

The Entry-Level ML Engineer Boot-camp!

Your First Steps in AI

Summary: The goal of the week is to get started with the Python language and data manipulation.

Chapter I

Introduction

Welcome to the Entry-Level ML Engineer Bootcamp! This bootcamp is designed as an entry point for anyone looking to start their journey in AI and machine learning. You'll learn the fundamentals of ML through structured modules, hands-on exercises, and curated resources.

The bootcamp is divided into four modules, with each module lasting one week, allowing you to complete the program in a month. Every week, you'll find exercises and resources to help you grasp key concepts. Additionally, we've included exploration questions to encourage deeper learning and creative thinking.

Our goal is that by the end of the bootcamp, participants will be able to collect and clean data, train machine learning models, and deploy them. Each week, you will focus on one essential skill that builds towards this goal.

We strongly encourage peer-to-peer learning—you'll gain so much by discussing and collaborating with others!

If you have any questions, feel free to ask in the community. Let's learn and grow together!

Chapter II

Common Instructions

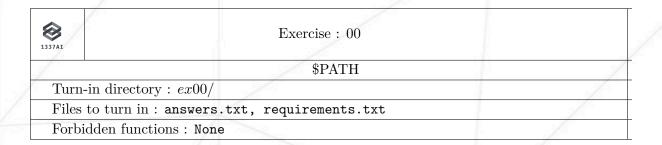
- The version of Python recommended to use is 3.12, you can check the version of Python with the following command: python -V
- The norm: during this Boot camp, it is recommended to follow the PEP 8 standards, though it is not mandatory. You can install pycodestyle which is a tool to check your Python code.
- The function eval is never allowed.
- The exercises are ordered from the easiest to the hardest.
- Your exercises are going to be evaluated by someone else, so make sure that your variable names and function names are appropriate and civil.
- Your manual is the internet.
- You can access our community on Whats App and ask your Questions for your peers in the dedicated Boot camp channel.
- If you find any issue or mistake in the subject please get in touch with us or create an issue on 1337-AI repository on Github.
- Submit your work to your git repository. Only the work in the git repository will be graded

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Chapter III

Exercise 00



The first thing you need to do is install Python.

Most modern Unix-based systems have a python interpreter installed by default, but its version might be lower/higher than the one used for these modules. It is also possible that the default python command uses a version 3.x (for legacy reasons). This is obviously very confusing for a new developper.

\$> python -v \$> python3 -v

To deal with those version issues we will use **venv**. This program allows you to manage your Python packages and several working environments.

Note: the actual requirement is to use a Python 3.12.X version. You are free to use a different program/utilities to achieve this goal. At your own risk.

Veny manual installation

1. Download & Install Venv

\$> python3 -m pip install virtualenv

3. Create a dedicated environment!

```
$> mkdir my_project
$> cd my_project
$> python3 -m venv .venv
> source .venv/bin/activcate
```

4. Check your Python environment

```
$> pip list
Package Version
------
pip 23.0.1
```



Check this for more information about Virtual Env Resource

(Finally) getting started

Now that your setup is ready to run, here are a few questions that need to be solved using python, pip or conda. Save your answers in a file answers.txt (one answer per line and per question), and check them with your peers.

Find the commands to:

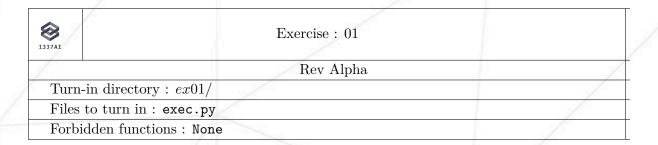
- Output a list of installed packages and their versions.
- Show the package metadata of numpy.
- Remove the package numpy.
- (Re)install the package numpy.
- Freeze your python packages and their versions in a requirements.txt file you have to turn-in.



What is Conda?

Chapter IV

Exercise 01



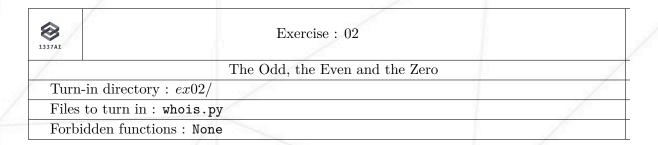
Make a program that takes a string as argument, reverses it, swaps its letters case and prints the result.

