

# Outline

- ① Introduction
- ② Why Python?
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- ④ First Steps in Python
- ⑤ Variables
- ⑥ Basic Operations and Modules
- ⑦ Antigravity
- ⑧ Useful Functions and Variables**

# Useful functions

Choose the precision

```
In [1]: 3/7.0
In [2]: payment = 3/7.
In [3]: payment2 = round(payment, 4)
In [4]: payment2
```

But attention

```
In [1]: payment*pow(10,6)
Out [1]: 428571.4285714285
In [2]: payment2*pow(10,6)
Out [2]: 428600.0
```

# More maths

## Mathematical constants and special functions

```
In [1]: math.e
In [2]: math.pi
In [3]: math.sin(math.pi)
In [4]: math.cos(math.pi)
In [4]: math.log(math.e)
In [5]: math.exp(1)
```

## But attention

```
In [1]: payment*pow(10,6)
Out [1]: 428571.4285714285
In [2]: payment2*pow(10,6)
Out [2]: 428600.0
```

# Useful functions

## How to print

```
In [1]: import math
In [2]: print 'Pi = ', math.pi
In [3]: print math.pi
In [4]: print 'Pi is {} or e is {}'.format(
        math.pi, math.e)
```

## Finding out the type of a variable

```
In [1]: x = 1
In [2]: type(x)
In [3]: x = float(1)
In [4]: type(x)
In [5]: if isinstance(x, (int, float)):
...     :     print 'x is a number'
```

# Useful functions

## Combining strings (that is text)

```
In [1]: a = 'Hello'
In [2]: b = 'world'
In [3]: a+b
In [4]: a+'_' +b
In [5]: print '{}_{}!'.format(a,b)
```

## Stripping and changing case

```
In [1]: x = '    heLlo    '
In [2]: x.upper()
In [3]: x.lower()
In [4]: x.capitalize()
In [5]: x.strip()
In [6]: x.strip().capitalize()
```

# Tuples

Combining strings (that is text)

```
In [1]: t = ('JC', 33)
In [2]: print t
In [3]: len(t)
In [4]: t[0]
In [5]: type(t[1])
In [6]: type(t)
In [7]: print 'My name is {} and my age is {}'.format(*t)
```

# Exercises

- 4 How do you find all the built-in functions?
- 5 Convert the text 'This exercise is simple' to capital letters.
- 6 We have 41 persons in this class. If we want to make groups of 3 for projects, how many groups will there be and how many people will there be in a non-complete group?
- 7 explain the following results:

```
In [1]: x = 5.566  
In [2]: round(x, 2)  
Out [2]: 5.56
```

# Solutions

- Exercise 4

```
In [1]: dir(__builtins__)
```

- Exercise 5

```
In [1]: s='This is a simple exercise'.upper()  
In [2]: print s
```

- Exercise 6

```
In [1]: print 'With {} students there will \\\n...    : be {} groups with {} students and \\\n...    : there will remain {}'.format(  
...    : 41, 41/3, 3, 41%3)
```



# Solutions

- Exercise 7: The way round works in mathematics is that digits below 5 are rounded down, digits greater or equal 5 are rounded up, so  $\text{round}(3.4)=3$ ,  $\text{round}(3.5)=4$  and  $\text{round}(3.14,1)=3.1$ ,  $\text{round}(3.15,1)=3.2$