HOW DOES PYTHON'S *IMPORT* WORK?

OMAR KOHL, PYTHON USER GROUP FREIBURG, JULY 2016

Nomenclature

- **Module:** A Python file (*.py)
- **Package:** A directory containing an **__init__.py** file
- **Distribution Package:** Something you can install with **pip install**

import mod_b

mod_a.py

```
import mod_b

mod_b.printer()
```

mod_b.py

```
def printer():
    print("Hi I'm a printer")
```

$ bash

```
python3 mod_a.py
```

ex1

mod_a.py

```
print("[1] start of mod_a")

import mod_b

print("[2] mod_a after 'import mod_b'")

mod_b.printer()

print("[3] end of mod_a")
```

mod_b.py

```
print("[4] start of mod_b")

def printer():
    print("[5] Hi I'm a printer")

print("[6] end of mod_b")
```

$ bash

```
python3 mod_a.py
```

ex2

mod_a.py

```
import mod_b
import mod_c

mod_c.COUNTER += 1
mod_b.printer()

print(mod_c.COUNTER)
```

mod_b.py

```
import mod_c

mod_c.COUNTER += 1

def printer():
    print("Hi I'm a printer")
    mod_c.COUNTER += 1
```

mod_c.py

```
COUNTER = 0
```

$ bash

```
python3 mod_a.py
```

ex3

mod_a.py

```
import time
import random
from threading import Thread

def worker():
    import mod_c
    time.sleep(random.randint(0, 3))
    my_counter = mod_c.COUNTER
    time.sleep(random.randint(0, 3))
    mod_c.COUNTER = my_counter + 1

ALL_THREADS = []

for i in range(10):
    t = Thread(target=worker)
    ALL_THREADS.append(t)
    t.start()
    #t.join()
```

mod_c.py

```
COUNTER = 0
```

$ bash

```
python3 mod_a.py
```

ex4

mod_a.py

```
import sys
from pprint import pprint

print('\n\n')
pprint(sys.modules)
...
```

mod_b.py

```
def myfunc():
    pass
```

$ bash

```
python3 mod_a.py
```

ex5

```
# What is the difference between ...
python3 mod_a.py
```

```
# ... and
import mod_a
```

```
# What about?
python3 -m mod_a
```

Isn't mod_a always executed? No difference?

ex6

```
from mod_a import func1, func2
```

```
import mod_a
```

Any difference? Module always executed?

ex7

What is executed? What is added to sys.modules?

```
import pkg1.pkg2.mod_3
```

Is the following possible?

```
import pkg1
pkg1.pkg2.mod_3.myfunc()
```

ex8

Example from *Fluent Python by Luciano Ramalho*

```
# Scenario 1
import evaltime
```

```
# Scenario 2
python3 evaltime.py
```