- If more than one argument is provided, merge them into a single string with each argument separated by a single space character.
- If no argument is provided, do nothing or print an usage.

```
$> python3 exec.py 'Hello World!' | cat -e
!DLROw OLLEh$
$>
$> python3 exec.py 'Hello' 'my Friend' | cat -e
DNEIRf YM OLLEh$
$>
$> python3 exec.py
$> python3 exec.py
```

Chapter V

Exercise 02



Make a program that takes a number as argument, checks whether it is odd, even or zero, and prints the result.

- If more than one argument is provided or if the argument is not an integer, print an error message.
- If no argument is provided, do nothing or print an usage.

```
$> python3 whois.py 12
I'm Even.
$>
$> python3 whois.py 3
I'm Odd.
$>
$> python3 whois.py
$>
$> python3 whois.py 0
I'm Zero.
$>
$> python3 whois.py Hello
AssertionError: argument is not an integer
$>
$> python3 whois.py 12 3
AssertionError: more than one argument is provided
$>
```

Chapter VI

Exercise 03

Exercise: 03	
Functional file	7
Forbidden functions : None	
	Functional file

Part 1. text_analyzer

Create a function called text_analyzer that takes a single string argument and displays the total number of printable characters, and respectively: the number of upper-case characters, lower-case characters, punctuation characters and spaces.

- If None or nothing is provided, the user is prompted to provide a string.
- If the argument is not a string, print an error message.
- This function must have a docstring explaning its behavior.

Test your function with the python console

```
The text contains 234 printable character(s):
 5 upper letter(s)
 187 lower letter(s)
 8 punctuation mark(s)
 30 space(s)
>>> text_analyzer()
What is the text to analyze?
>> Hello World!
The text contains 12 printable character(s):
 2 upper letter(s)
 8 lower letter(s)
 1 punctuation mark(s)
 1 space(s)
>>> text_analyzer(42)
AssertionError: argument is not a string
>>> print(text_analyzer.__doc__)
   This function counts the number of upper characters, lower characters,
   punctuation and spaces in a given text.
```

Part 2. ___name___==___main___

In the previous part, you wrote a function that can be used in the console or in another file when imported. Without changing this behavior, update your file so it can also be launched as a standalone program.

- If more than one argument is provided to the program, print an error message.
- Otherwise, use the text_analyzer function.

```
$> python3 count.py 'Hello World!'
The text contains 12 character(s):
- 2 upper letter(s)
- 8 lower letter(s)
- 1 punctuation mark(s)
- 1 space(s)
$> python3
>>> from count import text_analyzer
>>> text_analyzer("Hello World!")
The text contains 12 character(s):
- 2 upper letter(s)
- 8 lower letter(s)
- 1 punctuation mark(s)
- 1 space(s)
```

Chapter VII

Exercise 04

\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Exercise: 04	
1	The right format	1
Turn-in directory	r: ex04/	
Files to turn in:	kata00.py, kata01.py, kata02.py, kata03.py, kata04.py	
Forbidden functi	ons: None	

Let's get familiar with the useful concept of **string formatting** through a kata series.

Each exercice will provide you with a kata variable. This variable can be modified to a certain extent: your program must react accordingly.

kata00

The kata variable is always a tuple and can only be filled with integers.

```
# Put this at the top of your kata00.py file
kata = (19,42,21)
```

Write a program that displays this variable content according to the format shown below:

```
$> python3 kata00.py
The 3 numbers are: 19, 42, 21
$>
```

kata01

The kata variable is always a dictionary and can only be filled with strings.

```
# Put this at the top of your kata01.py file
kata = {
   'Python': 'Guido van Rossum',
   'Ruby': 'Yukihiro Matsumoto',
   'PHP': 'Rasmus Lerdorf',
}
```

Write a program that displays this variable content according to the format shown below:

```
$> python3 kata01.py
Python was created by Guido van Rossum
Ruby was created by Yukihiro Matsumoto
PHP was created by Rasmus Lerdorf
$>
```

kata02

The kata variable is always a tuple that contains 5 non-negative integers. The first integer contains up to 4 digits, the rest up to 2 digits.

```
# Put this at the top of your kata02.py file
kata = (2019, 9, 25, 3, 30)
```

Write a program that displays this variable content according to the format shown below:

```
$> python3 kata02.py | cat -e
09/25/2019 03:30$
$> python3 kata02.py | wc -c
17
$>
```

kata03

The kata variable is always a string whose length is not higher than 42.

```
# Put this at the top of your kata03.py file
kata = "The right format"
```

