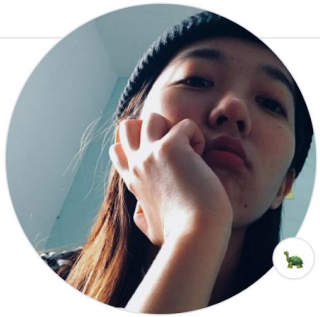
Python Tutorial

NCHU Lab.5501

2020.10.23 Joy Liao

About Me



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Highlights
Arctic Code Vault Contributor

Organizations

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Work Experience

Backend Engineer at SELLERLINX

Jul 2019 - Aug 2020, Taipei City, Taiwan.

- We build Serverless Application on Amazon Web Service (AWS).
- My main job was to build RESTful APIs using Lambda, API Gateway, DynamoDB, S3, RDS (MySQL), SQS, etc. Besides, I further had experience in creating microservices using ECR and ECS during this period.

Pinned — Order updated. — Customize your pins

music.cluster
Includes two parts, the first part for automatically create feature datasets from Spotify playlists, another for music clusters.
Python ☆ 1 1

music.platform
As an experimental music platform, be used to collect users' listening data.
TSQL

_nchuzero
Record some of my practice about the ML & DL.
Jupyter Notebook

crawl.big.TW
Python ☆ 1 1

01

BASIC REVIEW

- Condition
- Loop
- Function

02

CLASS & INSTANCE

- Attribute
- Static/Class Method

03

CLASS INHERITANCE

- Method Overriding
- Multi-Level Inheritance

04

WELL-MAINTAINED CODE

- Cohesion & Coupling
- Clean Code Tips

01

BASIC REVIEW-1

```python
# Define a variable in Python
my_name = 'Joy'
myName = 'Joy'
IAM_RELLY_COOL = True

# How to Define a function
def do_something_really_cool_like_joy():
    # You could do something in the function.
    # for example, like print string.
    print('OK, Maybe ...')
    print('Study Machine Learning hard ? ')
    # ok, maybe this example not cool.

def doNothing():
    # and you also could return something in the end of the function.
    # here return None bcz the function name call `do nothing` haha.
    return None

# If condition
if IAM_RELLY_COOL:
    do_something_really_cool_like_joy()

elif not IAM_RELLY_COOL:
    do_what = doNothing()

else:
    pass
```

01

BASIC REVIEW-2

```python
# For-loop a range
for i in range(10):
    print('No.', i, 'time in this for-loop.')

# For-loop a `list`
artist_joy_like = ['deca joins', '9m88', 'Leo Wang', 'Ryan Beatty',
                   'MAMAMOO', 'Soft Lipa', 'Waa Wei', 'The Black Skirts']

# okay, so if you also like these singer, contact me. (X)
for artist in artist_joy_like:
    print(artist)

# For-loop in one-line
odd_numbers = [n for n in range(20) if n %2 == 1]
print(odd_numbers)

# Equal to
odd_numbers = []
for n in range(20):
    if n % 2 == 1:
        odd_numbers.append(n)
print(odd_numbers)
```

```python
# How to define a class
# A Class is like an object constructor,
# or a "blueprint" for creating objects.

class Person:
    def __init__(self, name):
        self.name = name # necessary attribute
        self.birthday = None # not necessary

    def say_hi(self):
        # method
        print('%s say HI!' % self.name)

# instance it
joy = Person('Joy')

# now, we have an Person object.
# and this object is able to say hi.
joy.say_hi()

# We don't know joy's birthday.
if joy.birthday is None:
    print('We don\'t know about the birthday.')
    joy.birthday = input('Could you tell us? ')

print('Okay,', joy.name, '\'s birthday at', joy.birthday, '.')
```

