A Quick Python Tour

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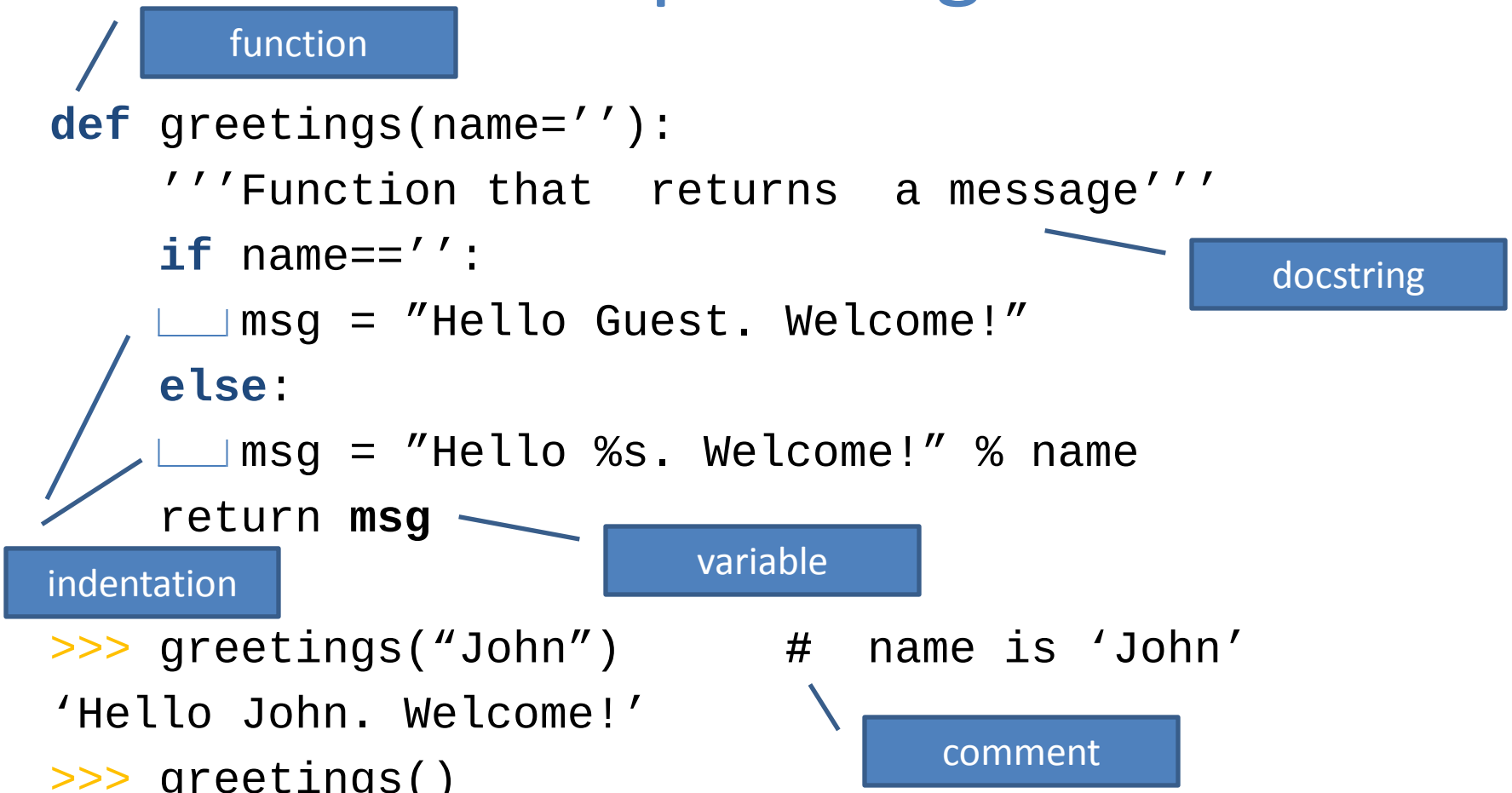
What is Python?

