

# 1. Introduction

- Python is a general purpose, high level language.
- It is dynamically typed and interpreted language.

## 1.1 Getting Started

- Python runs mostly on all modern operating systems.
- Windows – <http://docs.python-guide.org/en/latest/starting/install/win/>  
(<http://docs.python-guide.org/en/latest/starting/install/win/>)
- GNU/Linux – <http://docs.python-guide.org/en/latest/starting/install/linux/>  
(<http://docs.python-guide.org/en/latest/starting/install/linux/>)
- Mac OSX – <http://docs.python-guide.org/en/latest/starting/install/osx/>  
(<http://docs.python-guide.org/en/latest/starting/install/osx/>)

## 1.2 Python Interpreter

- Type python in the Command Prompt or Terminal. The output should look like

```
> → learnpythoninminutes python
Python 2.7.5 (default, Mar  9 2014, 22:15:05)
[GCC 4.2.1 Compatible Apple LLVM 5.0 (clang-500.0.68)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

- Command takes you to Python Interactive Shell. The important thing to note here is Python 2.7.5 which says python version installed in the machine. All the tutorial will focus on Python 2.7.x.

## 1.3 Using Python Interpreter

```
> >>> print("Welcome to learn python in minutes tutorial")
Welcome to learn python in minutes tutorial
>>> place = "Bangalore"
>>> duration = 180 # Duration in minutes. This is a comment!
>>> author = "Kracekumar"
>>> print("Welcome to learn python in minutes tutorial by %s for %d minutes in
%s" % (author, duration, place))
Welcome to learn python in minutes tutorial by Kracekumar for 180 minutes in
Bangalore
```

- >>> indicates we are inside Python interpreter.
- Interpreter reads every line, evaluates and returns result if any.
- place = "Bangalore" is variable. Left hand side of = is the name of the variable and right hand side is the value.

- No need to give what is the type of the variable.
- `print()` is function which prints result to standard output, here it is Python Interpreter.
- `duration = 180` is a variable which stores int value.
- `%s`, `%d` are format specifiers like c.

## 1.4 Numbers

- Python has very good support for number crunching.

```
>>> duration_in_mins = 180
>>> duration_in_mins / 60 # Hours, in int
3
>>> duration_in_mins / 60.0 # Hours, in float
3.0
>>> duration_in_mins * 60 # In seconds
10800
>>> 12 + 23 # Simple add
35
>>> 12 - 23 # Subtraction
-11
>>> 12 / 23 # Division
0
>>> 12 / 23.0 # Note the denominator
0.5217391304347826
>>> 12 * 23.0 # multiply
276.0
>>> 3 % 2 # Modulo
1
>>> 12 ** 23.0 # 12 power of 23
6.624737266949237e+24 # When number is too large scientific notation is used
>>> 12 ** 12
8916100448256
>>> 12 ** 18
26623333280885243904L # 'L' at the end says it is a long number.
>>> 12 + 20 * 2 - 4 * 2 / 2.0
48.0
>>> 12 + (20 * 2) - 4 * (2 / 2.0)
48.0
>>> 12 + (20 * 2) - (4 * 2) / 2.0
48.0
```

- While dividing two numbers if both are int result will be int else float.

Let's see how expression are handled without brackets.

```
12 + 20 * 2 - 4 * 2 / 2.0
12 + 40 - 4 * 2 / 2.0
12 + 40 - 8 / 2.0
12 + 40 - 4.0
52 - 4.0
```

- Expression is evaluated from Left -> Right. BODMAS (Bracket Of Division Multiplication) rule is followed while evaluating expression.

## 1.5 More about variables

- It is possible to create multiple variables in same line.

```
>>> a, b = 12, 23 # Multiple declaration
>>> print(a, b)
(12, 23)
>>> b, a = a, b
>>> print a, b # print is a statement
23 12
```

- Woot! We swapped two numbers without intermediate variable.

## 1.6 Summary

- `a = 23` creates a new variable, no need to mention value type.
- No need to use bracket while evaluating expression unless explicit preference is needed.
- Python automatically rounds off number during division if both the numbers are int.

## 2. String

- single quote ('python') or double quote ("python") or triple single/double quotes can be used to create a new string.
- strings are immutable data type.

### 2.1 String Interpolation

#### Code

```
author = 'Kracekumar'
one_liner_about_python = "Python is simple and powerful language"
description = """Python is a general purpose, high level language.
It is dynamically typed and interpreted language.
"""

print(author)
print(one_liner_about_python)
print(description)

complete_msg = """Author: {}
One liner about Python:
- {}
Long Description:
{}""".format(author, one_liner_about_python, description)
print(complete_msg)
```

## Output

```
> Kracekumar
Python is simple and powerful language
Python is a general purpose, high level language.
It is dynamically typed and interpreted language.