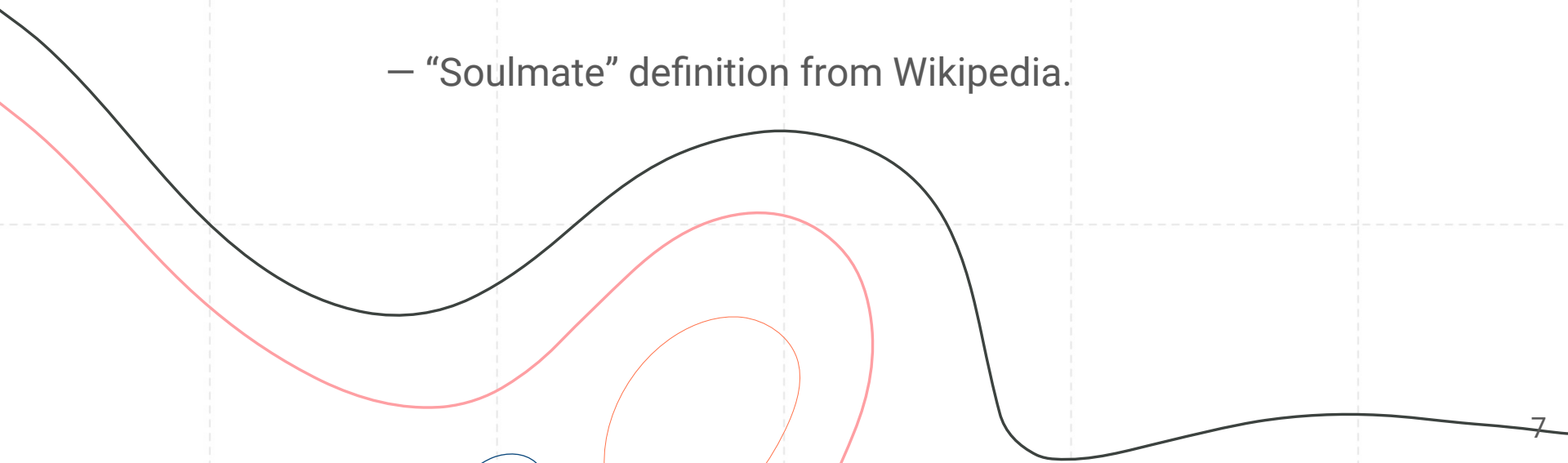
02

CLASS & INSTANCE

- Define a Person Class.
- Define a Function in Class.
- Instance it !!!

“A soulmate is a person with whom one has a feeling of deep or natural affinity.
This may involve similarity, love, comfort and trust.”

— “Soulmate” definition from Wikipedia.



Static Method

- Write another class: Soulmate.
- A static method is also a method which is bound to the class and not the object of the class.

```
2
3   class SoulMate():
4       def __init__(self, name, in_common=[]):
5           self.name = name
6           self.birthday = None
7           self.in_common = in_common
8
9       def list_in_common(self):
10          print('%s and you have many things in common, like:' % self.name)
11          for item in self.in_common:
12              print(item)
13          return self.in_common
14
15      @staticmethod
16      def definition():
17          print('Definition of Soulmate: ')
18          print('A soulmate is a person with whom one has a feeling of deep or natural affinity.'
19                ' This may involve similarity, love, comfort and trust.')
20
21
22  # static method no need to instantiate the object.
23  # for example: definition()
24  SoulMate.definition()
25
26  # list_in_common need to.
27  byul = SoulMate('byul', ['foods', 'cool', 'experience'])
28  byul.list_in_common()
```

Class Method

- Write another class: Lover.
- A class methods can be called by both class and object.

```
2
3   class Lover():
4       weekends_with_you = 'My lover lover lover don\'t say no.\
5                           I just wanna head home I don\'t feel so well.'
6
7       def __init__(self, name, date_from='Someday'):
8           self.name = name
9           self.date_from = date_from
10          self.memories = list()
11
12      @classmethod
13      def do_something(cls):
14          print(cls.weekends_with_you)
15          return cls.weekends_with_you
16
17      def add_memory(self, memory):
18          self.memories.append(memory)
19
20      def recall_memory(self):
21          print(self.memories)
22          return self.memories
23
24  # call classmethod without instance it.
25  Lover.do_something()
26
27  # call classmethod by object.
28  someone_i_love = Lover('JC', '2020-10-20')
29  someone_i_love.do_something()
```

