Annotated follow-along guide_ Hello, Python!

May 14, 2023

1 Annotated follow-along guide: Hello, Python!

This notebook contains the code used in the instructional videos from Week 1: Hello, Python!

As a reminder, an in-video message will appear to advise that the video you are viewing contains coding instruction and examples. This follow-along notebook has different sections for each video included in the week's content. The in-video message will direct you to the relevant section in the notebook for the specific video you are viewing.

To skip directly to the code for a particular video, use the following links:

1. **Section ??**
2. **Section ??**
3. **Section ??**
4. **Section ??**
5. **Section ??**
6. **Section ??**

## 1. Discover more about Python

[1]:
```python
# Print to the console
print("Hello, world!")
```

```
Hello, world!
```

[2]:
```python
# Print to the console
print(22)
```

```
22
```

[3]:
```python
# Simple arithmetic
(5 + 4) / 3
```

[3]:
```
3.0
```

[4]:
```python
# Assign variables
country = 'Brazil'
age = 30

print(country)
print(age)
```

```
Brazil
30
```

[5]:
```
# Evaluations
# Double equals signs is used to check equivalency
10**3 == 1000
```

[5]: True

[6]:
```
# Evaluations
# A single equals sign is reserved for assignment statements
10 ** 3 = 1000
```

```
      File "<ipython-input-6-57bc1cacb102>", line 3
    10 ** 3 = 1000
               ^
SyntaxError: can't assign to operator
```

[7]:
```
# Evaluations
# Double equals signs is used to check equivalency
10 * 3 == 40
```

[7]: False

[8]:
```
# Evaluations
# Double equals signs is used to check equivalency
10 * 3 == age
```

[8]: True

[9]:
```
# Conditional statements
if age >= 18:
    print('adult')
else:
    print('minor')
```

```
adult
```

[10]:
```
# Loops
for number in [1, 2, 3, 4, 5]:
    print(number)
```

```
1
2
3
4
5
```

[11]:

```python
# Loops
my_list = [3, 6, 9]

for x in my_list:
    print(x / 3)
```

```
1.0
2.0
3.0
```

[12]:

```python
# Functions
def is_adult(age):

    if age >= 18:
        print('adult')
    else:
        print('minor')
```

[13]:

```python
# Use the function that was just created
is_adult(14)
```

```
minor
```

[14]:

```python
# Use built-in sorted() function
new_list = [20, 25, 10, 5]

sorted(new_list)
```

[14]:

```
[5, 10, 20, 25]
```

## 2. Jupyter Notebook

NOTE: The import statements cell must be run before running some of the following cells. This setup step was not shown in the instructional video, and you will learn about import statements later in this course.

[37]:

```python
# Import statements
import warnings
warnings.filterwarnings('ignore')

import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from mpl_toolkits.mplot3d import Axes3D
import seaborn as sns
```

[38]:

```
# Create a list
my_list = [10, 'gold', 'dollars']
```

[39]:

