0x02. Python - import & modules

Python

Weight: 1

Project over - took place from Oct 5, 2023 6:00 AM to Oct 6, 2023 6:00 AM

An auto review will be launched at the deadline

In a nutshell…

- **Auto QA review:** 73.0/85 mandatory & 58.0/58 optional
- **Altogether: 171.76%**
  - Mandatory: 85.88%
  - Optional: 100.0%
  - Calculation: 85.88% + (85.88% * 100.0%) == **171.76%**

Resources

Read or watch:

- Modules (/rltoken/SY-cMfnwbHoPFaJ-D_LWig)
- Command line arguments (/rltoken/5e3TphtJ6WSVkWsdd2eX_A)
- Pycodestyle – Style Guide for Python Code (/rltoken/FlkAJ_kPXHC4Y65WrRvA4A)

man or help:

- `python3`

Learning Objectives

At the end of this project, you are expected to be able to explain to anyone (/ritoken/wwTE_cGg7Ug-Vp3IQ6tmXA), **without the help of Google**:

General

- Why Python programming is awesome
- How to import functions from another file
- How to use imported functions
- How to create a module
- How to use the built-in function `dir()`
- How to prevent code in your script from being executed when imported
- How to use command line arguments with your Python programs

Copyright - Plagiarism

- You are tasked to come up with solutions for the tasks below yourself to meet with the above learning objectives.
- You will not be able to meet the objectives of this or any following project by copying and pasting someone else's work.
- You are not allowed to publish any content of this project.
- Any form of plagiarism is strictly forbidden and will result in removal from the program.

Requirements

General

- Allowed editors: `vi`, `vim`, `emacs`
- All your files will be interpreted/compiled on Ubuntu 20.04 LTS using python3 (version 3.8.5)
- All your files should end with a new line
- The first line of all your files should be exactly `#!/usr/bin/python3`
- A `README.md` file, at the root of the folder of the project, is mandatory
- Your code should use the pycodestyle (version `2.8.*`)
- All your files must be executable
- The length of your files will be tested using `wc`

Quiz questions

Great! You've completed the quiz successfully! Keep going! (Show quiz)

Tasks

0. Import a simple function from a simple file

mandatory

Score: 100.0% (*Checks completed: 100.0%*)

Write a program that imports the function `def add(a, b):` from the file `add_0.py` and prints the result of the addition `1 + 2 = 3`

- You have to use `print` function with string format to display integers
- You have to assign:
  - the value `1` to a variable called `a`
  - the value `2` to a variable called `b`
  - and use those two variables as arguments when calling the functions `add` and `print`
- `a` and `b` must be defined in 2 different lines: `a = 1` and another `b = 2`
- Your program should print: `<a value> + <b value> = <add(a, b) value>` followed with a new line
- You can only use the word `add_0` once in your code
- You are not allowed to use `*` for importing or `__import__`
- Your code should not be executed when imported - by using `__import__`, like the example below

```
guillaume@ubuntu:~/0x02$ cat add_0.py
#!/usr/bin/python3
def add(a, b):
    """My addition function

    Args:
        a: first integer
        b: second integer

    Returns:
        The return value. a + b
    """
    return (a + b)

guillaume@ubuntu:~/0x02$ ./0-add.py
1 + 2 = 3
guillaume@ubuntu:~/0x02$ cat 0-import_add.py
__import__("0-add")
guillaume@ubuntu:~/0x02$ python3 0-import_add.py
guillaume@ubuntu:~/0x02$
```

Repo:

- GitHub repository: `alx-higher_level_programming`
- Directory: `0x02-python-import_modules`
- File: `0-add.py`

Done! | Check your code | Get a sandbox | QA Review

1. My first toolbox!

mandatory

Score: 100.0% (*Checks completed: 100.0%*)

Write a program that imports functions from the file `calculator_1.py`, does some Maths, and prints the result.