Author: Kracekumar
One liner about Python:
- Python is simple and powerful language
Long Description:
Python is a general purpose, high level language.
It is dynamically typed and interpreted language.
```

## 2.2 Methods

- Everything is an object in Python.
- string has lot of methods like upper, lower, strip etc ..

### Code

```
> print("lower".upper())
print("upper".lower())
print("captialize".capitalize())
print(" extra spaces ".strip()) # Very useful in web development while cleaning user input
print("find a word's position in the sentence".find('word')) # returns starting position
print("how many times the letter `e` is present in the sentence".count('e'))
print("Replace delete with remove".replace('delete', 'remove'))
print("Python is simple and powerful language".startswith('Python'))
```

## Output

```
> LOWER
upper
Captialize
extra spaces
7
11
Replace remove with remove
True
```

## 2.3 Accessing characters in string

### Code

```
> language = 'python'
print(language[0]) # Print first character
print(language[-1]) # print last character
print(len(language)) # builtin function, Find the length of the string
print(language[0:2]) # Print first 3 characters. Slicing '0' is starting index and
```

```
'2' is last index.  
print(language[-3:]) # print last three characters  
language = language + "." # Add a dot after python. Here new variable is created  
print(language)
```

### Output

```
p  
n  
6  
py  
hon  
python.
```

## 2.4 Summary

- string is immutable datatype.
- string has lot of useful methods for data processing.
- negative index can be used for accessing the string content from reverse direction.
- slicing is used for getting partial content from the string.

## 3. Condition

- True and False are Boolean values in Python. None is used to represent absence of a value.
- Python uses if, elif, else for branching.
- == is used to check two values are equal, != is used for non equality checks.

### 3.1 Boolean values

#### Code

```
print(23 == 32)  
print(23 != 32)  
print(True == False)  
print(True != False)
```

#### Output

```
False  
True  
False  
True
```

### 3.2 Branching

Write a program if a given number is divisible by 3 print fizz, 5 print buzz, divisible by both 3 and 5 print fizz buzz else print nothing. Create a new file called fizzbuzz.py and write the code. python fizzbuzz.py should execute the code.

## Code

```
# fizzbuzz.py

number = 23

print(number)
if number % 15 == 0:
    print("fizz buzz")
elif number % 3 == 0:
    print("fizz")
elif number % 5 == 0:
    print("buzz")
else:
    print("nothing")
```

## Output

```
examples $ python fizzbuzz.py
23
nothing
```

## 3.3 Few things to note

- Python uses indentation to separate block. So use 4 spaces or tabs which converts to 4 spaces. Don't mix both.
- : at the end of if, elif, else statement.

## 3.4 Boolean operations

- Python uses keyword and, or, not for and, or, not operations.

## Code

```
print(True and False)
print(23 and 12) # Watch for output
print(True or False)
print(23 or 12) # Watch for output
print("python" or "javascript")
print("python" and "javascript")
print(not 23)
```

## Output

```
False
12
True
23
python
javascript
False
```

### 3.5 Summary

- True, False are Boolean values. None represents absence of value.
- Logical operators are and, or, not. Logic operators can be used with any data type.
- ==, != are comparison operators.

## 4 List - Data Structure

- List is collection of heterogenous data type.
- List is similar to array in other languages.
- Size of the list grows over the course of the program.

### 4.1 List in Action

#### Code

```
collection = ['Ruby', 23, 45.9, True] # Collection of different elements.
"""Representaion of list
-----
| 'Ruby' | 23 | 45.9 | True |
-----
0         1         2         3

"""

print(collection)
# Access the first element
print(collection[0])
# Access the last element
print(collection[-1])
# Replace the first element
collection[0] = 'Python'
print(collection[0])
# Add an element at the last position
collection.append("last")
print(collection[-1])
# Insert an element at position 2
print(collection)
collection.insert(2, 12)
print(collection)
# Delete the last element
del collection[-1]
print(collection)
# Length of the list
print(len(collection))
```

#### Output

```
['Ruby', 23, 45.9, True]
Python
True
Python
```

```
last
['Python', 23, 45.9, True, 'last']
['Python', 23, 12, 45.9, True, 'last']
['Python', 23, 12, 45.9, True]
5
```

## 4.2 Nested list

- List can have list inside it.

### Code

```
> nested_collection = [['apple', 'orange'], ['Python', 'Go']]
print(nested_collection) # Access first element in first list
print(nested_collection[0][0])
```

### Output

```
> [['apple', 'orange'], ['Python', 'Go']]
apple
```

## 4.3 Methods

### Code

