Язык Python

Евгений Борисов

Python: реализации языка

Cpython

Cythone

Jython (Java)

IronPython (.NET)

PyPy (compiler)

Python: дистрибутивы

CPython

Anaconda (Miniconda)

Python: IDE

iPython / Jupyter

PyCharm

Visual Studio Code

Eclipse + PyDev

Vim

Apache Zeppelin

Python: про версии

CPython — стандарт де-факто

2.7 vs 3.8

PEP (Python Enhancement Proposals)
предложения по улучшению Python

PEP 8: руководство по написанию кода

Python: **что почитать?**

SoloLearn : Python

Python Help : Tutorial

Sebastian Raschka Python Machine Learning

Python: **типы данных**

Логические

Числовые

Строки

Списки

Множества

Словари

None

Python: **тип данных логический**

Boolean Type:

True

False

Python: **типы данных числовые**

Numeric Type:

int – целое число

7

float – число с плавающей точкой

7.5, 75e-1

Python: **тип данных строки**

Text Sequence Type

'привет'

"медвед"

**''' 'превед
Медвед''' '**

Python: **типы данных списки**

Sequence Type:

list – список

[1, 2, 'a', [4,'a', 5,] ,]

tuple – кортеж

(1, 2, 'a',)

Python: **типы данных множества**

Set Types:

set – множество

set([1,2,2,3,4,2,3,4]) → {1,2,3,4}

frozenset – неизменяемое множество

Python: **типы данных словарь**

Mapping Types:

dict – словарь

{'a':1, 'b':2, 'zzz':7,}

Python: изменяемые типы данных

всё есть объекты

присваивание создаёт новый объект

immutable:
int float bool string tuple frozenset

mutable:
list dict set

Python: операции

Операции с данными: арифметические, логические, строковые, битовые

управление

циклы

ввод / вывод

Python: операции с данными

присваивание, арифметика и сравнения

```
a,b = 1,2
a,b = b,a
  a = 10
  a += 7
```

```
a / b
a // 3
a % 3
a - b
a + b
a * b
a**2
```

```
a<10
b<=7
a>2
a!=b
a==1
```

Python: операции с данными

логические

a = True
b = False

a or b
a and b
not b

Python: операции с данными

битовые

a = 255
b = 7

a^b
a&b
a|b
a>>3

Python: операции с данными

строковые

s = 'abc'

s*3 → 'abcabcabc'

s + 'dmr' → 'abcdmr'

Python: операции управления

```
if not x:
    print('x')
elif y:
    print('y')
else:
    print('z')
```

Python: цикл while

```
i=0
while i<5:
    print(i)
    i+=1
```

```
i=0
while i<5:
    i+=1
    if i<3:
        continue
    print(i)
```

```
i=0
while True:
    print(i)
    i+=1
    if i>5:
        break
```

Python: цикл for

```
for x in [1,2,3,4]:
    print(x)
```

Python: списки (list)

s=[1,7,3,4,['a','b']]

s=[1,5,3,4,]

len(s) **sorted**(s)

s[2] s[2:] s[2:4]

2 **in** s

s.**append**(9)

s.**insert**(5,'a')

s.**index**(2)

s = **list**(**range**(10))

s = [i/2 **for** i **in range**(10) **if** i!=3]

Python: кортежи (tuple)

```
c = (1,2,3,5)
```

Python: словари (dict)

```
d = { 'a':1, 'b':44, 'c':45, 'cvc':-1,  }

d['c']→ 45

d.keys()      d.values()
```

Python: множества (set)

s = **set**([1,2,3,1,3,4,5])

{1,2,3,4,5}

s[2] → error

операции: & | -

Python: менеджер контекстов (with)

```
with open('temp.txt','r') as f:
    x = f.read()

with open('temp.txt','r') as f:
    x = [ s for s in f.read().split('\n') if s ]
```

Python: функции

```
def myfunc(x,y=1):
    print(x)
    return x+1,y/2


a,b = myfunc(y=5,x=-1)
```

Python: итераторы

объект перечислитель

реализует навигацию по элементам другого объекта

выдаёт следующий элемент __next__()

если элементов больше нет
то бросает исключение

```
s='abcdef'
it_s = iter(s)
it_s.__next__()
for c in it_s:
    print(c)
```

```
s='abcdef'
for c in s:
    print(c)
```

Python: генераторы

генерирует последовательность

```
def ones(n):
    while n > 0:
        n -= 1
        yield 1

for o in ones(4):
    print(o)
```

Python: функциональное программирование

```
squares = map(lambda x: x * x, [0, 1, 2, 3, 4])

sum = reduce(lambda a, x: a + x, [0, 1, 2, 3, 4])
```