- Do not use the function `print` (with string format to display integers) more than 4 times
- You have to define:
  - the value `10` to a variable `a`
  - the value `5` to a variable `b`
  - and use those two variables only, as arguments when calling functions (including `print`)
- `a` and `b` must be defined in 2 different lines: `a = 10` and another `b = 5`
- Your program should call each of the imported functions. See example below for format
- the word `calculator_1` should be used only once in your file
- You are not allowed to use `*` for importing or `__import__`
- Your code should not be executed when imported

7)

```
guillaume@ubuntu:~/0x02$ cat calculator_1.py
#!/usr/bin/python3
def add(a, b):
    """My addition function

    Args:
        a: first integer
        b: second integer

    Returns:
        The return value. a + b
    """
    return (a + b)


def sub(a, b):
    """My subtraction function

    Args:
        a: first integer
        b: second integer

    Returns:
        The return value. a - b
    """
    return (a - b)


def mul(a, b):
    """My multiplication function

    Args:
        a: first integer
        b: second integer

    Returns:
        The return value. a * b
    """
    return (a * b)


def div(a, b):
    """My division function

    Args:
        a: first integer
        b: second integer

    Returns:
        The return value. a / b
    """
    return int(a / b)
```

```
guillaume@ubuntu:~/0x02$ ./1-calculation.py
10 + 5 = 15
10 - 5 = 5
10 * 5 = 50
10 / 5 = 2
guillaume@ubuntu:~/0x02$
```

Repo:

- GitHub repository: `alx-higher_level_programming`
- Directory: `0x02-python-import_modules`
- File: `1-calculation.py`

Done! | Check your code | Get a sandbox | QA Review

2. How to make a script dynamic!

mandatory

Score: 100.0% (*Checks completed: 100.0%*)

Write a program that prints the number of and the list of its arguments.

- The output should be:
  - Number of argument(s) followed by `argument` (if number is one) or `arguments` (otherwise), followed by
  - `:` (or `.` if no arguments were passed) followed by
  - a new line, followed by (if at least one argument),
  - one line per argument:
    - the position of the argument (starting at `1`) followed by `:`, followed by the argument value and a new line
- Your code should not be executed when imported
- The number of elements of `argv` can be retrieved by using: `len(argv)`
- You do not have to fully understand lists yet, but imagine that `argv` can be used just like a C array: you can use an index to walk through it. There are other ways (which will be preferred for future project tasks), if you know them you can use them.

```
guillaume@ubuntu:~/0x02$ ./2-args.py
0 arguments.
guillaume@ubuntu:~/0x02$ ./2-args.py Hello
1 argument:
1: Hello
guillaume@ubuntu:~/0x02$ ./2-args.py Hello Welcome To The Best School
6 arguments:
1: Hello
2: Welcome
3: To
4: The
5: Best
6: School
guillaume@ubuntu:~/0x02$
```

Repo:

- GitHub repository: `alx-higher_level_programming`
- Directory: `0x02-python-import_modules`
- File: `2-args.py`

Done! | Check your code | Get a sandbox | QA Review

3. Infinite addition

mandatory

Score: 100.0% (*Checks completed: 100.0%*)

Write a program that prints the result of the addition of all arguments

- The output should be the result of the addition of all arguments, followed by a new line
- You can cast arguments into integers by using `int()` (you can assume that all arguments can be casted into integers)
- Your code should not be executed when imported

```
guillaume@ubuntu:~/0x02$ ./3-infinite_add.py
0
guillaume@ubuntu:~/0x02$ ./3-infinite_add.py 79 10
89
guillaume@ubuntu:~/0x02$ ./3-infinite_add.py 79 10 -40 -300 89
-162
guillaume@ubuntu:~/0x02$
```