03

INHERITANCE

- Inheritance allows us to define a class that inherits all the methods and properties from another class.

```python
# Import a module
# from <File Name> import <Class Name> or <Function Name>
from base_person import Person

# Bcz the definition of SoulMate "soulmate is a person".
# Soulmate will inherit the properties and methods from the People.

class SoulMate(Person):
    def __init__(self, name, in_common):
        # By using the super() function,
        # you do not have to use the name of the parent element,
        # it will automatically inherit the methods and properties from its parent

        super(SoulMate, self).__init__(name)
        self.in_common = in_common

    def list_in_common(self):
        print('%s and you have many things in common, like:' % self.name)
        for item in self.in_common:
            print(item)
        return self.in_common

    @staticmethod
    def definition():
        print('Definition of Soulmate: ')
        print('A soulmate is a person with whom one has a feeling of deep or natural affinity.'
              ' This may involve similarity, love, comfort and trust.')



byul = SoulMate('byul', ['cool', 'experience', 'tattoos'])
byul.list_in_common()

# inherit the methods 'say_hi()' from the Person.
byul.say_hi()

# inherit the attribute 'birthday' from the Person
byul.birthday = '1997-12-20'
print(byul.birthday)
```

MULTI-LEVEL INHERITANCE

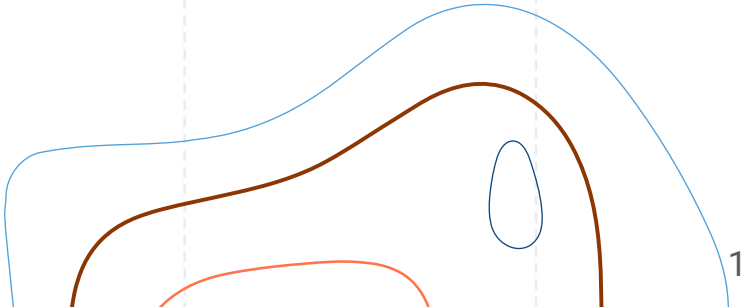
- In multilevel inheritance, features of the base class and the derived class are inherited into the new derived class.
- Method overriding occurs by simply defining in the child class a method with the same name of a method in the parent class.

```
# Import a module
# from <File Name> import <Class Name> or <Function Name>
from soulmate import SoulMate

class Lover(SoulMate):
    weekends_with_you = 'My lover lover lover don\'t say no.\
                         I just wanna head home I don\'t feel so well.'

    def __init__(self, name, in_common, date_from):
        super(Lover, self).__init__(name, in_common)
        self.date_from = date_from
        self.memories = list()

    def say_hi(self):
        print('%s say good morning.' % self.name)

    @classmethod
    def do_something(cls):
        print(cls.weekends_with_you)

    def add_memory(self, memory):
        self.memories.append(memory)

    def recall_memory(self):
        print(self.memories)
        return self.memories

jian = Lover('Jian', ['music'], '2020-10-20')

# inherit the function 'list_in_common()' from the SoulMate.
jian.list_in_common()

# could replace the function 'say_hi()' from People.
jian.say_hi()
```

04

WELL-MAINTAINED CODE

- Cohesion & Coupling
- Clean code tips



COHESION

Refers to what the class or module can do.

- Low Cohesion:
  - The class does a great variety of actions.
  - Unfocused on what is should do.
- High Cohesion:
  - The class is focused on what it should be doing.
  - Only methods relating the intention of the class.

COUPLING

How related or dependent two class/modules are toward each other.

- **Low Coupled**:
  - Change something major in one class should not affect the other.
- High Coupled:
  - Make it difficult to change and maintain your code.
  - Making a change that could require an entire system revamp.

High Cohesion

Low Coupling

Okay, Let me give some examples ...

Example 01

```
4   train_df = pd.read_csv("./a_random_dataset.csv")
5   for i in range(len(train_df['a_specific_col'])):
6       str = train_df.loc[i, 'a_specific_col']
7
8       if str == 'a_value':
9           train_df.loc[i, 'a_specific_col'] = 0
10
11      elif str == 'b_value':
12          train_df.loc[i, 'a_specific_col'] = 1
13
14      elif str == 'c_value':
15          train_df.loc[i, 'a_specific_col'] = 2
16
17      elif str == 'd_value':
18          train_df.loc[i, 'a_specific_col'] = 3
19
20      elif str == 'e_value':
21          train_df.loc[i, 'a_specific_col'] = 4
```

Think for a while

Is a good example or a bad example ?

