



# PYTHON

Advanced OOP

Advanced techniques of creating and serving exceptions

# ADVANCED TECHNIQUES OF CREATING AND SERVING EXCEPTIONS

- ¿Qué es una exception?
  - Python contiene 63 (este número puede variar en función de la versión de Python) excepciones integradas (*built-in exceptions*).
  - Todas heredan de *BaseException*.
  - Las nuevas excepciones creadas deben heredar de *BaseException* o de alguna de las excepciones derivadas.
  - Las excepciones se gestionan a través de los bloques *try-except*.

```
try:  
    print(int('a'))  
except ValueError:  
    print('Error de conversión')
```

<https://docs.python.org/3/library/exceptions.html>

# ADVANCED TECHNIQUES OF CREATING AND SERVING EXCEPTIONS

- Se puede recoger en una variable la excepción utilizando la palabra clave **as**.
- El atributo **args** de la excepción contiene una tupla con la información de esta.

```
try:  
    print(int('a'))  
except ValueError as ve:  
    print('Error de conversión')  
    print(ve.args)
```



```
Error de conversión  
("invalid literal for int() with base 10: 'a'",)
```

# ADVANCED TECHNIQUES OF CREATING AND SERVING EXCEPTIONS

- Algunas excepciones tienen más información en otros atributos además de **args**.
  - *ImportError* incluye los atributos:
    - *name* (de la librería que se quería importar)
    - *path* (la ruta del fichero que lanzó la excepción –puede ser None-).

```
try:  
    import abcdefghijk  
  
except ImportError as e:  
    print(e.args)  
    print(e.name)  
    print(e.path)
```



```
("No module named 'abcdefghijk',")  
abcdefghijk  
None
```

# ADVANCED TECHNIQUES OF CREATING AND SERVING EXCEPTIONS

- Algunas excepciones tienen más información en otros atributos además de **args**.
  - *UnicodeError* incluye los atributos:
    - *encoding* – the name of the encoding that raised the error.
    - *reason* – a string describing the specific codec error.
    - *object* – the object the codec was attempting to encode or decode.
    - *start* – the first index of invalid data in the object.
    - *end* – the index after the last invalid data in the object.

```
try:  
    b'\x80'.decode("utf-8")  
except UnicodeError as e:  
    print(e)  
    print(e.encoding)  
    print(e.reason)  
    print(e.object)  
    print(e.start)  
    print(e.end)
```



```
'utf-8' codec can't decode byte 0x80 in position 0: invalid start byte  
utf-8  
invalid start byte  
b'\x80'  
0  
1
```

# ADVANCED TECHNIQUES OF CREATING AND SERVING EXCEPTIONS

- Encadenamiento de excepciones (*chained exceptions*).
  - Permite mantener la información de una excepción cuando en su tratamiento se produce otra.
  - Permite transformar una excepción en otra sin perder información.
  - Se basa en el uso de dos atributos:
    - `__context__`, propio de las excepciones encadenadas implícitamente
    - `__cause__`, propio de las excepciones encadenadas explícitamente

# ADVANCED TECHNIQUES OF CREATING AND SERVING EXCEPTIONS

## ■ Encadenamiento de excepciones **implícito**.

```
a_list = ['First error', 'Second error']

try:
    print(a_list[3])
except Exception as e:
    try:
        # the following line is a developer mistake - they wanted to print progress
        # as 1/10 but wrote 1/0
        print(1 / 0)
    except ZeroDivisionError as f:
        print('Inner exception (f):', f)
        print('Outer exception (e):', e)
        print('Outer exception referenced:', f.__context__)
        print('Is it the same object:', f.__context__ is e)
```

# ADVANCED TECHNIQUES OF CREATING AND SERVING EXCEPTIONS

## ■ Encadenamiento de excepciones **explícito**.

### ■ *Uso combinado de **raise** y **from***

```
class RocketNotReadyError(Exception):
    pass

def personnel_check():
    try:
        print("\tThe captain's name is", crew[0])
        print("\tThe pilot's name is", crew[1])
        print("\tThe mechanic's name is", crew[2])
        print("\tThe navigator's name is", crew[3])
    except IndexError as e:
        raise RocketNotReadyError('Crew is incomplete') from e

crew = ['John', 'Mary', 'Mike']
print('Final check procedure')

try:
    personnel_check()
except RocketNotReadyError as f:
    print('General exception: "{}", caused by "{}"'.format(f, f.__cause__))
```



# ADVANCED TECHNIQUES OF CREATING AND SERVING EXCEPTIONS

## ■ Encadenamiento de excepciones explícito. Transformación de excepciones.

```
class RocketNotReadyError(Exception):  
    pass
```

```
def personnel_check():  
    try:  
        print("\tThe captain's name is", crew[0])  
        print("\tThe pilot's name is", crew[1])  
        print("\tThe mechanic's name is", crew[2])  
        print("\tThe navigator's name is", crew[3])  
    except IndexError as e:  
        raise RocketNotReadyError('Crew is incomplete') from e
```

```
def fuel_check():  
    try:  
        print('Fuel tank is full in {}'.format(100 / 0))  
    except ZeroDivisionError as e:  
        raise RocketNotReadyError('Problem with fuel gauge') from e
```

```
crew = ['John', 'Mary', 'Mike']  
fuel = 100  
check_list = [personnel_check, fuel_check]
```

```
print('Final check procedure')
```

```
for check in check_list:  
    try:  
        check()  
    except RocketNotReadyError as f:  
        print('RocketNotReady exception: "{}", caused by {}'.format(f, f.__cause__))
```



Final check procedure

The captain's name is John

The pilot's name is Mary

The mechanic's name is Mike

RocketNotReady exception: "Crew is incomplete", caused by "list index out of range"

RocketNotReady exception: "Problem with fuel gauge", caused by "division by zero"

# ADVANCED TECHNIQUES OF CREATING AND SERVING EXCEPTIONS

- Atributo `__traceback__`. Contiene información sobre el origen de la excepción.
  - Se encuentra en el módulo **traceback**

```
import traceback
```

```
class RocketNotReadyError(Exception):  
    pass
```

```
def personnel_check():  
    try:  
        print("\tThe captain's name is", crew[0])  
        print("\tThe pilot's name is", crew[1])  
        print("\tThe mechanic's name is", crew[2])  
        print("\tThe navigator's name is", crew[3])  
    except IndexError as e:  
        raise RocketNotReadyError('Crew is incomplete') from e
```

```
crew = ['John', 'Mary', 'Mike']
```

```
print('Final check procedure')
```

```
try:  
    personnel_check()  
except RocketNotReadyError as f:  
    print(f.__traceback__)  
    print(type(f.__traceback__))  
    print('\nTraceback details')  
    details = traceback.format_tb(f.__traceback__)  
    print("\n".join(details))
```

```
print('Final check is over')
```

Final check procedure

The captain's name is John

The pilot's name is Mary

The mechanic's name is Mike

<traceback object at 0x000002BE50FCBA40>

<class 'traceback'>

Traceback details

File "h:\Mi unidad\\_\_Transparencias\_propias\Python\EDUBE-Python-Professional-Advanced OOP\ejemplo.py", line 22, in <module>  
 personnel\_check()

File "h:\Mi unidad\\_\_Transparencias\_propias\Python\EDUBE-Python-Professional-Advanced OOP\ejemplo.py", line 14, in personnel\_check  
 raise RocketNotReadyError('Crew is incomplete') from e

Final check is over