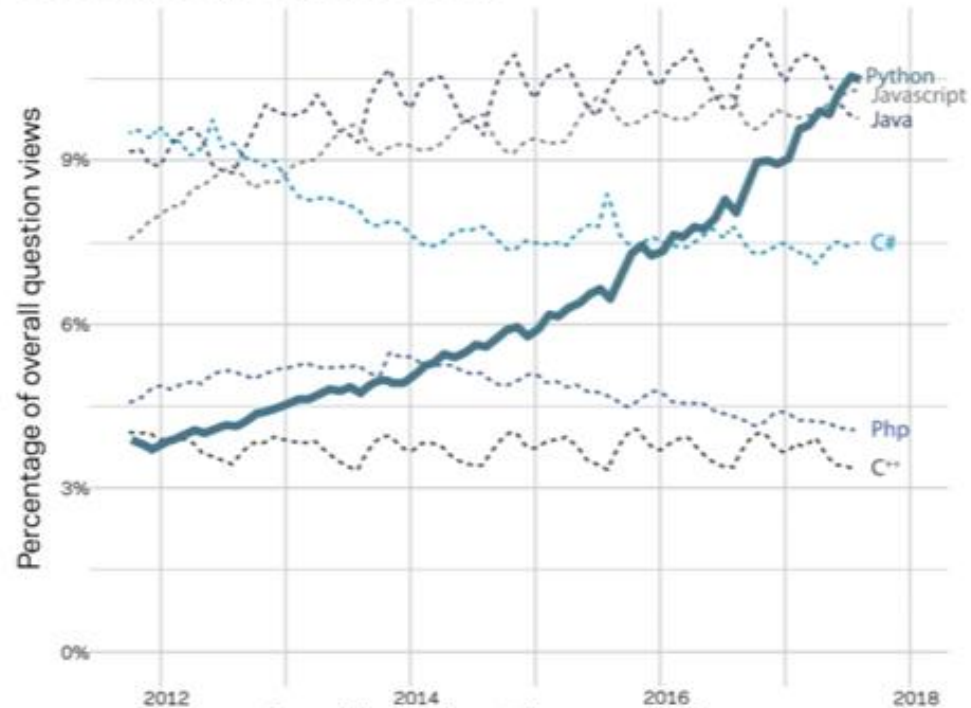
## Reasons for Python's adoption:

- Simple to use
- Suitable for beginners
- Powerful as compared to other languages

# Popularity of Python Over the Years

## Growth of major programming languages

Based on Stack Overflow question views



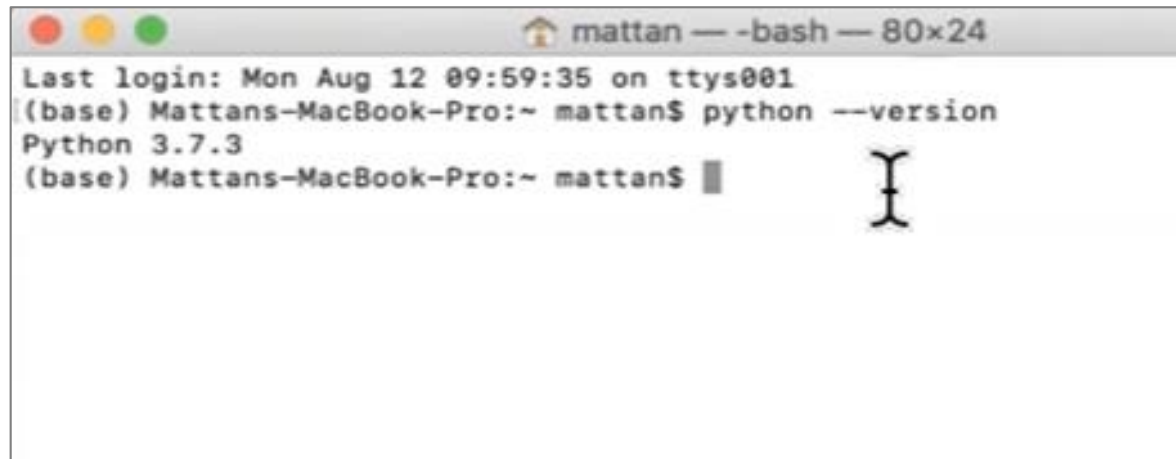
## Things You Need to Get Started

1. Text editor called Atom
2. Python, download using Anaconda's Downloader
3. The command line is referred to as the terminal on a Mac, and on Windows, the Powershell command line