But, WHY ?

Example 01

```
24  def tokenizer_by_column(df, col_name=None):
25      values_unique_list = df[col_name].unique()
26      count = 0
27      for value in values_unique_list:
28          mask = (df[col_name] == value)
29          df[col_name][mask] = count
30          count += 1
31      return df
32
33
34  train_df = pd.read_csv("./a_random_dataset.csv")
35  train_df = tokenizer_by_column(train_df, 'a_specific_col')
```

Okay, seems like BETTER ?

Example 02

Here is the code from my ML homework haha.

```
8   class Standardize:
9
10      @staticmethod
11      def rubust_scaler(df, col_name=None, q_range=(25, 75)):...
22
23      @staticmethod
24      def normailizer(df, col_name=None, method='l2'):...
34
35      @staticmethod
36      def standard_scaler(df, col_name=None):...
48
49  class ValueReplacer:
50
51      @staticmethod
52      def replace_value(df, col_name, new_value, old_value):...
56
57      @staticmethod
58      def tokenizer_by_column(df, col_name=None):...
70
71      @staticmethod
72      def fill_missing_value(df, col_name=None, method='mean'):...
80
81      @staticmethod
82      def fill_missing_value_by_imputer(df, col_name=None, method='mean'):...
```

Think for a while

Is a good example or a bad example ?

But, WHY ?

Example 02

That why we need function and module !

```
12    from preprocess import ValueReplacer, Standardize
13    def pipeline():
14        bank = pd.read_csv('bank/bank-full.csv', delimiter=';')
15        bank = ValueReplacer.tokenizer_by_column(bank, 'housing')
16        bank = ValueReplacer.tokenizer_by_column(bank, 'loan')
17        bank = ValueReplacer.tokenizer_by_column(bank, 'default')
18        bank = ValueReplacer.tokenizer_by_column(bank, 'marital')
19        bank = ValueReplacer.tokenizer_by_column(bank, 'job')
20        bank = ValueReplacer.tokenizer_by_column(bank, 'education')
21
22        bank = ValueReplacer.replace_value(bank, 'poutcome', 'failure', 'other')
23        bank = ValueReplacer.replace_value(bank, 'poutcome', 'failure', 'unknown')
24        bank = ValueReplacer.tokenizer_by_column(bank, 'poutcome')
25
26        bank = Standardize.standard_scaler(bank, 'age')
27        bank = Standardize.standard_scaler(bank, 'campaign')
28        bank = Standardize.standard_scaler(bank, 'previous')
29        bank = Standardize.standard_scaler(bank, 'balance')
30        bank = Standardize.standard_scaler(bank, 'duration')
31        bank = Standardize.standard_scaler(bank, 'pdays')
32        bank = Standardize.standard_scaler(bank, 'day')
33
34        bank = ValueReplacer.tokenizer_by_column(bank, 'month')
35        bank = ValueReplacer.tokenizer_by_column(bank, 'contact')
```

Example 02

Chiller way

```
14  def another_pipeline():
15      bank = pd.read_csv('bank/bank-full.csv', delimiter=';')
16      need_tokenizer_columns = [
17          'housing',
18          'loan',
19          'default',
20          'marital',
21          'job',
22          'education'
23      ]
24
25      for col_name in need_tokenizer_columns:
26          bank = ValueReplacer.tokenizer_by_column(bank, col_name)
```

CLEAN CODE TIPS

- Clean code always looks like it was written by someone who cares.
- Make your code read like a story.
- The first rule of functions is that should be small.
  - A function should do one thing, and only one thing.
- Methods should be have verb or phrase names.
- Tips for Error Handling:
  - Avoid empty except blocks !!!!!
  - Avoid empty except blocks !!!!!
  - Avoid empty except blocks !!!!!

THANKS!

Do you have any questions?