Motion Capture and Future Interaction Technology Research

Fundamental Structures of Python Programming: Part A

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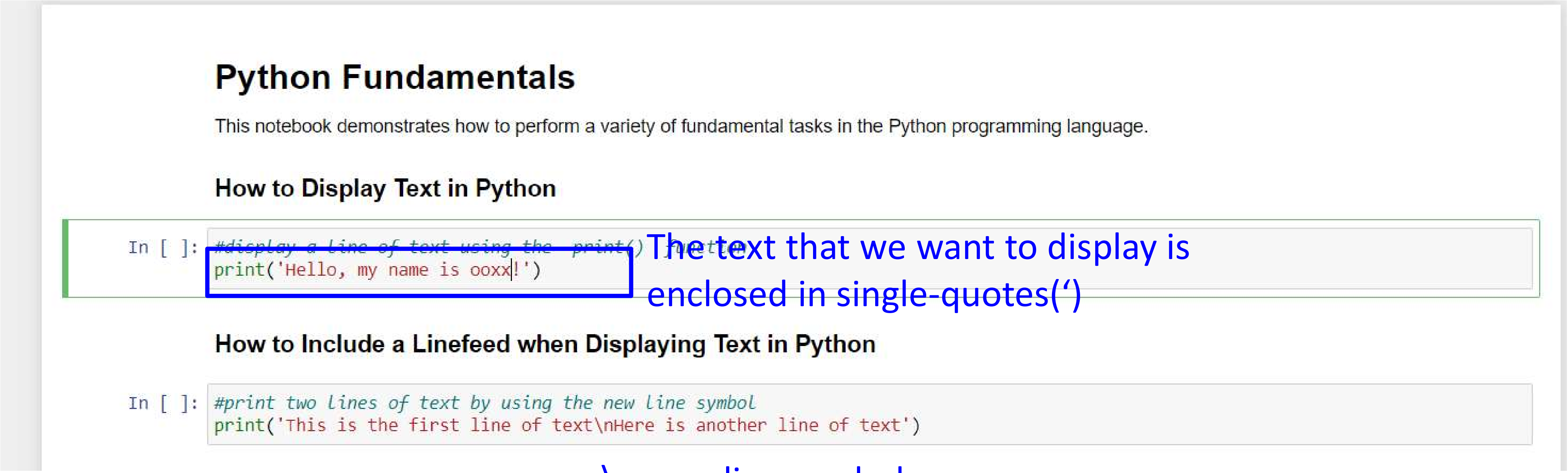
Outline

- How to display text
- Variables
- Operators
- If-else structure
- Lists

How To Display Text in Python



Python Fundamentals

This notebook demonstrates how to perform a variety of fundamental tasks in the Python programming language.

How to Display Text in Python

```
In [ ]: #display a line of text using the  print() function
        print('Hello, my name is ooxx!')
```

The text that we want to display is enclosed in single-quotes(‘)

How to Include a Linefeed when Displaying Text in Python

```
In [ ]: #print two lines of text by using the new line symbol
        print('This is the first line of text\nHere is another line of text')
```