Python: ООП

```
class Animal:
  def __init__(self, name, color):
    self.name = name
    self.color = color
```

```
class Wolf(Animal):
  def bark(self):
    print("Grr...!")
```

```
class Dog(Wolf):
  def bark(self):
    super().bark()
    print("Woof!")
  def __repr__(self):
    return "Dog({})".format(self.name)
```

Python: ООП декораторы

```
class Rectangle:
    def __init__(self, width, height):
        self.width = width
        self.height = height
        self._allowed = False

    def calculate_area(self):
        return self.width * self.height

    @classmethod
    def new_square(cls, side_length):
        return cls(side_length, side_length)

    @staticmethod
    def square(a):
        return a**2
```

```
@property
def allowed(self):
    return self._allowed

@allowed.setter
def allowed(self, value):
    self._allowed = not(value)
```

```
sq = Rectangle.new_square(5)

print(sq.calculate_area())
# 25
sq.allowed=0
print(sq.allowed)
# True
print(Rectangle.square(4))
# 16
```

Python: модули

```
import numpy as np

help(np)
np.__name__
np.__version__

from numpy.random import rand
```

Python: менеджер пакетов pip

```
# pip search pep8

# pip install autopep8

# pip list

# pip uninstall autopep8
```

Python: утилиты

показывает места нарушения стиля
pep8 --first main.py

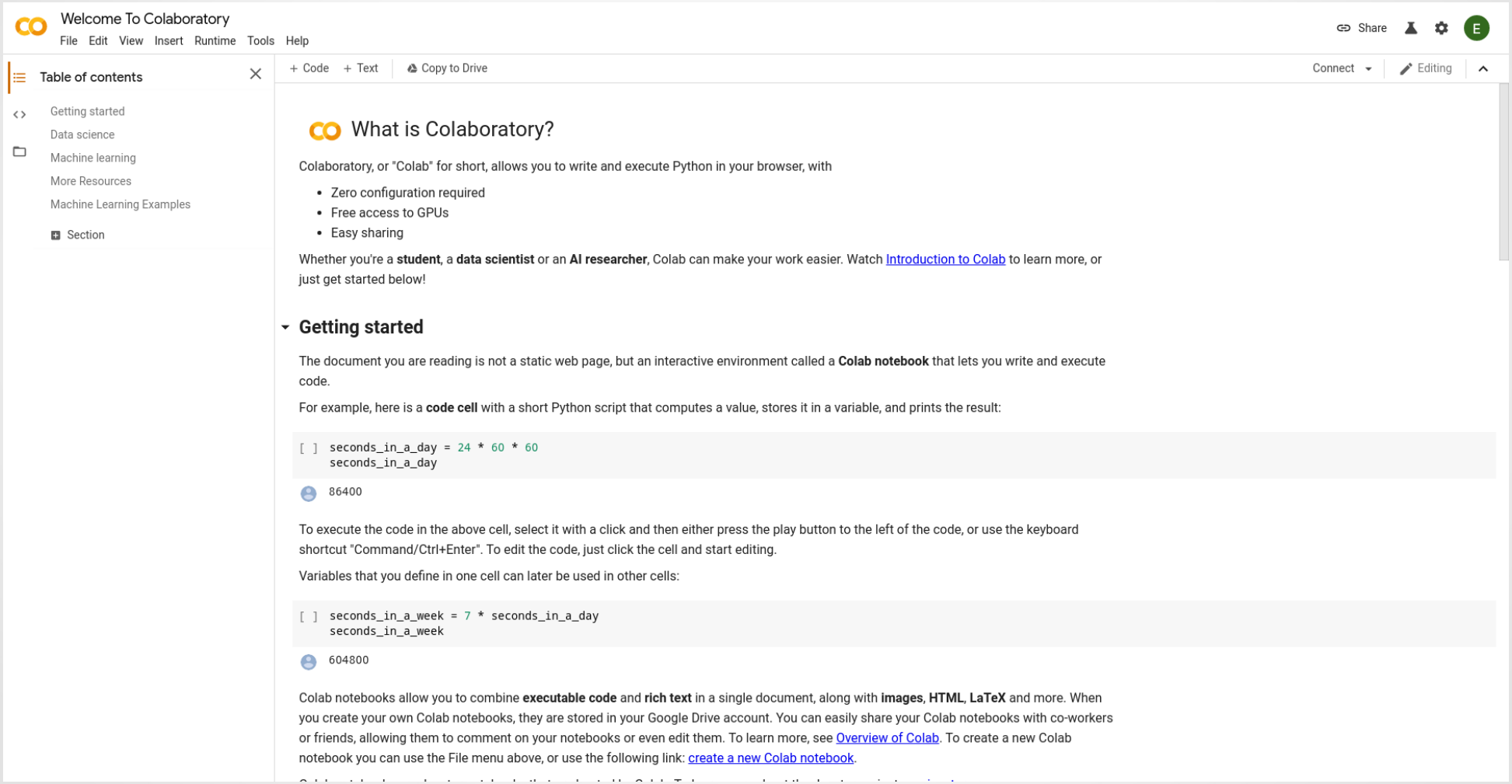
определяет и исправляет нарушения стиля
autopep8 ./ --recursive --in-place -a