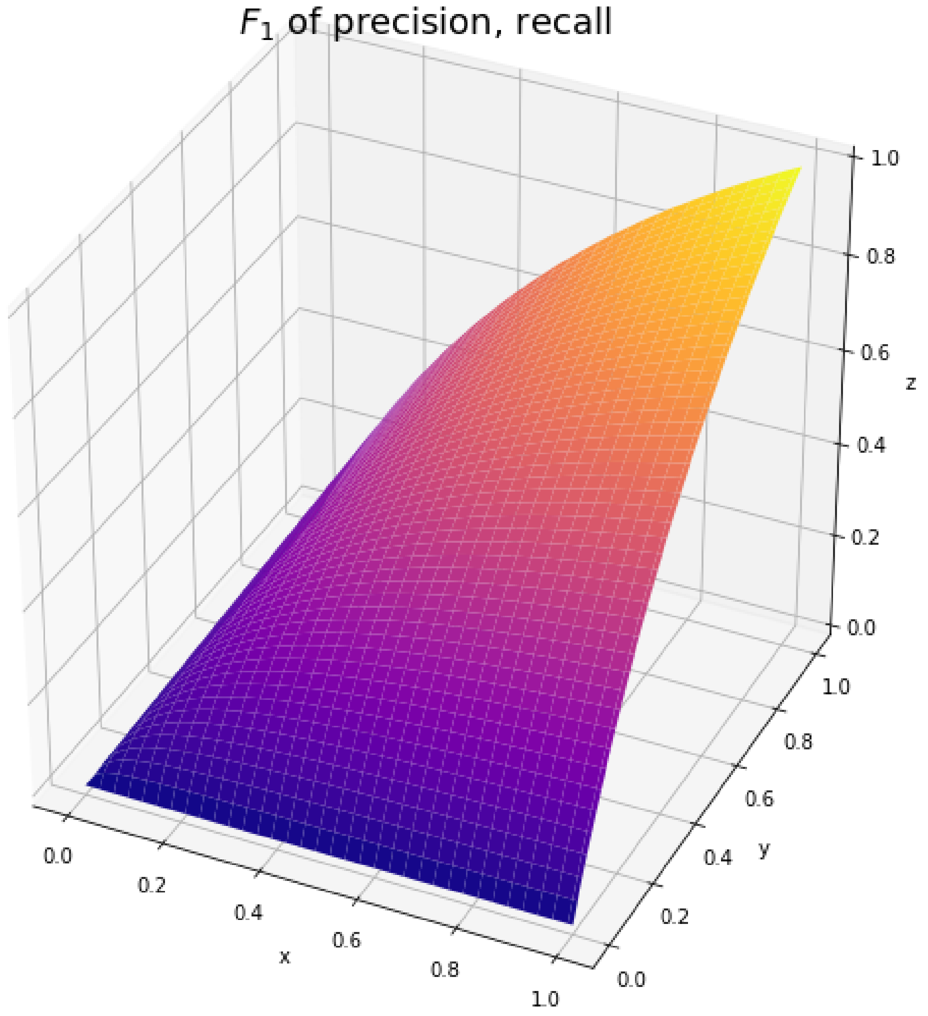
```
# Helper function to calculate F1 score used in graphics below
def f1_score(precision, recall):
    score = 2*precision*recall / (precision + recall)
    score = np.nan_to_num(score)

    return score
```

[40]:

```
# Generate a graph of F1 score for different precision and recall scores
x = np.linspace(0, 1, 101)
y = np.linspace(0, 1, 101)
X, Y = np.meshgrid(x, y)
Z = f1_score(X, Y)
fig = plt.figure()
fig.set_size_inches(10, 10)
ax = plt.axes(projection='3d')
ax.plot_surface(X, Y, Z, rstride=2, cstride=3, cmap='plasma')

ax.set_title('$F_{1}$ of precision, recall', size=18)
ax.set_xlabel('x')
ax.set_ylabel('y')
ax.set_zlabel('z')
ax.view_init(35, -65)
```



The below cells use markdown (like this cell) to create formatted text like headers and bullets, tables, and mathematical equations. Select any cell and enter into edit mode to view the markdown text. Run the cell to view the rendered output.

1.0.1 Section 2

- Part 1:
- Part 2:

Title	Author	Date
The Art of War	Sun Tzu	5th cent. BCE
Don Quixote de la Mancha	Miguel de Cervantes Saavedra	1605
Pride and Prejudice	Jane Austen	1813

$$\int_0^\infty \frac{x^3}{e^x - 1}\, dx = \frac{\pi^4}{15}$$

## 3. Object-oriented programming

[41]:
```
# Assign a string to a variable and check its type
magic = 'HOCUS POCUS'
print(type(magic))
```

```
<class 'str'>
```

[42]:
```
# Use swapcase() string method to convert from caps to lowercase
magic = 'HOCUS POCUS'
magic = magic.swapcase()
magic
```

[42]:
```
'hocus pocus'
```

[43]:
```
# Use replace() string method to replace some letters with other letters
magic = magic.replace('cus', 'key')
magic
```

[43]:
```
'hokey pokey'
```

[44]:
```
# Use split() string method to split the string into 2 strings
magic = magic.split()
magic
```