```
> collection = ['Python', 23, 45.9, True]
print(collection.count(23))
print(collection.index(23)) # If not found Exception will be raised.
print('23' in collection) # Check if an element is present in list
print('p' in 'python') # 'in' works on strings, list etc..
```

### Output

```
> 1
1
False
True
```

## 4.4 Summary

- List is collection of heterogenous data types.
- List can have nested elements.
- append adds the element at the end of the list.
- in operator is used to check presence of an element.

## 5.1 For loop

- for loop can be used against data structure which is iterable like list, string.

## 5.2 loop over list



### Code

```
> for i in ['Python', 23, 45.9, True]: # During every iteration i value is replaced,
    'python' -> '23' -> '45.9' -> 'True'
    print(i)
```

### Output

```
> Python
23
45.9
True
```

### Code

```
> for ch in "Python":
    print(ch)
```

### Output

```
> P
y
t
h
o
n
```

### Code

```
> for number in range(0, 10): # Produces list of numbers starting from 0 til 9, 10 is excluded.
    if number % 2 == 0:
        print("Even")
    else:
        print("Odd")
```

```
> Even
Odd
Even
Odd
Even
Odd
Even
Odd
Even
Odd
```

## 5.3 Summary

- During every iteration temporary variable holds the value in the iterable.
- : at the end of the for statement is important.
- Similar to if statement body of for loop is indented.

## 6.1 Functions

- Function is unit which may take arguments, compute and returns a value. Sometimes function doesn't return a value.

## 6.2 Let's calculate

### Code

```
def square(x): # No need to specify type of the argument.
    return x * x

def cube(x):
    return square(x) * x

def msg(): # Function with no arguments and doesn't return any value
    print("End")

print(square(2))
print(square(23))
msg()
```

### Output

```
4
529
End
```

## 6.3 Default value

### Code

```
def square(x=2): # if x didn't receive any value, 2 is taken.
    return x * x

print(square(23))
print(square())
```

### Output

```
529
4
```

## 6.4 Function as function argument

- Function can take function as an argument.

### Code

```
def fxy(f, x, y): # f(x, y) = f(x) . f(y)
    return f(x) * f(y)
```

```
def square(x):
    return x * x

print(fxy(square, 2, 3))
```

### Output

```
> 36
```

## 6.5 Summary

- Function is small unit of computation which may take arguments and may return values.
- Function can be passed to a function as an argument.
- Function body should be indented like if statement.

## 7.1 Builtin functions

- Python has lot of builtin functions.

## 7.2 Handy builtin functions

### Code

```
> print(sum([1, 2, 3, 4])) # 10
print(max([1, 2, 3, 4])) # 4
print(min([1, 2, 3, 4])) # 1
print(sorted([1, 2, 3, 4])) # Ascending order
print(sorted([1, 2, 3, 4], reverse=True)) # Descending order
print(float(23)) # Typecast into float
print(list("23")) # String -> list
print(str(23))
print(int('23'))
# Find data type
print(type(23))
print(type([2]))
print(type('23'))
```

### Output

```
> 10
4
1
[1, 2, 3, 4]
[4, 3, 2, 1]
23.0
['2', '3']
23
23
<type 'int'>
<type 'list'>
```

```
<type 'str'>
```

## 7.3 Summary

- There are around 80 builtin functions, complete details is available here <https://docs.python.org/2/library/functions.html> (<https://docs.python.org/2/library/functions.html>) .

## 8.1 Classes

- class is a template for creating objects. Objects contains attributes and methods.
- Object is created by invoking the constructor or initializer.
- Attributes and methods may belong to instance or class.

## 8.2 Objects

Create a class Person with attributes first\_name, last\_name, age. Add full\_name and is\_major as methods to class Person.

### Code

```
class Person:
    def __init__(self, first_name, last_name='', age=18): # self is always first
        argument in all instance method
        # __init__ is initializer
        self.first_name = first_name
        # 'self' is used for accessing instance attribute and method.
        self.last_name = last_name
        self.__age = age # Private like attribute

    def full_name(self):
        # Instance method
        return self.first_name + ' ' + self.last_name

    def get_age(self):
        # Since __age is private like variable we need to have getters and setters.
        Getter
        return self.__age

    def set_age(self, age):
        # Setter
        self.__age = age

    def is_major(self):
        return self.__age >= 18

guido = Person("Guido", "van rossum", 58) # __init__ of Person is called
krace = Person("Kracekumar", "Ramaraju", 24)
# Access instance first_name, last_name
print(guido.first_name)
```

```

print(guido.last_name)
print(krace.first_name)
print(krace.last_name)
# Access instance methods
print(guido.full_name()) # self is passed implicitly in the background.
print(krace.is_major())