форматирует комментарии
docformatter --in-place example.py

универсальная утилита приведения кода к PEP
pyformat

Python: Google Colab

https://colab.research.google.com/



https://habr.com/ru/post/348058/

Python: Google Colab

https://colab.research.google.com/

test1.ipynb ☆

File Edit View Insert Runtime Tools Help All changes saved

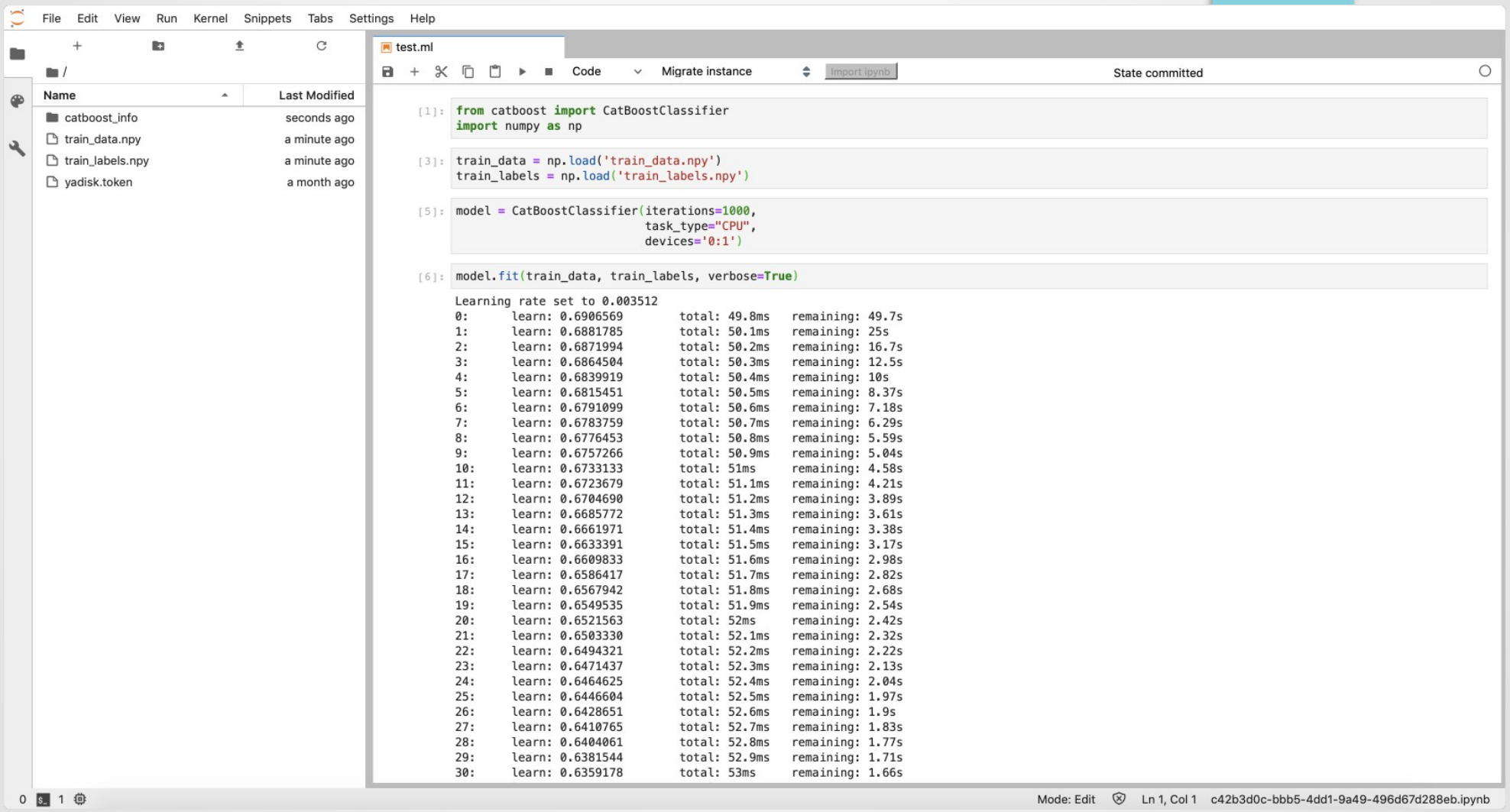
+ Code + Text

```
import tensorflow as tf
from tensorflow import keras
from tensorflow.python.client import device_lib

print('tensorflow:', tf.__version__)
print('keras:', keras.__version__)

if tf.test.is_built_with_cuda():
    print('GPU devices:\n  ',
        [ [x.name, x.physical_device_desc]
          for x in device_lib.list_local_devices()
          if x.device_type == 'GPU' ]
    )
    print('default GPU device:', tf.test.gpu_device_name() )

else:
    print('no GPU device found')
```

```
tensorflow: 1.15.0
keras: 2.2.4-tf
GPU devices:
   [['/device:GPU:0', 'device: 0, name: Tesla T4, pci bus id: 0000:00:04.0, compute capability: 7.5']]
default GPU device: /device:GPU:0
```