Last but not least, your program should also handle big numbers. And the good news is: if your program works for the above example, it will work for the following example:

```
guillaume@ubuntu:~/0x02$ ./3-infinite_add.py 11111111111111111111111111111111111111111111111
1111111111112222222222222222222222222222222222222343546786676544353443422222225444444444444 4
4444444444444444444444444444444444444444444444444444444444444444444444444444444444444455555
55555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555
55555555555555555555555555555555555555555555555555555666666666666666666666666666666777777777
77777777777777777777788888888888888888888888888888888899999999999999999999999990000000000000 00
0000 11111111111111111111111111111111111111111111111111222222222222222222222222223333333333
33333333345677888888899999999999999999999999999999999999999999999999999999999999999999999999
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11111111111111111111111111111111111111111111111111222222222222222222222222222333333333333333
33333456890000001111111111111111111111111111111111111111111111111111222222222222222222222222
22222222222234354678667654435344342222222544444444444444444444444444444444444444444444444444
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55555555555555556666666666666666666666666666667777777777777777777777777777778888888888888888
88888888888888889999999999999999999999989999999999999999999
guillaume@ubuntu:~/0x02$
```
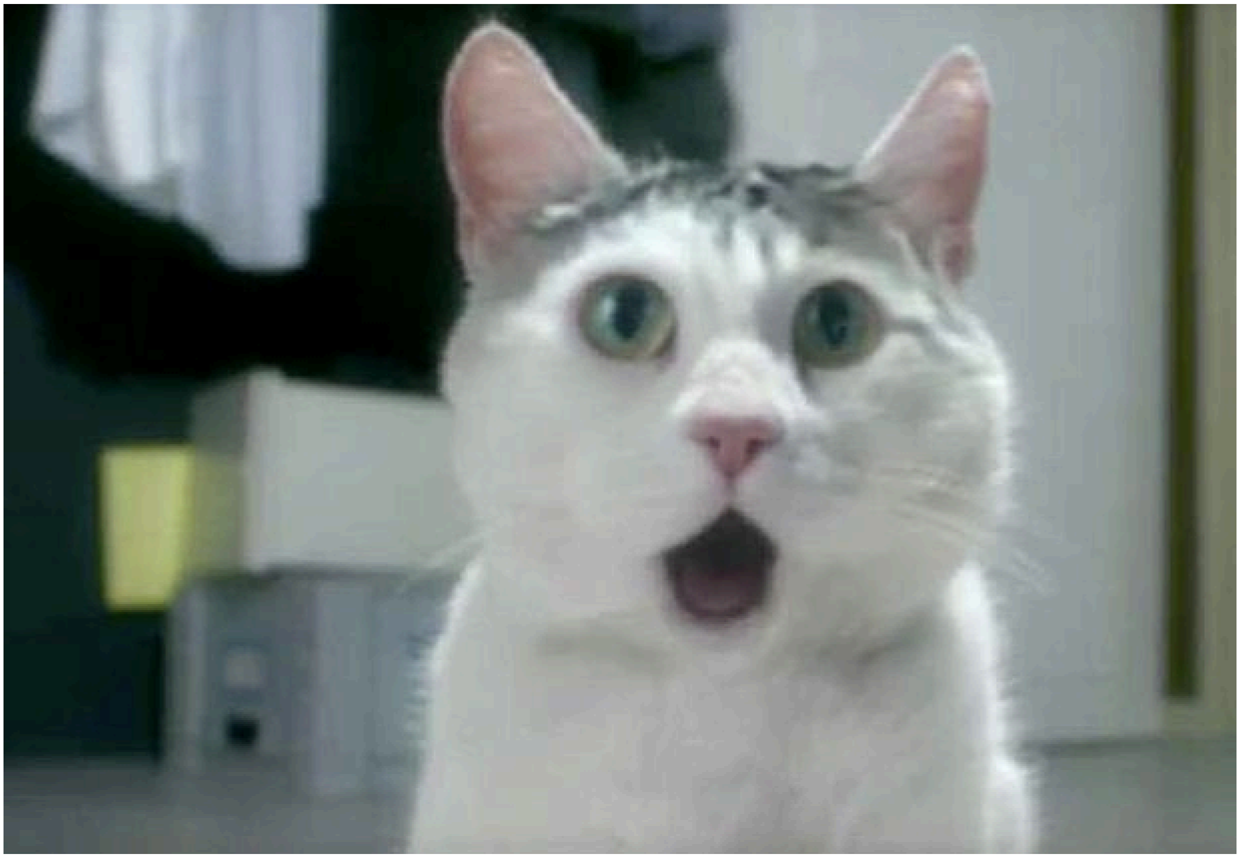

Remember how you did (or did not) do it in C? `#pythoniscool`



Repo:

- GitHub repository: `alx-higher_level_programming`

- Directory: `0x02-python-import_modules`
- File: `3-infinite_add.py`

Done! | Check your code | Get a sandbox | QA Review

4. Who are you?

mandatory

Score: 7.69% (*Checks completed: 7.69%*)

Write a program that prints all the names defined by the compiled module hidden_4.pyc (https://github.com/alx-tools/0x02.py/raw/master/hidden_4.pyc) (please download it locally).

