Introspection in Python: Looking into your toolbox

You can think of programming as a craftsmans' place of work: there is a set of tools that allow you to get things done. As an apprentice of Python, you might want to know at the beginning *„Which tools are there?"*. In the Python shell, it is easy to look into your toolbox and see what is inside:

```
>>> dir()
['__builtins__', '__doc__', '__name__', '__package__']
```

Let's see what we have in our toolbox: There are apparently four different items here. We can type them one by one to see what they are:

```
>>> __name__
'__main__'
>>> __doc__
>>> __package__
>>> __builtins__
<module '__builtin__' (built-in)>
```

__name__ seems to be some kind of label for our toolbox. __doc__ and __package__ both seem to be empty. Not very helpful so far. How about __builtin__? This appears to be a 'module', some kind of box. Could we look into this box as well? We can:

```
>>> dir(__builtins__)
['ArithmeticError', 'AssertionError', 'AttributeError',
…
'tuple', 'type', 'unichr', 'unicode', 'vars', 'xrange', 'zip']
```

Whoa! Thats a lot of things. Actually, all these items are *built-in*, so they can be used any time in Python by typing their names. You can e.g. try what print does:

```
>>> print
>>>
```

This creates an empty line. Could be useful.

Lets try something else:

```
>>> cmp
<built-in function cmp>
```

Isn't there something that tells us ***in human language*** what a given tool might be good for?

```
>>> help(cmp)
Help on built-in function cmp in module __builtin__:

cmp(...)
    cmp(x, y) -> integer

    Return negative if x<y, zero if x==y, positive if x>y.
```

So eventually, we can use this to compare numbers (and maybe other things) later.

Summary:

- Python is a set of tools that are grouped into boxes.
- **`dir()`** shows all names of things (tools and toolboxes) available in Python.
- **`dir(something)`** shows everything inside a box-like structure.
- **`help(something)`** shows a description of a tool or toolbox.

Task 1:

Read the text above and try the three comands described there.

Taks 2:

Import one of the standard modules **`random`**, **`math`** or **`time`**.

```
>>> import random
```

Examine them using **`dir`** and **`help`** and identify three functions that you are able to use. Explain to the group what they do and how to use them.