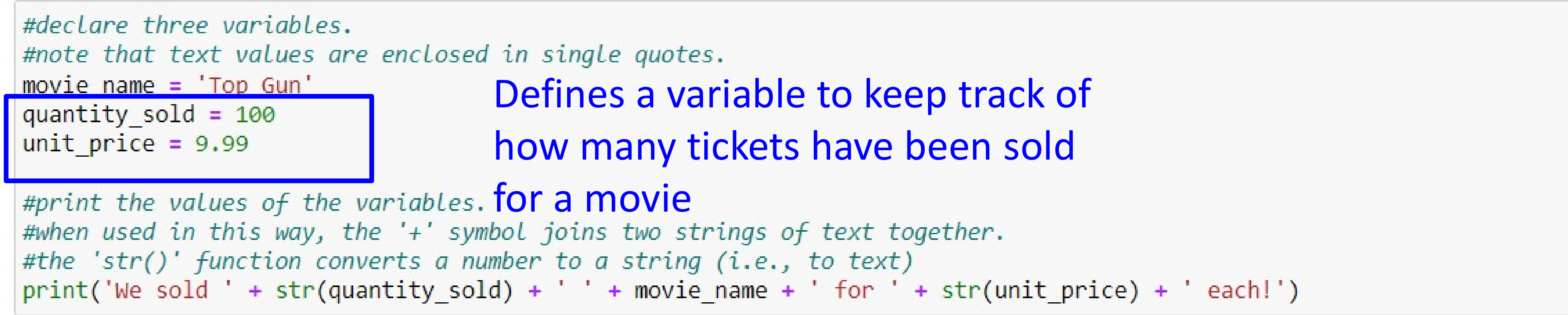
\n new line symbol

#Comments are for human use only – python will ignore them

VARIABLES in Python

- A variable is a **named storage** location in the computer memory.
  - Each variable has a name and a value
  - The value of a variable can be changed
  - A variable can hold data of any type, such as text, integers, or floats

To create a new variable in Python



```
#declare three variables.
#note that text values are enclosed in single quotes.
movie_name = 'Top Gun'
quantity_sold = 100
unit_price = 9.99

#print the values of the variables.
#when used in this way, the '+' symbol joins two strings of text together.
#the 'str()' function converts a number to a string (i.e., to text)
print('We sold ' + str(quantity_sold) + ' ' + movie_name + ' for ' + str(unit_price) + ' each!')
```

Defines a variable to keep track of how many tickets have been sold for a movie

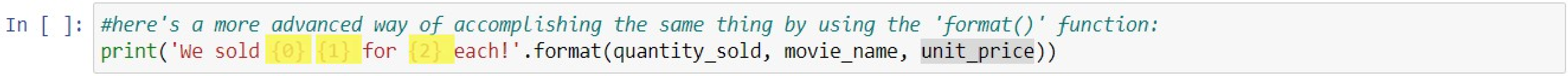
That is,
“unit_price = 9.99” means “set a variable named unit_price equal to the value 9.99”

Note that when used in this way, the “+” symbol joins two string of text together.

Also note that the ‘str()’ function is being used to convert numbers to strings.

VARIABLES in Python

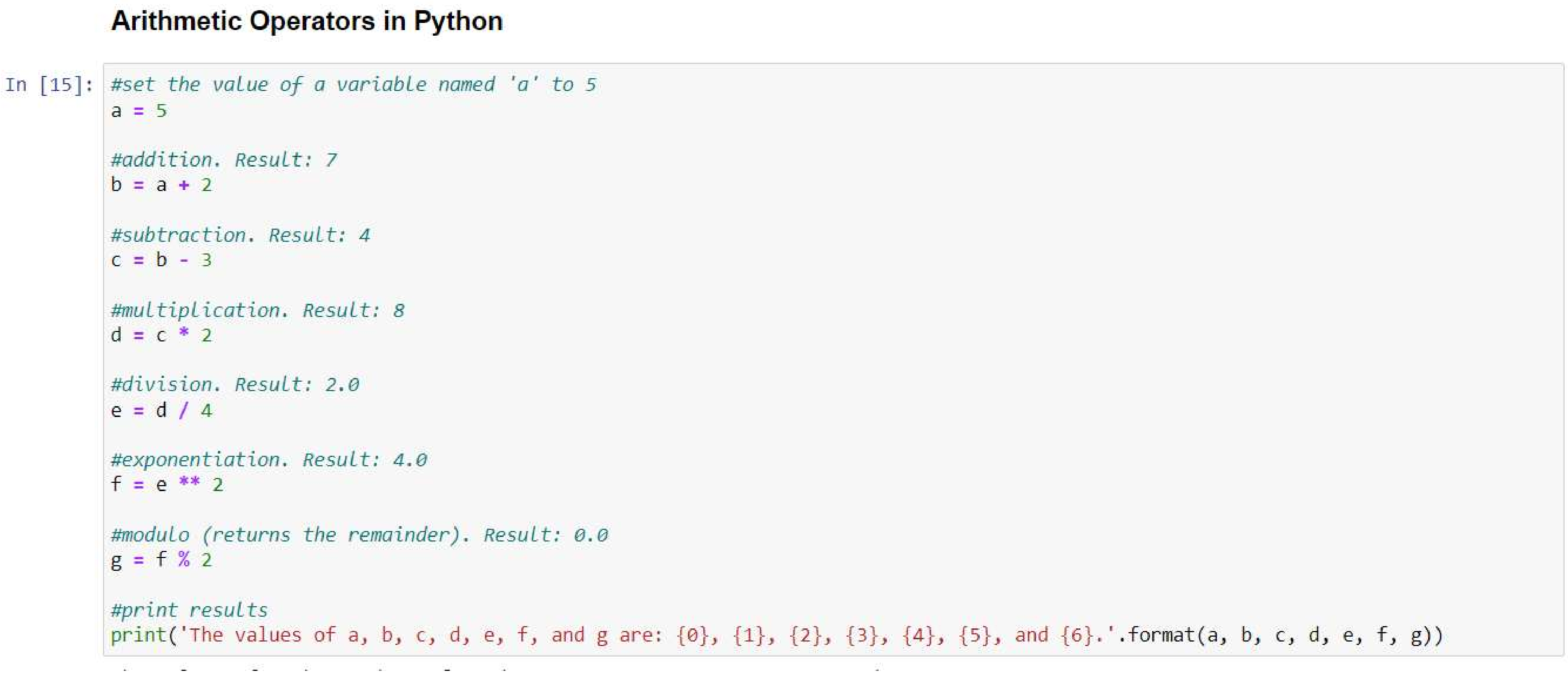
format() function



```
In [ ]: #here's a more advanced way of accomplishing the same thing by using the 'format()' function:
        print('We sold {0} {1} for {2} each!'.format(quantity_sold, movie_name, unit_price))
```