[44]:
```
['hokey', 'pokey']
```

[45]:
```
# Set-up cell to create the `planets` dataframe
# (This cell was not shown in the instructional video.)
import pandas as pd
data = [['Mercury', 2440, 0], ['Venus', 6052, 0,], ['Earth', 6371, 1],
        ['Mars', 3390, 2], ['Jupiter', 69911, 80], ['Saturn', 58232, 83],
        ['Uranus', 25362, 27], ['Neptune', 24622, 14]
]

cols = ['Planet', 'radius_km', 'moons']

planets = pd.DataFrame(data, columns=cols)
```

[46]:
```
# Display the `planets` dataframe
planets
```

[46]:
```
    Planet  radius_km  moons
0  Mercury       2440      0
```

```
1     Venus       6052      0
2     Earth       6371      1
3      Mars       3390      2
4   Jupiter      69911     80
5    Saturn      58232     83
6    Uranus      25362     27
7   Neptune      24622     14
```

```
[47]: # Use shape dataframe attribute to check number of rows and columns
      planets.shape
```

```
[47]: (8, 3)
```

```
[48]: # Use columns dataframe attribute to check column names
      planets.columns
```

```
[48]: Index(['Planet', 'radius_km', 'moons'], dtype='object')
```

## 4. Variables and data types

```
[15]: # Assign a list containing players' ages
      age_list = [34, 25, 23, 19, 29]
```

```
[16]: # Find the maximum age and assign to `max_age` variable
      max_age = max(age_list)
      max_age
```

```
[16]: 34
```

```
[17]: # Convert `max_age` to a string
      max_age = str(max_age)
      max_age
```

```
[17]: '34'
```

```
[18]: # Reassign the value of `max_age`
      max_age = 'ninety-nine'
      max_age
```

```
[18]: 'ninety-nine'
```

```
[19]: # FIRST, RE-RUN THE SECOND CELL IN THIS VIDEO
      # Check the value contained in `max_age` (SHOULD OUTPUT 34)
      max_age
```

```
[19]: 'ninety-nine'
```

[20]:
```
# Find the minimum age and assign to `min_age` variable
min_age = min(age_list)

# Subtract `min_age` from `max_age`
max_age - min_age
```

```
      ␣
↪---------------------------------------------------------------------------

       TypeError                                 Traceback (most recent call␣
↪last)

       <ipython-input-20-cd60915be1ae> in <module>
         3
         4 # Subtract `min_age` from `max_age`
   ----> 5 max_age - min_age


       TypeError: unsupported operand type(s) for -: 'str' and 'int'
```

## 5. Create precise variable names

[55]:
```
# Trying to assign a value to a reserved keyword will return a syntax error
else = 'everyone loves some esparagus'
```

```
         File "<ipython-input-55-1f1f078fc2a2>", line 2
       else = 'everyone loves some esparagus'
         ^
   SyntaxError: invalid syntax
```

[56]:
```
# The word "asparagus" is misspelled. That's allowed.
esparagus = 'everyone loves some esparagus'
```

[57]:
```
# Order of operations
2 * (3 + 4)
```

[57]: 14

[58]:
```
# Order of operations
(2 * 3) + 4
```

[58]: 10

[59]:

```
# Order of operations
3 + 4 * 10
```

[59]:

```
43
```

## 6. Data types and conversions

[60]:

```
# Addition of 2 ints
print(7+8)
```

```
15
```

[61]:

```
# Addition of 2 strings
print("hello " + "world")
```

```
hello world
```

[62]:

```
# You cannot add a string to an integer
print(7+"8")
```

```
      ␣
 ↪---------------------------------------------------------------------------

       TypeError                                 Traceback (most recent call␣
 ↪last)

       <ipython-input-62-199724c0b4c0> in <module>
         1 # You cannot add a string to an integer
   ----> 2 print(7+"8")


       TypeError: unsupported operand type(s) for +: 'int' and 'str'
```

[63]:

```
# The type() function checks the data type of an object
type("A")
```

[63]:

```
str
```

[64]:

```
# The type() function checks the data type of an object
type(2)
```

[64]:

```
int
```

[65]:

```
# The type() function checks the data type of an object
type(2.5)
```

[65]:
```
float
```

[66]:
```python
# Implicit conversion
print(1 + 2.5)
```

```
3.5
```

[67]:
```python
# Explicit conversion (the str() function converts a number to a string)
print("2 + 2 = " + str(2 + 2))
```

```
2 + 2 = 4
```