- Programming Language created by **Guido van Rossum**
- It has been around for over 20 years
- Dynamically typed, object-oriented language
- Runs on Win, Linux/Unix, Mac, OS/2 etc
- Versions: 2.x and 3.x

What can Python do?

- Scripting
- Rapid Prototyping
- Text Processing
- Web applications
- GUI programs
- Game Development
- Database Applications
- System Administrations
- And many more.

A Sample Program



Python Data Types

- Built-in types
  - int, float, complex, long
- Sequences/iterables
  - string
  - dictionary
  - list
  - tuple

Built-in Types

- Integer

  >>> a = 5
- Floating-point number

  >>> b = 5.0
- Complex number

  >>> c = 1+2j
- Long integer

  >>> d = 12345678L

String

- Immutable sequence of characters enclosed in quotes

```
>>> a = “Hello”
>>> a.upper()          # change to uppercase
‘HELLO’
>>> a[0:2]             # slicing
‘He’
```

List

- Container type that stores a sequence of items
- Data is enclosed within square brackets []

```
>>> a = [“a”, “b”, “c”, “d”]
>>> a.remove(“d”)  # remove item “d”
>>> a[0] = 1            # change 1st  item to 1
>>>  a
[ 1, “b”, “c” ]
```

Tuple

- Container type similar to list but is immutable
- More efficient in storage than list.
- Data is enclosed within braces ()

```
>>> a = ('a', 'b', 'c')
>>> a[1]
'b'
>>> a[0] = 1            # invalid
>>> a += (1, 2, 3)      # invalid
>>> b = a+(1,2,3)       # valid, create new tuple
```

Dictionary

- Container type to store data in key/value pairs
- Data is enclosed within curly braces {}

```
>>> a = {“a”:1, “b”:2}
>>> a.keys()
[‘a’, ‘b’]
>>> a.update({‘c’:3})      # add pair {‘c’:3}
>>> a.items()
[(‘a’, 1), (‘c’, 3), (‘b’, 2)]
```

Control Structures

- Conditional
  - if, elif, else - branch into different paths
- Looping
  - while - iterate until condition is false
  - for - iterate over a defined range
- Additional control
  - break - terminate loop early
  - continue - skip current iteration
  - pass - empty statement that does nothing

if, else, elif

- Syntax:

  if *condition1*:

  statements

  [elif *condition2*:

  statements]

  [else:

  statements]

- Example:

```
x = 1
y = 2
if x>y:
    print “x is greater.”
elif x<y:
    print “y is greater.”
else:
    print “x is equal to y.”
```

- Output:

```
y is greater.
```

while

- Syntax:

  while *condition*:

  statements

- Example:

```
x = 1
while x<4:
    print x
    x+=1
```

- Output:

```
1
2
3
```

for

- Syntax:

  for *item* in *sequence*:

      statements

- Example:

  for x in “abc”:

      print x

- Output:

  a

  b

  c

Function

• A function or method is a group of statements performing a specific task.

- Syntax:

```
def fname(parameters):
    [''' doc string ''']
     statements
    [return expression]
```

- Example:

```
def triangleArea(b, h):
    '''Return triangle area'''
    area = 0.5 * b * h
    return area
```

- Output:

```
>>> triangleArea(5, 8)
20.0
>>> triangleArea.__doc__
'Return triangle area'
```

class and object

• A class is a construct that represent a kind using methods and variables. An object is an instance of a class.

- Syntax:

```
class ClassName:
    [class documentation]
    class statements
```

- Example:

```
class Person:
    def __init__(self, name):
        self.name = name
    def introduce(self):
        return “I am %s.” % self.name
```

- Output:

```
>>> a = Person(“John”).    # object
>>> a.introduce()
‘I am John.’
```

End of Tour

This is just a brief introduction.

What is next?

- Read **PySchools** *Quick Reference*
- Practice the online tutorial on PySchools

Have Fun!