Python: Yandex DataSphere

https://cloud.yandex.ru/blog/posts/2020/05/datasphere



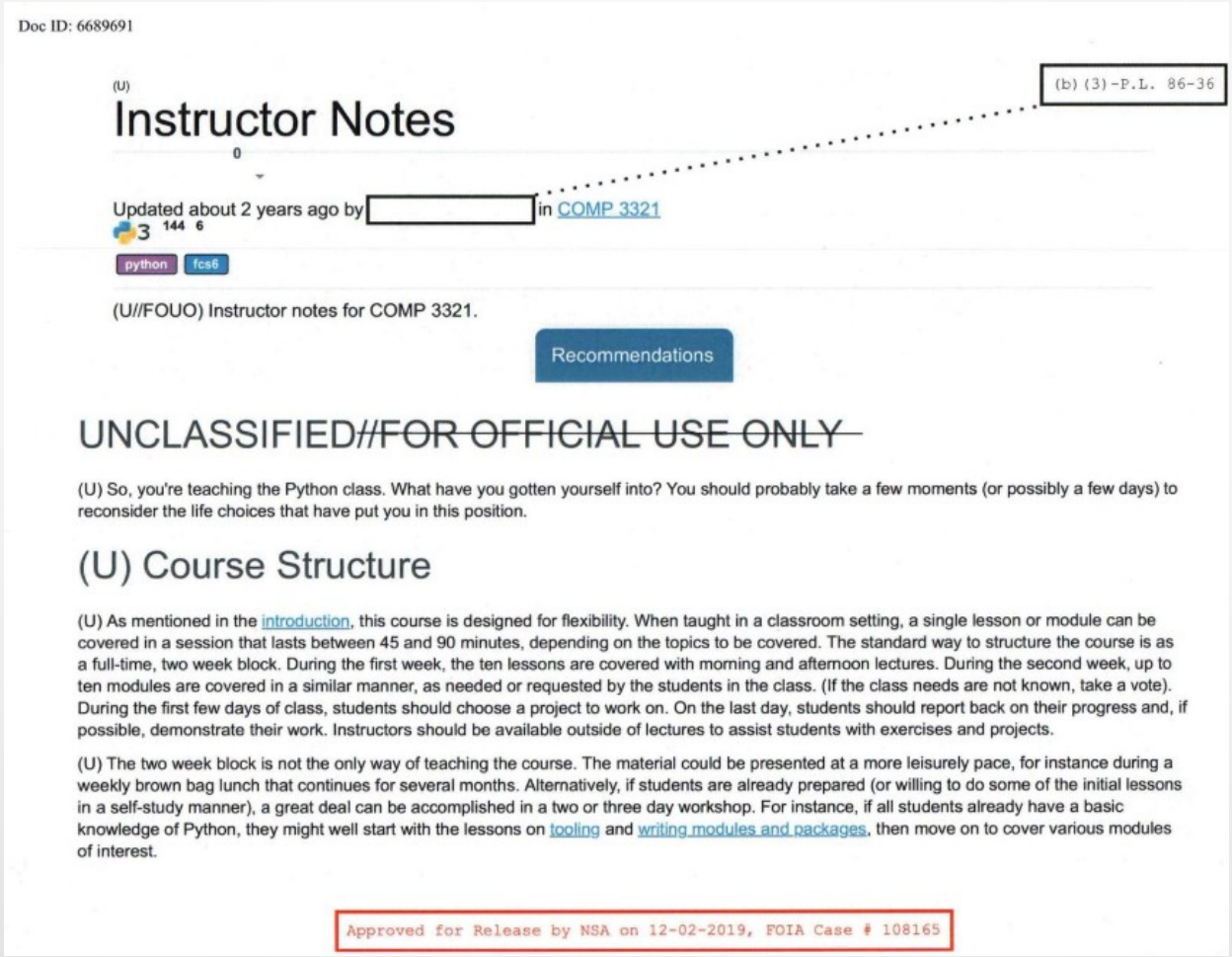
https://habr.com/ru/article/565086/

Python

В сети появился курс по Python от Агентства нацбезопасности США

https://dev.by/news/v-seti-poyavilsya-kurs-po-python-ot-anb

https://nsa.sfo2.digitaloceanspaces.com/comp3321.pdf



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(U)

Instructor Notes

(b)(3)-P.L. 86-36

Updated about 2 years ago by [redacted] in COMP 3321

3 144 6

python fcs6

(U//FOUO) Instructor notes for COMP 3321.

Recommendations

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(U) So, you're teaching the Python class. What have you gotten yourself into? You should probably take a few moments (or possibly a few days) to reconsider the life choices that have put you in this position.

(U) Course Structure

(U) As mentioned in the introduction, this course is designed for flexibility. When taught in a classroom setting, a single lesson or module can be covered in a session that lasts between 45 and 90 minutes, depending on the topics to be covered. The standard way to structure the course is as a full-time, two week block. During the first week, the ten lessons are covered with morning and afternoon lectures. During the second week, up to ten modules are covered in a similar manner, as needed or requested by the students in the class. (If the class needs are not known, take a vote). During the first few days of class, students should choose a project to work on. On the last day, students should report back on their progress and, if possible, demonstrate their work. Instructors should be available outside of lectures to assist students with exercises and projects.

(U) The two week block is not the only way of teaching the course. The material could be presented at a more leisurely pace, for instance during a weekly brown bag lunch that continues for several months. Alternatively, if students are already prepared (or willing to do some of the initial lessons in a self-study manner), a great deal can be accomplished in a two or three day workshop. For instance, if all students already have a basic knowledge of Python, they might well start with the lessons on tooling and writing modules and packages, then move on to cover various modules of interest.

Approved for Release by NSA on 12-02-2019, FOIA Case # 108165

Python: упражнения numpy

https://github.com/rougier/numpy-100

100 numpy exercises