## The Command Line

- If you have an older version of Python, make sure to have all the functionalities of 3.7.3 to be able to perform all the coding in this course.
- Some codes can be case-sensitive.

A screenshot of a macOS terminal window. The title bar shows a home icon, the name 'mattan', and the shell '-bash' with a window size of '80x24'. The terminal text shows a login message: 'Last login: Mon Aug 12 09:59:35 on ttys001'. Below that, the prompt '(base) Mattans-MacBook-Pro:~ mattan\$' is followed by the command 'python --version'. The output is 'Python 3.7.3'. The prompt is repeated, followed by a cursor icon.

```
mattan — -bash — 80x24
Last login: Mon Aug 12 09:59:35 on ttys001
(base) Mattans-MacBook-Pro:~ mattan$ python --version
Python 3.7.3
(base) Mattans-MacBook-Pro:~ mattan$ █
```

It is important to understand the command line to run Python codes.

## The Command Line: Helpful Codes

*pwd*

returns current location on the computer

*open .  
(on Mac)*

opens current folder

*start .  
(on Windows)*

*ls*

lists the content of the current folder

*cd <location>*

allows to navigate within the computer (folder name is case sensitive)

*cd ..*

moves one level outside the current folder



## Python Interactive Mode

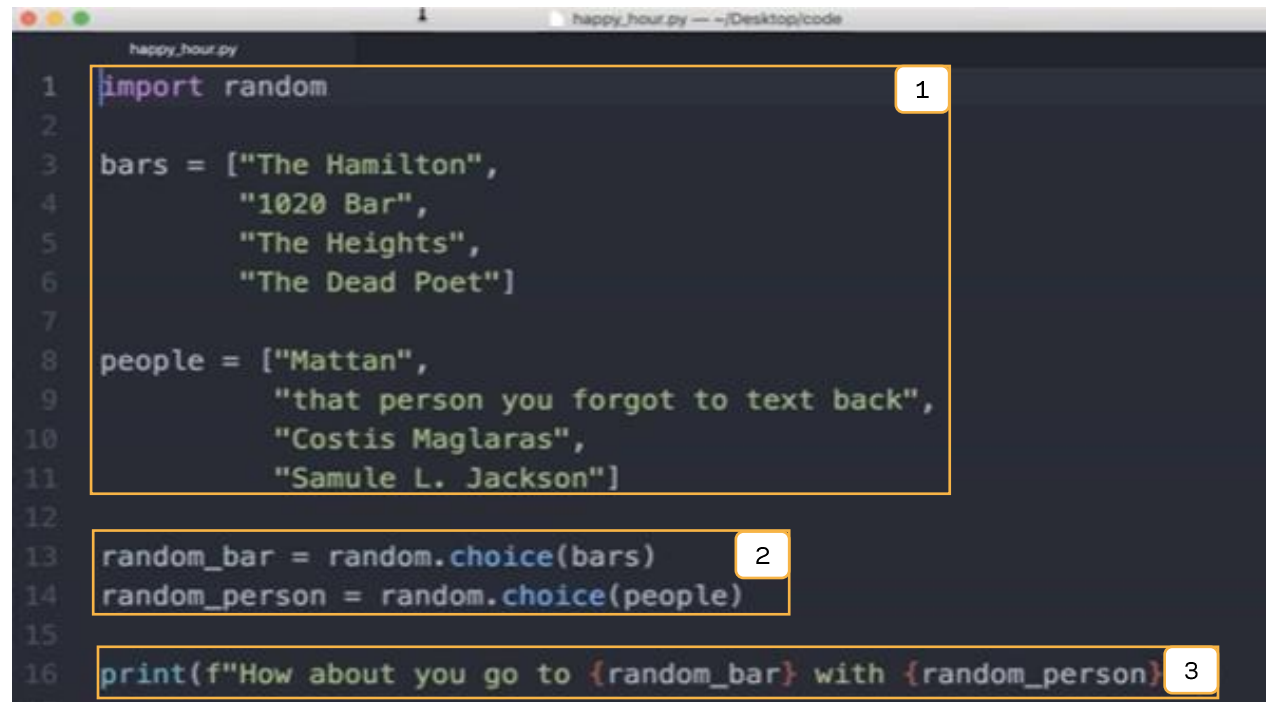
To exit, type exit in parentheses followed by Enter; or Control D on a Mac; or Control Z and Enter on a Windows.