🟨 placeholders

Operators in Python



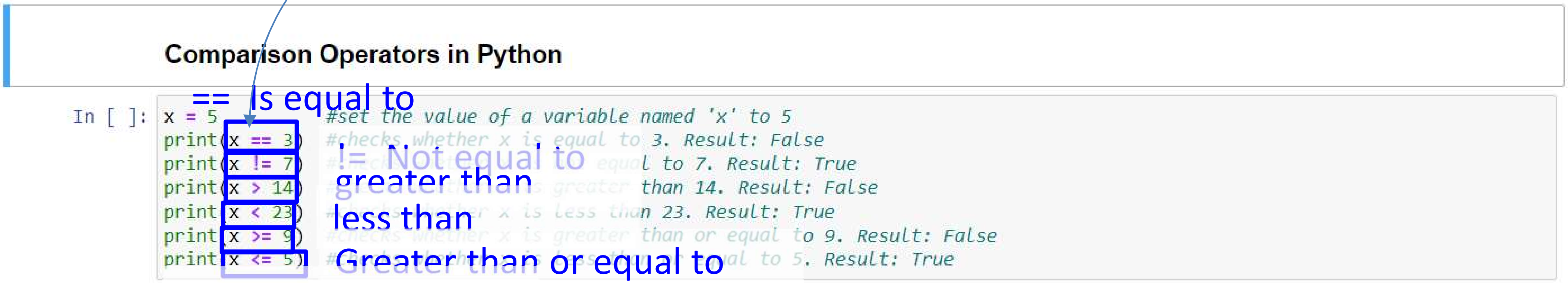
Arithmetic Operators in Python

In [15]:
```
#set the value of a variable named 'a' to 5
a = 5

#addition. Result: 7
b = a + 2

#subtraction. Result: 4
c = b - 3

#multiplication. Result: 8
d = c * 2

#division. Result: 2.0
e = d / 4

#exponentiation. Result: 4.0
f = e ** 2

#modulo (returns the remainder). Result: 0.0
g = f % 2

#print results
print('The values of a, b, c, d, e, f, and g are: {0}, {1}, {2}, {3}, {4}, {5}, and {6}.'.format(a, b, c, d, e, f, g))
```

Operators in Python

Comparison operators compare two different values and tell us if the relationship is true

Note that this is very different from one equal sign, = set equal to



Comparison Operators in Python

```
In [ ]: x = 5        #set the value of a variable named 'x' to 5
        print(x == 3)  #checks whether x is equal to 3. Result: False
        print(x != 7)  #checks whether x is not equal to 7. Result: True
        print(x > 14)  #checks whether x is greater than 14. Result: False
        print(x < 23)  #checks whether x is less than 23. Result: True
        print(x >= 9)  #checks whether x is greater than or equal to 9. Result: False
        print(x <= 5)  #checks whether x is less than or equal to 5. Result: True
```

