

Exceptions

Exceptions and Interrupts

- both change program flow
- interrupts – caused by external events

examples: keyboard, serial port data

- exceptions – caused by program

examples: division by zero

- Python has mechanisms to “catch” and process exceptions
- unhandled exceptions stop execution

No Exception Handling

```
def compute_inverse(x):  
    y = 1.0/x  
    return y
```

```
>>> x = compute_inverse(4)
```

```
0.25
```

```
>>> x = compute_inverse(0)
```

```
ZeroDivisionError: float division by zero
```

Exception Handling

```
def compute_inverse(x):  
    try:  
        y = 1.0/x  
    except Exception as error:  
        print (error)  
        y = 0  
    finally:  
        print ('finished')  
        y = 0  
    return (y)
```

```
>>> x = compute_inverse(4)
```

```
0.25
```

```
>>> x = compute_inverse(0)
```

```
ZeroDivisionError: float division by zero
```

Exception Examples

Name	Description
Exception	base class
ArithmeticError	errors in computation
ZeroDivisionError	division by zero
ImportError	import statement fails
IndexError	index not in sequence
KeyError	key not in dictionary
NamedError	identifier not found
SyntaxError	error in syntax
IndentationError	improper indentation

Exception Handling

```
try:
    <statements_block_0>
except exception_group_1 as variable_1
    <statements_block_1>
# -----
except exception_group_n as variable_n
    <statements_block_1>
else:
    <statements for unknown error>
finally:
    <final statements>
```

Example Without Errors

```
>>> x = 'Mozzarella'
```

```
>>> y = 3
```

```
>>> print (x * y)
```

```
'MozzarellaMozzarellaMozzarella'
```



MozzarellaMozzarellaMozzarella

Frames

Objects

Global frame

x	"Mozzarella"
---	--------------

y	3
---	---

Example Without Errors

```
>>> x = 'Mozzarella'
```

```
>>> y = '3'
```

```
>>> print (x*y)
```

```
TypeError: can't multiply sequence by non-  
int of type 'str'
```

- program stops after printing error

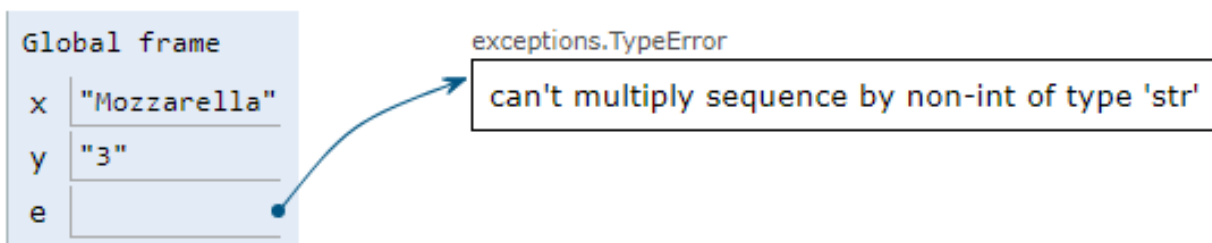
Catching *TypeError* Exception

```
>>> x = 'Mozzarella'
>>> y = '3'
>>> try:
>>>     print (x*y)
>>> except TypeError, e:
>>>     print 'exception caught !!!'
>>>     print e
>>> finally:
>>>     print('execution continues ...')
```

```
exception caught !!!
can't multiply sequence by non-int of type 'str'
execution continues ...
```

Frames

Objects



Try/Except without Exception

```
>>> x = 'Mozzarella'
>>> y = 3
>>> try:
>>>     print (x*y)
>>> except TypeError, e:
>>>     print 'exception caught !!!'
>>>     print e
>>> finally:
>>>     print('execution continues ...')
```

```
MozzarellaMozzarellaMozzarella
execution continues ...
```

Frames

Objects

Global frame

x	"Mozzarella"
y	3

Review Problems

Interview Problem

- give an example to demonstrate exception handling

Interview Problem

- what is exception handling?
- how do you achieve it in Python?

Interview Problem

- explain different ways to trigger / raise exceptions in a Python script?