- You should print one name per line, in alpha order
- You should print only names that do **not** start with `__`
- Your code should not be executed when imported
- Make sure you are running your code in Python3.8.x (`hidden_4.pyc` has been compiled with this version)

```
guillaume@ubuntu:~/0x02$ curl -Lso "hidden_4.pyc" "https://github.com/alx-tools/0x02.py/raw/master/hidden_4.pyc"
guillaume@ubuntu:~/0x02$ ./4-hidden_discovery.py | sort
my_secret_santa
print_hidden
print_school
guillaume@ubuntu:~/0x02$
```

Repo:

- GitHub repository: `alx-higher_level_programming`
- Directory: `0x02-python-import_modules`
- File: `4-hidden_discovery.py`

Done? | Check your code | Ask for a new correction | Get a sandbox | QA Review

5. Everything can be imported

mandatory

Score: 100.0% (*Checks completed: 100.0%*)

Write a program that imports the variable `a` from the file `variable_load_5.py` and prints its value.

- You are not allowed to use `*` for importing or `__import__`
- Your code should not be executed when imported

```
guillaume@ubuntu:~/0x02$ cat variable_load_5.py
#!/usr/bin/python3
a = 98
"""Simple variable
"""

guillaume@ubuntu:~/0x02$ ./5-variable_load.py
98
guillaume@ubuntu:~/0x02$
```

Repo:

- GitHub repository: `alx-higher_level_programming`
- Directory: `0x02-python-import_modules`
- File: `5-variable_load.py`

Done! | Check your code | Get a sandbox | QA Review

6. Build my own calculator!

#advanced

Score: 100.0% (*Checks completed: 100.0%*)

Write a program that imports all functions from the file `calculator_1.py` and handles basic operations.

- Usage: `./100-my_calculator.py a operator b`
  - If the number of arguments is not 3, your program has to:
    - print `Usage: ./100-my_calculator.py <a> <operator> <b>` followed with a new line
    - exit with the value `1`
  - `operator` can be:
    - `+` for addition
    - `-` for subtraction
    - `*` for multiplication
    - `/` for division
  - If the operator is not one of the above:
    - print `Unknown operator. Available operators: +, -, * and /` followed with a new line
    - exit with the value `1`
  - You can cast `a` and `b` into integers by using `int()` (you can assume that all arguments will be castable into integers)
  - The result should be printed like this: `<a> <operator> <b> = <result>`, followed by a new line
- You are not allowed to use `*` for importing or `__import__`
- Your code should not be executed when imported

7)

```
guillaume@ubuntu:~/0x02$ cat calculator_1.py
#!/usr/bin/python3
def add(a, b):
    """My addition function

    Args:
        a: first integer
        b: second integer

    Returns:
        The return value. a + b
    """
    return (a + b)


def sub(a, b):
    """My subtraction function

    Args:
        a: first integer
        b: second integer

    Returns:
        The return value. a - b
    """
    return (a - b)


def mul(a, b):
    """My multiplication function

    Args:
        a: first integer
        b: second integer

    Returns:
        The return value. a * b
    """
    return (a * b)


def div(a, b):
    """My division function

    Args:
        a: first integer
        b: second integer

    Returns:
        The return value. a / b
    """
    return int(a / b)
```

```
guillaume@ubuntu:~/0x02$ ./100-my_calculator.py ; echo $?
Usage: ./100-my_calculator.py <a> <operator> <b>
1
guillaume@ubuntu:~/0x02$ ./100-my_calculator.py 3 + 5 ; echo $?
3 + 5 = 8
0
guillaume@ubuntu:~/0x02$ ./100-my_calculator.py 3 H 5 ; echo $?
Unknown operator. Available operators: +, -, * and /
1
guillaume@ubuntu:~/0x02$
```

Repo:

- GitHub repository: `alx-higher_level_programming`
- Directory: `0x02-python-import_modules`
- File: `100-my_calculator.py`

Done! | Check your code | Get a sandbox | QA Review

7. Easy print

#advanced

Score: 100.0% (*Checks completed: 100.0%*)

Write a program that prints `#pythoniscool`, followed by a new line, in the standard output.