== Is equal to

!= Not equal to

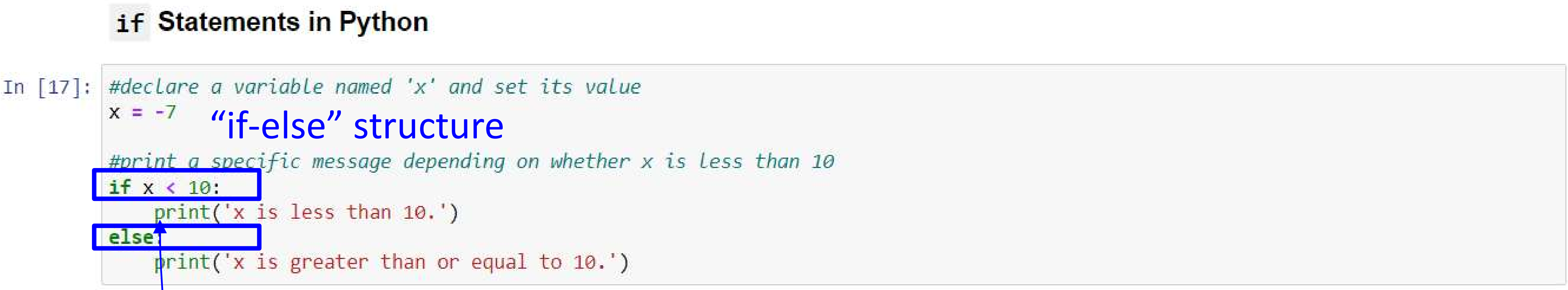
greater than

less than

Greater than or equal to

less than or equal to

if Structure in Python



`if` Statements in Python

```
In [17]: #declare a variable named 'x' and set its value
         x = -7

         #print a specific message depending on whether x is less than 10
         if x < 10:
             print('x is less than 10.')
         else:
             print('x is greater than or equal to 10.')
```

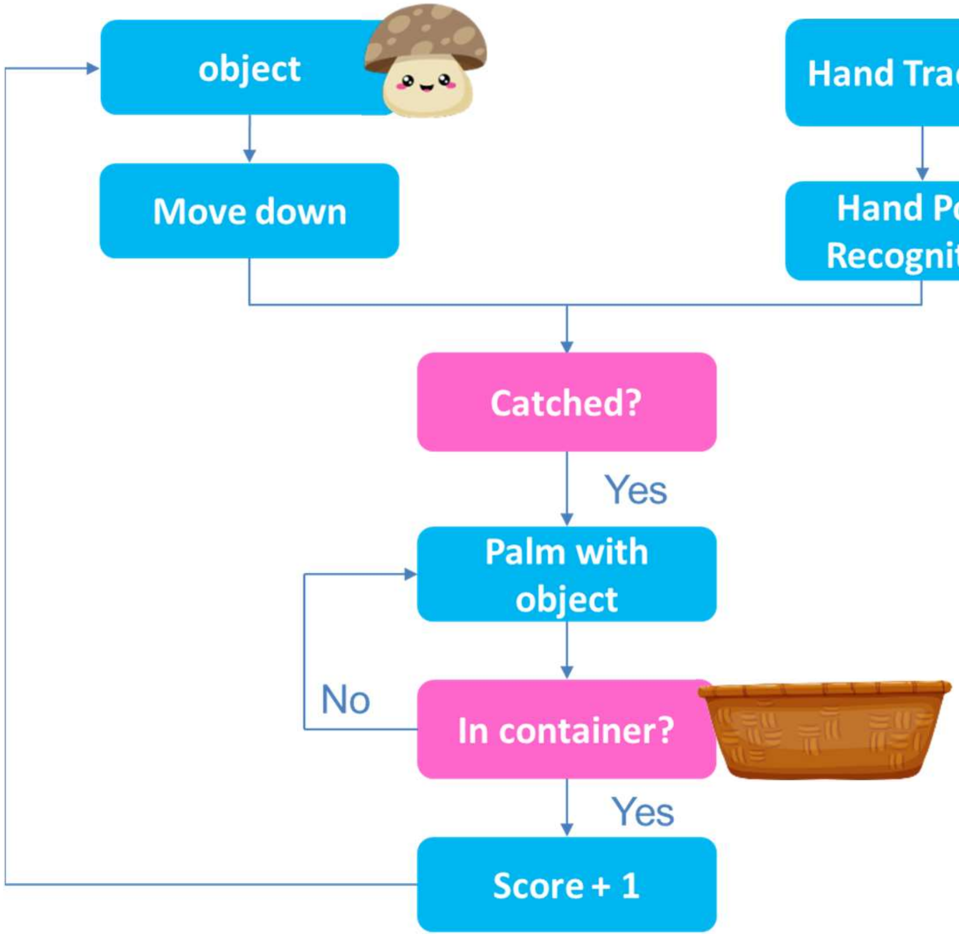
“if-else” structure

Note that the next line is indented.