# Modif the age, first_name
krace.set_age(12)
krace.first_name = 'kracekumar'
print(krace.get_age(), krace.first_name)
print(krace.is_major())

```

## Output

```

 Guido
van rossum
Kracekumar
Ramaraju
Guido van rossum
True
(12, 'kracekumar')
False

```

## 8.3 Summary

- `__init__` is initializer in Python.
- `self` is passed as first argument in method.
- Attributes starting `__` are inaccessible with `.` notation .

## 9.1 Dictionary

- Dictionary is Hash Map or Associative Array in other programming languages.
- Every entry in dictionary consist of Key, Value pair.

## 9.2 Examples

### Code

```

months = {'jan': 31, 'feb': 28, 'mar': 31, 'apr': 30} # Colon is used to separate key and value

# 'jan' is key and '31' is value
""" Visual representation of Dictionary
-----
|Key|Value|
-----
|jan|31   |
-----
|feb|28   |
-----

```

```

|mar|31 |
-----
|apr|30 |
-----
"""

print(months) # Dictionary don't maintain the order of insertion.
print(months['jan']) # Values in dictionary are accessed using key, in list index
is used.
print(months.get('jan')) # .get returns None if the key is missing
print('dec' in months) # 'in' is used to check presence of key in dictionary.
print(len(months)) # len function is used to find total key, value pair in diction
ary.
for key, value in months.items(): # .items() returns two values during every itera
tion. First is key, second is value
    print(key, '->', value)
months['feb'] = 29 # Leap year! if key is already present value will be replaced el
se key, value pair will be added.
print(months)
months['dec'] = 31
print(months)

```

## Output

```

{ 'jan': 31, 'apr': 30, 'mar': 31, 'feb': 28}
31
31
False
4
('jan', '->', 31)
('apr', '->', 30)
('mar', '->', 31)
('feb', '->', 28)
{ 'jan': 31, 'apr': 30, 'mar': 31, 'feb': 29}
{ 'jan': 31, 'apr': 30, 'dec': 31, 'mar': 31, 'feb': 29}

```

## 9.3 Use case

- Dictionary is used when representation is key, value pair like monthly sales, student marks stored subject wise.
- Dictionary lookup takes constant time.

## 9.4 Summary

- Dictionary doesn't maintain the key, value pair order.
- .get() method is used to value of the key in dictionary. If key is missing None is returned.

## 10.1 Exceptions

- When something goes unexpected interpreter raises Exception like dividing by zero, accessing the missing array index.

- Exceptions can be caught and acted accordingly.

## 10.2 try

### Code

```
> 1 = [1, 2, 3]
    print(l[5]) # This raises IndexError since list only contains 3 elements.
```

### Output

```
> -----
    ---
    IndexError                                Traceback (most recent call last)

    <ipython-input-56-5e770730b19a> in <module>()
    1 1 = [1, 2, 3]
    ----> 2 print(l[5]) # This raises IndexError since list only contains 3 elements.

    IndexError: list index out of range
```

### Code

```
> d = {'a': 1}
    print(d['b']) # Raises KeyError
```

### Output

```
> -----
    ---
    KeyError                                Traceback (most recent call last)

    <ipython-input-57-945bd7e85bd3> in <module>()
    1 d = {'a': 1}
    ----> 2 print(d['b']) # Raises KeyError

    KeyError: 'b'
```

## 10.3 catch

### Code

```
> try:
    1 = [1, 2, 3]
    print(l[5])
except IndexError as e:
    print(e)
```

### Output

list index out of range

❏

#### Code

❏ try:

```
    d = {'a': 1}
    print(d['b'])
except KeyError as e:
    print(e)
```

#### Output

❏ 'b'

### 10.4 Catch all

#### Code

❏ try:

```
    l = [1, 3, 3]
    d = {'a': 1}
    print(l[5], d['a'])
except (IndexError, KeyError) as e:
    print(e)
finally:
    print("end")
```

#### Output

❏ list index out of range  
end

### 10.4 Summary

- try, except, finally are three exception handling blocks.
- except can catch more than one Exception type.

### 11.1 More Resources

- Learn Python HardWay – <http://learnpythonthehardway.org/>  
(<http://learnpythonthehardway.org/>)
- Build your search engine – <https://www.udacity.com/course/cs101>  
(<https://www.udacity.com/course/cs101>)
- Official Docs: <https://docs.python.org/2/> (<https://docs.python.org/2/>)

### 11.2 Contact

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### 11.3 Contributors

- Thanks Praseetha ([https://twitter.com/void\\_imagineer](https://twitter.com/void_imagineer)) , Mudassir Ali (<https://www.facebook.com/lime.4951?fref=ts>) for feedback.