Write a program that displays this variable content according to the format shown below:

```
$> python3 kata03.py | cat -e
-------------------------The right format%
$> python3 kata03.py | wc -c
42
$>
```

kata04

The kata variable is always a tuple that contains, in the following order:

- 2 non-negative integers containing up to 2 digits
- 1 decimal
- 1 integer
- 1 decimal

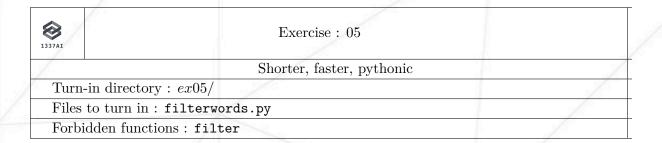
```
# Put this at the top of your kata04.py file
kata = (0, 4, 132.42222, 10000, 12345.67)
```

Write a program that displays this variable content according to the format shown below:

```
$> python3 kata04.py
module_00, ex_04 : 132.42, 1.00e+04, 1.23e+04
$> python3 kata04.py | cut -c 10,18
,:
```

Chapter VIII

Exercise 05



Make a program that takes a string S and an integer N as argument and prints the list of words in S that contains more than N non-punctuation characters.

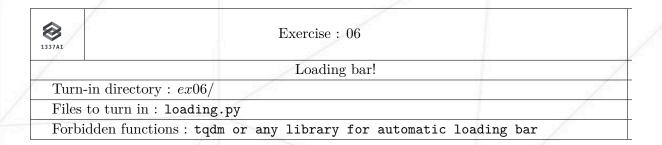
- Words are separated from each other by space characters
- Punctuation symbols must be removed from the printed list: they are neither part of a word nor a separator
- The program must contain at least one **list comprehension** expression.

If the number of argument is different from 2, or if the type of any argument is invalid, the program prints an error message.

```
$> python3 filterwords.py 'Hello, my friend' 3
['Hello', 'friend']
$> python3 filterwords.py 'Hello, my friend' 10
[]
$> python3 filterwords.py 'A robot must protect its own existence as long as such protection does not conflict with the First or Second Law' 6
['protect', 'existence', 'protection', 'conflict']
$> python3 filterwords.py Hello World
ERROR
$> python3 filterwords.py 3 'Hello, my friend'
ERROR
$> python3 filterwords.py 3 'Hello, my friend'
ERROR
$> python3 filterwords.py
```

Chapter IX

Exercise 06



You are about to discover the yield operator!
So let's create a function called ft_progress(lst).
The function will display the progress of a for loop.

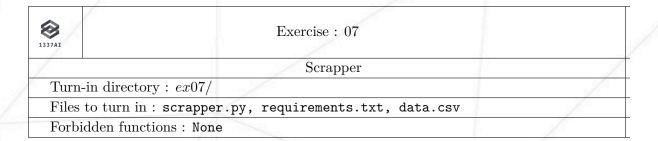
Examples

```
listy = range(1000)
for elem in ft_progress(listy):
   ret += (elem + 3) % 5
   sleep(0.01)
print()
print(ret)
$> python loading.py
ETA: 8.67s [ 23%] [====>
                                      ] 233/1000 | elapsed time 2.33s
listy = range(3333)
for elem in ft_progress(listy):
   ret += elem
   sleep(0.005)
print()
print(ret)
$> python loading.py
ETA: 14.67s [ 9%][=>
                                       ] 327/3333 | elapsed time 1.33s
```

We advise you to go take a look at the wonderful tqdm library, it will come in handy in many situations

Chapter X

Exercise 07



By the end of this bootcamp, you will build an AI model capable of predicting house prices based on features such as the number of bathrooms, area, parking spaces, and more. To achieve this, we first need to gather the data required for training our model. That's why we have provided a dataset available at this link.

Your Task:

- Scrape the website to extract the house price data.
- Save the extracted data in a CSV file.

This dataset will be used later to train and evaluate your machine learning model.

Examples

\$> python3 scrapper.py data.csv



you can use beautifulsoup



Now that you have scraped and saved the dataset, take a moment to analyze it. What patterns do you notice in the data?

Contact

You can contact 1337AI organization by email: contact@1337ai.org

Find all the relevant and up-to-date information about 1337AI on our Website! Thank you for attending the Entry-Level ML Engineer Boot-camp!