## Reading Code

Open the .py file with Atom

1. Top line
2. Middle line
3. Bottom line



```
happy_hour.py
1 import random
2
3 bars = ["The Hamilton",
4         "1020 Bar",
5         "The Heights",
6         "The Dead Poet"]
7
8 people = ["Mattan",
9           "that person you forgot to text back",
10          "Costis Maglaras",
11          "Samule L. Jackson"]
12
13 random_bar = random.choice(bars)
14 random_person = random.choice(people)
15
16 print(f"How about you go to {random_bar} with {random_person}")
```

## Saving Your Code

Select 'File' and then 'Save' OR

Command+S (on Mac)

Ctrl+S (on Windows)

Save the code every time you make a change. The blue dot next to the filename prompts you to save and disappears once you have saved the code.



```
happy_hour.py
1 import random
2
3 bars = ["The Hamilton",
4         "1020 Bar",
5         "The Heights",
6         "The Dead Poet"]
7
```

## Clearing The Screen

Windows

Type *clear* and hit Enter

Mac

Press Command+K



## Two Ways to Run Python Code

### First

1. Open Command Line
2. Type python <filename>
3. Select Enter

### Second

1. Open Python Interactive Mode\*
2. Type python and select Enter
3. Enter the python code next to the ">>>"
4. Select Enter

*\*Command line commands won't work in this mode.*

## Printing

Python 2

```
print "Winter is coming"
```

Python 3  
(uses parentheses)

```
print("Winter is coming")
```



## Reading Errors

- Break down the error message line by line
- Search for the error message on the internet
- Stackoverflow.com can be very helpful

Reference links:

- [How do I ask a good question](#)
- [How to create a Minimal, Reproducible Example](#)



## Commenting (1/3)

Add a '#' before or after any line of code in Python, this will comment the code and it won't get run by Python.

Select the lines you want to comment and hit Command+? Or / on a Mac and Ctrl+/ on Windows





## Commenting (2/3)

Example of result after commenting the lines:

```
(base) Mattans-MacBook-Pro:code mattan$ python print.py
since feeling is first
who pays any attention
to the syntax of things
will never wholly kiss you;
wholly to be a fool
while Spring is in the world

we are for each other: then
laugh, leaning back in my arms
for life's not a paragraph

and death i think is no parenthesis
(base) Mattans-MacBook-Pro:code mattan$
```

```
print.py
1  # "Since feeling is first" by E. E. Cummi
2  print("since feeling is first")
3  print("who pays any attention")
4  print("to the syntax of things")
5  print("will never wholly kiss you;")
6  print("wholly to be a fool")
7  print("while Spring is in the world")
8  print()
9  # print("my blood approves")
10 # print("and kisses are a better fate")
11 # print("than wisdom")
12 # print("lady i swear by all flowers. Don
13 # print("—the best gesture of my brain is
14 # print("your eyelids' flutter which says
15 print()
16 print("we are for each other: then")
17 print("laugh, leaning back in my arms")
18 print("for life's not a paragraph")
```