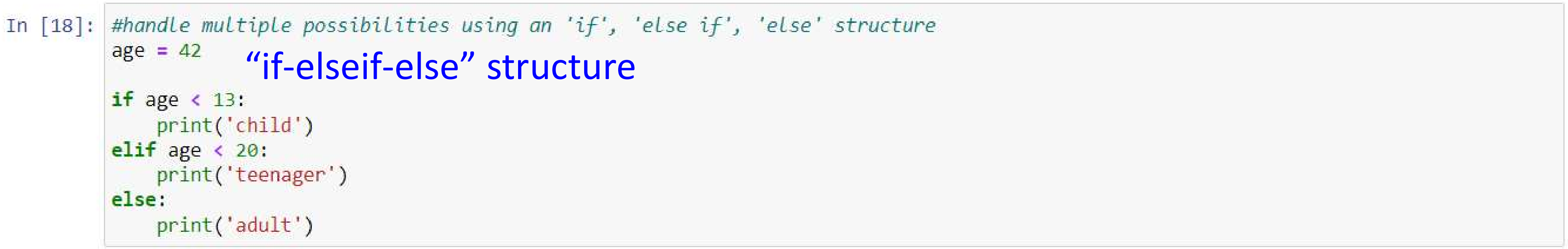
Any indented lines appearing after the “if” statement will be run if the condition is true.

The next line of code begins with “else” followed by a colon. Here we’re telling Python that we want it to do something else if condition is not true.

Class Work: Add a countdown timer to this game



if Structure in Python



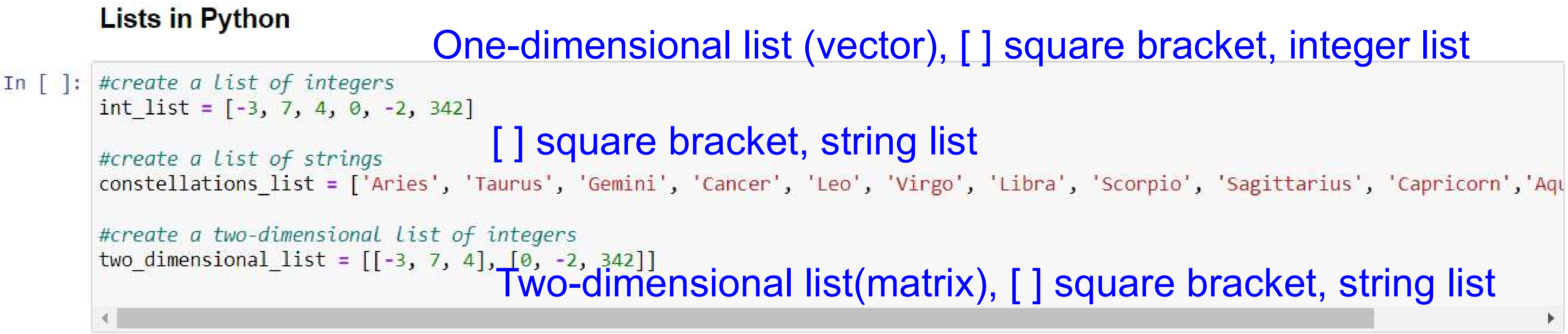
In [18]:

```python
#handle multiple possibilities using an 'if', 'else if', 'else' structure
age = 42

if age < 13:
    print('child')
elif age < 20:
    print('teenager')
else:
    print('adult')
```

“if-elseif-else” structure

LIST in Python

- A list is a named collection of items
- The items in a list can be anything – numbers, text, variables, objects, and even other list!
  - A list whose items are other lists is called a multidimensional list