- Your program should be maximum 2 lines long
- You are not allowed to use `print` or `eval` or `open` or `import sys` in your file `101-easy_print.py`

```
guillaume@ubuntu:~/0x02$ ./101-easy_print.py
#pythoniscool
guillaume@ubuntu:~/0x02$
```

Repo:

- GitHub repository: `alx-higher_level_programming`
- Directory: `0x02-python-import_modules`
- File: `101-easy_print.py`

Done! | Check your code | Get a sandbox | QA Review

8. ByteCode -> Python #3

#advanced

Score: 100.0% (*Checks completed: 100.0%*)

(/)

Write the Python function `def magic_calculation(a, b):` that does exactly the same as the following Python bytecode:

```
(/)3          0 LOAD_CONST               1 (0)
              3 LOAD_CONST               2 (('add', 'sub'))
              6 IMPORT_NAME              0 (magic_calculation_102)
              9 IMPORT_FROM              1 (add)
             12 STORE_FAST               2 (add)
             15 IMPORT_FROM              2 (sub)
             18 STORE_FAST               3 (sub)
             21 POP_TOP

  4          22 LOAD_FAST                0 (a)
             25 LOAD_FAST                1 (b)
             28 COMPARE_OP               0 (<)
             31 POP_JUMP_IF_FALSE       94

  5          34 LOAD_FAST                2 (add)
             37 LOAD_FAST                0 (a)
             40 LOAD_FAST                1 (b)
             43 CALL_FUNCTION            2 (2 positional, 0 keyword pair)
             46 STORE_FAST               4 (c)

  6          49 SETUP_LOOP              38 (to 90)
             52 LOAD_GLOBAL              3 (range)
             55 LOAD_CONST               3 (4)
             58 LOAD_CONST               4 (6)
             61 CALL_FUNCTION            2 (2 positional, 0 keyword pair)
             64 GET_ITER
       >>    65 FOR_ITER                21 (to 89)
             68 STORE_FAST               5 (i)

  7          71 LOAD_FAST                2 (add)
             74 LOAD_FAST                4 (c)
             77 LOAD_FAST                5 (i)
             80 CALL_FUNCTION            2 (2 positional, 0 keyword pair)
             83 STORE_FAST               4 (c)
             86 JUMP_ABSOLUTE           65
       >>    89 POP_BLOCK

  8    >>    90 LOAD_FAST                4 (c)
             93 RETURN_VALUE

 10    >>    94 LOAD_FAST                3 (sub)
             97 LOAD_FAST                0 (a)
            100 LOAD_FAST                1 (b)
            103 CALL_FUNCTION            2 (2 positional, 0 keyword pair)
            106 RETURN_VALUE
            107 LOAD_CONST               0 (None)
            110 RETURN_VALUE
```

- Tip: Python bytecode (/rltoken/FMdg7W8NKJZKRuFGG8mzmg)

Repo:

- GitHub repository: `alx-higher_level_programming`
- Directory: `0x02-python-import_modules`
- File: `102-magic_calculation.py`

Done! | Check your code | Get a sandbox | QA Review

9. Fast alphabet

#advanced

Score: 100.0% (*Checks completed: 100.0%*)

Write a program that prints the alphabet in uppercase, followed by a new line.

- Your program should be maximum 3 lines long
- You are not allowed to use:
  - any loops
  - any conditional statements
  - `str.join()`
  - any string literal
  - any system calls

```
guillaume@ubuntu:~/0x02$ ./103-fast_alphabet.py
ABCDEFGHIJKLMNOPQRSTUVWXYZ
guillaume@ubuntu:~/0x02$ wc -l 103-fast_alphabet.py
3 103-fast_alphabet.py
guillaume@ubuntu:~/0x02$
```

Repo:

- GitHub repository: `alx-higher_level_programming`
- Directory: `0x02-python-import_modules`
- File: `103-fast_alphabet.py`

Done! | Check your code | Get a sandbox | QA Review