# More Python Types & Functions

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## Set Type

```
numbers = set([1,2,5])
print 3 in numbers
numbers.add(4)
print numbers
numbers.add(1)
print numbers
print numbers | set(['Rita'])
print numbers - set([2,3])
Output:
False
set ([1, 2, 4, 5])
set ([1, 2, 4, 5])
set ([1, 2, 4, 5, 'Rita'])
set ([1, 4, 5])
```

# None object

None

## Object Identity

#### Object Identity

- A is B
- A is not B

### Exercise

```
A = []
B = []
A.append(1)
B. append (1)
 print (A == B)
 print (A is B)
This prints:
(a)
                 (b)
                                   (c)
                                                    (d)
                                  False
False
True
                 False
                                                    True
True
                 True
                                                    False
```

## Exercise Break

### Exercise Break

Consider the following code:  $g2g = \{$ 

```
'PBANKA_000230': ['GO:0003899'],
'PBANKA_000370': ['GO:0016740'],
'PBANKA_010060': ['GO:0030430'],
'PBANKA_010080': ['GO:0008270'],
```

(In real life, this would have 2420 entries) How do you look up GO term for gene PBANKA\_000230?

## Exercise Break

```
Consider the following code:
```

(In real life, this would have 2420 entries) How do you look up GO term for gene PBANKA 000230?

(a) (b) (c) g2g[0]  $g2g['PBANKA\_000230']$  g2g[000230]

# List Comprehensions

```
name = [ <expr> for <name> in <sequence> if <condition> ]
maps to
name = []
for <name> in <sequence>:
    if <condition>:
        name.append(<expr>)
```

# List Comprehensions Example

```
\begin{aligned} & \text{squares} = \left[ \, \mathbf{x}^* \mathbf{x} \; \text{ for } \mathbf{x} \; \text{ in } \; \mathbf{xrange} \left( \mathbf{1} \,, 20 \right) \, \right] \\ & \text{squares} = \left[ \, \right] \\ & \text{for } \mathbf{x} \; \text{ in } \; \mathbf{xrange} \left( \mathbf{1} \,, 20 \right) \colon \\ & \text{squares.append} \left( \mathbf{x}^* \mathbf{x} \right) \end{aligned}
```

## Functions I

```
def greet():
    print 'Hello World'
    print 'Still Here'

greet()
greet()
print 'Now here'
greet()
```

## Functions II

```
def greet(name):
    print 'Hello {0}'.format(name)

greet('World')
greet('Luis')
greet('Kim')
```

## Functions III

# Multiple Assignment

A, B = 1, 2

Assign multiple elements at once.

```
def greet (name, greeting='Hello'):
    greet (name, greeting='Hello')
    Greets person by name
    Parameters
    name: str
        Name
    greeting: str, optional
        Greeting to use
    , , ,
    print greeting, name
ret = greet ('World')
```

# Sequences

```
for value in sequence:
```

### Sequences

- Lists
- Tuples
- Sets
- Dictionaries
- ...

### Goals for next 15 minutes

- A quiz
- Do a few exercises.
- Play around.
- You can work alone, in pairs, in triples,...
- Looking up answers on the internet is technique, not cheating!

### Lists I

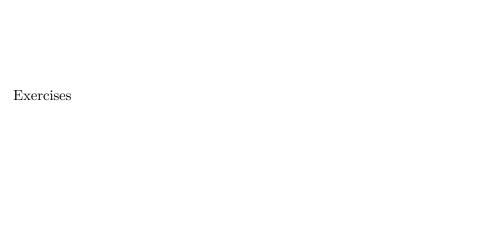
How do you access the first element of a list? Assume list is a list:

- list[1]
- list[0]
- **3** list[-1]
- **1** list(0)
- **o** list(-1)
- **6** list(1)

## Lists II

How do you access the last element of a list? Assume list is a list:

- list[1]
- **②** list(-0)
- **3** list[-1]
- **●** list(-1)
- **o** list(1)
- **o** list[-0]



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## Object Identity

What is the difference between the following two code examples: A)

$$A = \begin{bmatrix} 1, & 2, & 3 \\ B = \begin{bmatrix} 1, & 2, & 3 \end{bmatrix} \\ B = \begin{bmatrix} 1, & 2, & 3 \end{bmatrix} \\ B = A$$

Write a small piece of code (should be 2 or 3 lines) that behaves differently if you insert it after each of the two segments above.

## Object Identity

What is the difference between the following two code examples: A)

$$A = [1, 2, 3]$$

$$B = [1, 2, 3]$$

$$B)$$

$$A = [1, 2, 3]$$

Write a small piece of code (should be 2 or 3 lines) that behaves differently if you insert it after each of the two segments above.

$$B[0] = 0$$
print A

B = A

- Learn about the built-in function sum
- Write an implementation of this function

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- 2 Write an implementation of this function

```
\begin{array}{l} \text{numbers} = \, \text{set} \, (\, [\, 1\,, 2\,]\,) \\ \text{for i in } \, \text{xrange} \, (5\,) \, \colon \\ \text{numbers.add} \, (\, i\,) \\ \text{print len} \, (\, \text{numbers}\,) \end{array}
```

#### This prints:

- 7
- 6
- 5
- 4

## Learning more

- Learn Python the Hard Way by Zed Shaw (online for free or pay money for hard copy)
- http://python.org