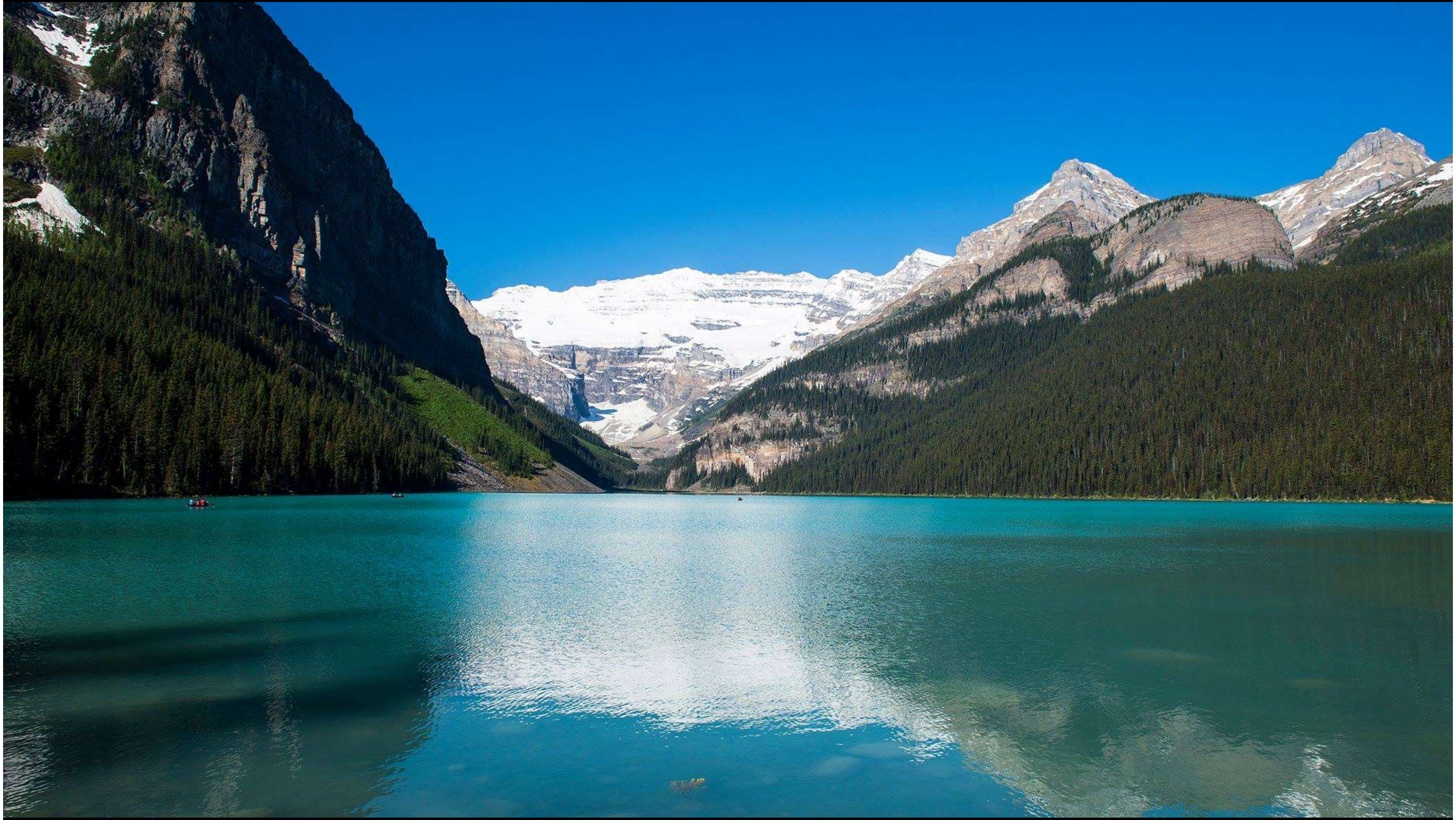
Lists in Python

One-dimensional list (vector), [ ] square bracket, integer list

```
In [ ]: #create a list of integers
        int_list = [-3, 7, 4, 0, -2, 342]

        #create a list of strings
        constellations_list = ['Aries', 'Taurus', 'Gemini', 'Cancer', 'Leo', 'Virgo', 'Libra', 'Scorpio', 'Sagittarius', 'Capricorn','Aqu

        #create a two-dimensional list of integers
        two_dimensional_list = [[-3, 7, 4], [0, -2, 342]]
```

[ ] square bracket, string list

Two-dimensional list(matrix), [ ] square bracket, string list



Q&A