This is a collection of exercises that have been collected in the numpy mailing list, on stack overflow and in the numpy documentation. The goal of this collection is to offer a quick reference for both old and new users but also to provide a set of exercises for those who teach.

If you find an error or think you've a better way to solve some of them, feel free to open an issue at https://github.com/rougier/numpy-100.

File automatically generated. See the documentation to update questions/answers/hints programmatically.

Run the `initialize.py` module, then for each question you can query the answer or an hint with `hint(n)` or `answer(n)` for n question number.

```
In [ ]: %run initialise.py
```

Python: упражнения pandas

https://github.com/ajcr/100-pandas-puzzles/

100 pandas puzzles

Inspired by 100 Numpy exerises, here are 100* short puzzles for testing your knowledge of pandas' power.

Since pandas is a large library with many different specialist features and functions, these excercises focus mainly on the fundamentals of manipulating data (indexing, grouping, aggregating, cleaning), making use of the core DataFrame and Series objects.

Many of the excerises here are stright-forward in that the solutions require no more than a few lines of code (in pandas or NumPy... don't go using pure Python or Cython!). Choosing the right methods and following best practices is the underlying goal.

The exercises are loosely divided in sections. Each section has a difficulty rating; these ratings are subjective, of course, but should be a seen as a rough guide as to how inventive the required solution is.

If you're just starting out with pandas and you are looking for some other resources, the official documentation is very extensive. In particular, some good places get a broader overview of pandas are...

- 10 minutes to pandas
- pandas basics
- tutorials
- cookbook and idioms

Python: virtualenv

проблема: пакеты определённых версий могут быть несовместимы между собой

решение: виртуальные python-среды

позволяет работать с несколькими версиями python

держать одновременно несколько наборов пакетов разных версий

```
# pip install virtualenv

# mkdir /home/user/python3.8_env

# virtualenv -p python3.8 python3.8_env

# source /home/user/python3.8_env/bin/activate
```

Python: что почитать?

http://www.sololearn.com/Course/Python/

http://github.com/mechanoid5/ml_lectorium

Дейтел П., Дейтел Х. Python: Искусственный интеллект, большие данные и облачные вычисления (2020)