## Commenting (2/2)

Example of result after uncommenting lines:

```
(base) Mattans-MacBook-Pro:code mattan$ python print.py
since feeling is first
who pays any attention
to the syntax of things
will never wholly kiss you;
wholly to be a fool
while Spring is in the world

we are for each other: then
laugh, leaning back in my arms
for life's not a paragraph

and death i think is no parenthesis
(base) Mattans-MacBook-Pro:code mattan$ python print.py
since feeling is first
who pays any attention
to the syntax of things
will never wholly kiss you;
wholly to be a fool
while Spring is in the world

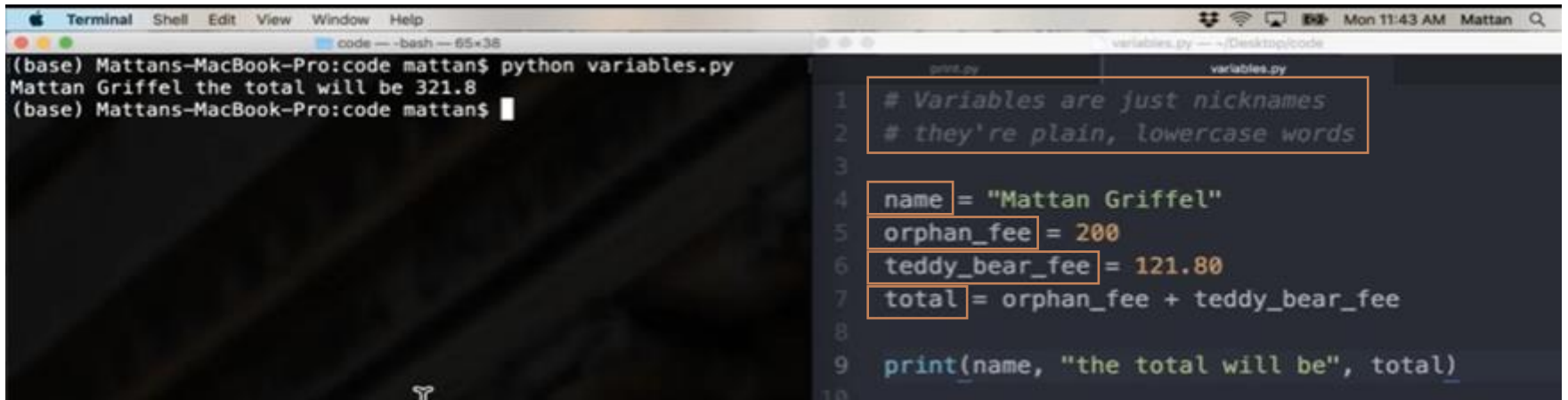
my blood approves
and kisses are a better fate
than wisdom
lady i swear by all flowers. Don't cry
—the best gesture of my brain is less than
your eyelids' flutter which says

we are for each other: then
laugh, leaning back in my arms
for life's not a paragraph

and death i think is no parenthesis
(base) Mattans-MacBook-Pro:code mattan$
```

```
print.py
1 # "Since feeling is first" by E. E. Cummings
2 print("since feeling is first")
3 print("who pays any attention")
4 print("to the syntax of things")
5 print("will never wholly kiss you;")
6 print("wholly to be a fool")
7 print("while Spring is in the world")
8 print()
9 print("my blood approves")
10 print("and kisses are a better fate")
11 print("than wisdom")
12 print("lady i swear by all flowers. Don't cry")
13 print("—the best gesture of my brain is less than")
14 print("your eyelids' flutter which says")
15 print()
16 print("we are for each other: then")
17 print("laugh, leaning back in my arms")
18 print("for life's not a paragraph")
19 print()
20 print("and death i think is no parenthesis")
21
```

# Variables and Printing Undefined Variables

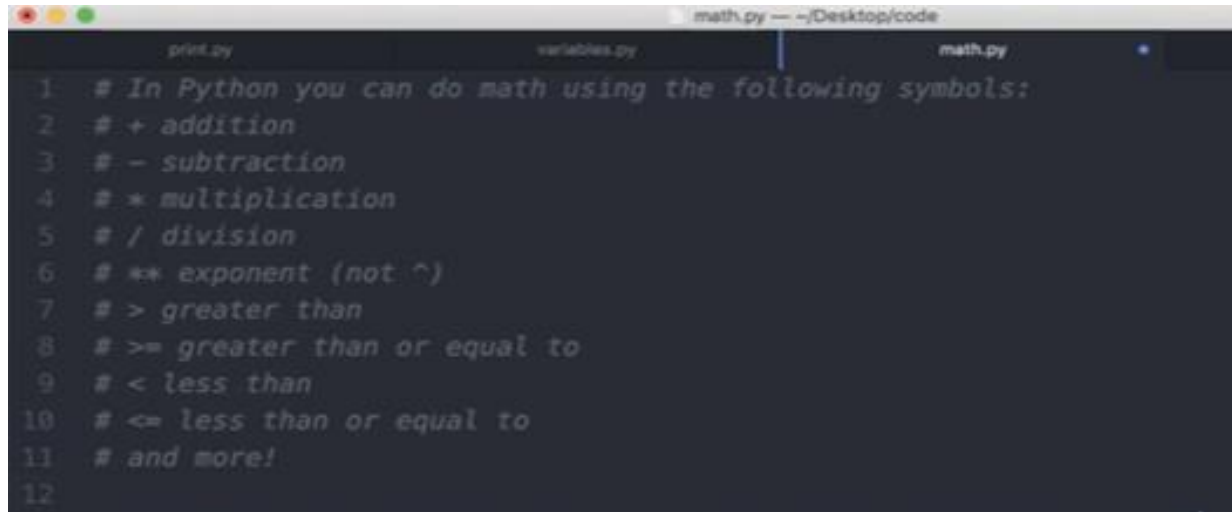


The screenshot shows a Mac desktop with a terminal window and a code editor. The terminal window on the left shows the command `python variables.py` being executed, resulting in the output `Mattan Griffel the total will be 321.8`. The code editor on the right shows the contents of `variables.py`, which includes comments and variable assignments. The variables `name`, `orphan_fee`, `teddy_bear_fee`, and `total` are highlighted with orange boxes. The `total` variable is calculated as the sum of `orphan_fee` and `teddy_bear_fee`. The `print` statement at the end of the script uses these variables to produce the output seen in the terminal.

```
Terminal Shell Edit View Window Help
(base) Mattans-MacBook-Pro:code mattan$ python variables.py
Mattan Griffel the total will be 321.8
(base) Mattans-MacBook-Pro:code mattan$

variables.py
1 # Variables are just nicknames
2 # they're plain, lowercase words
3
4 name = "Mattan Griffel"
5 orphan_fee = 200
6 teddy_bear_fee = 121.80
7 total = orphan_fee + teddy_bear_fee
8
9 print(name, "the total will be", total)
10
```

## Math Symbols



```
1 # In Python you can do math using the following symbols:
2 # + addition
3 # - subtraction
4 # * multiplication
5 # / division
6 # ** exponent (not ^)
7 # > greater than
8 # >= greater than or equal to
9 # < less than
10 # <= less than or equal to
11 # and more!
12
```

## Integers and Floats

- Integers are whole numbers and floats are basically decimals
- In Python 3, when you divide any two numbers the result is always a float
- In Python 2, you'd always get back an integer



## Strings and Text

Strings are text surrounded by quotes, both single (") and double (") can be used

Two ways of dealing with quotes in strings:

1. Switch to single quotes if the string uses double quotes
2. Use \ to escape quotes inside strings

You can run string functions directly on a string or on a variable with a string inside of it by putting a period after the string and then writing the function name with parentheses after it. For example, `kanye_quote.upper()`