Fresher Academy

Python for Data Science 1

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What Will You Learn

- Basic Syntax
- Variables
- Operators
- Decision Making
- Loops
- Numbers
- Strings

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Basic Syntax

Basic Syntax

Programming Modes

- Interactive Mode Programming

```
$ python3 Python 3.7.0 (#1, Nov 01 2018, 13:34:43) [GCC 4.1.2 20080704
(Red Hat 4.1.2-48)] on linux2 Type "help", "copyright", "credits" or
"license" for more information. >>>
```

- Script Mode Programming

```
$ python helloworld.py
```

Basic Syntax

Line and Indentation

- No braces for blocks of code
- Line indentation indicate blocks of code
- Same number of spaces for each line in a block of code
- The number of spaces in the indentation is flexible

```
if True:
        print("True")
else:
        print("False")
```

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Basic Syntax

Identifiers

- Starts with a letter A to Z or a to z or an underscore (_)
- Could have any letters, underscores and digits (0 to 9)
- Case sensitive programming language

```
userHistoryDays = 3
_completed3 = True
_Nov2018 = "Training Data"
```

Basic Syntax

Reserved Words

and	exec	not
assert	finally	or
break	for	pass
class	from	print
continue	global	raise
def	if	return
del	import	try
elif	in	while
else	is	with
except	lambda	yield

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Basic Syntax

Quotations

- Single ('), double (") and triple (''' or """) quotes to denote string literals
- The triple quotes for multiple line strings

```
language = 'Python'
schoolName = "Fresher Academy"
paragraph = """The training duration is more than 10 weeks.
        It will prepare all basic knowledge."""
```

Basic Syntax

Comments

- A hash sign (#) starts a comment

```python
# The first program
print("Hello, Python!") # The first statement
```

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Variables

Variables

Declaration and Assignment

- Variables are reserved memory locations to store values.
- Python variables do not need explicit declaration to reserve memory space.
- The declaration is automatically when you assign a value to a variable by using the equal sign (=)

```
counter = 100          # An integer assignment
miles   = 1125.0       # A floating point
name    = "Hans"       # A string
```

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Variables

Declaration and Assignment

- Could assign a single value to several variables simultaneously
- Could assign multiple objects to multiple variables.

```
i = j = k = 1
age, registered, name = 1, False, "Fresher Academy"
```

Variables

Standard Data Types

- Numbers
- String
- List
- Tuple
- Dictionary

```
year = 2018
school = "Fresher Academy"
languageList = ['Java', 'Python']
weekDays = ('Monday', 'Tuesday']
tinydict = {'name': 'AI','code':2018, 'dept': 'FA'}
```

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Variables

Data Type Convention

- int(x [,base]): Converts x to an integer. Base specifies the base if x is a string.
- long(x [,base]): Converts x to a long integer. Base specifies the base if x is a string.
- float(x): Converts x to a floating-point number.
- complex(real [,imag]): Creates a complex number.
- str(x): Converts object x to a string representation.
- tuple(s): Converts s to a tuple.
- list(s): Converts s to a list.
- set(s): Converts s to a set.
- dict(d): Creates a dictionary. d must be a sequence of (key,value) tuples.

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Operators

Operators

Arithmetic Operators

Operator	Example
+ Addition	10 + 20 = 30
- Subtraction	10 – 20 = -10
* Multiplication	10 * 20 = 200
/ Division	20 / 10 = 2
% Modulus	20 % 10 = 0
** Exponent	10**20 =10 to the power 20
// Floor Division	9//2 = 4, 9.0//2.0 = 4.0, -11//3 = -4, -11.0//3 = -4.0

Operators

Comparison (Relational) Operators

Operator	Example
`==`	`(10 == 20) is not true.`
`!=`	`(10 != 20) is true.`
`<>`	`(10 <> 20) is true. (similar to != operator.)`
`>`	`(10 > 20) is not true.`
`<`	`(10 < 20) is true.`
`>=`	`(10 >= 20) is not true.`
`<=`	`(10 <= 20) is true.`

Operators

Assignment Operators

Operator	Example
=	c = a + b
+=	c += a is equivalent to c = c + a
-=	c -= a is equivalent to c = c - a
*=	c *= a is equivalent to c = c * a
/=	c /= a is equivalent to c = c / a
%=	c %= a is equivalent to c = c % a
**=	c **= a is equivalent to c = c ** a
//=	c //= a is equivalent to c = c // a

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Operators

Logical Operators

Operator	Example
and Logical AND	(a and b) is true if both a and b are true Other cases are false
or Logical OR	(a or b) is false if both a and b are false Other cases are true
not Logical NOT	not(a) is false if a is true not(a) is true if a is false

Operators

Bitwise Operators

```
a = 60; and b = 13:
------------------
a = 0011 1100
b = 0000 1101
------------------
a&b = 0000 1100
a|b  = 0011 1101
a^b  = 0011 0001
~a    = 1100 0011
```

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Operators

Bitwise (Binary) Operators

Operator	Example
& Binary AND	(a & b) (means 0000 1100)
| Binary OR	(a | b) = 61 (means 0011 1101)
^ Binary XOR	(a ^ b) = 49 (means 0011 0001)
~ Binary Ones Complement	(~a) = -61 (means 1100 0011)
<< Binary Left Shift	a << 2 = 240 (means 1111 0000)
>> Binary Right Shift	a >> 2 = 15 (means 0000 1111)

Operators

Membership Operators

Operator	Example
in	x in y: true if x is a member of sequence y.
not in	x not in y: true if x is not a member of sequence y.

Operators

Identity Operators

Operator	Example
is	x is y: true if id(x) equals id(y).
is not	x is not y: true if id(x) is not equal to id(y).

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Decision Making

Decision Making

if statements

if expression:

        statement(s)

```
year = 2018
if year == 2018:
        print("Start the AI Fresher")
```

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Decision Making

if…elif…else

```
if expression1:
   statement(s)
elif expression2:
   statement(s)
else:
   statement(s)
```

```
year = 2018
if year == 2018:
        print("Started the AI Fresher")
elif year == 2017:
        print("Founded Fresher Academy")
else:
        print("NA")
```

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Loops

Loops

for

for iterating_var in sequence:

  statements(s)

```
for letter in 'Python':
        print('Current Letter :', letter)
```

```
fruits = ['banana', 'apple',  'mango']
for index in range(len(fruits)):
        print('Current fruit :', fruits[index])
```

Loops

while

while expression:

  statement(s)

```
count = 0
while (count < 9):
        print('The count is:', count)
        count = count + 1
```

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Loops

break statement

- The break statement terminates the current loop

```
for letter in 'Python':
        if letter == 'h':
                break
        print('Current Letter :', letter)
```

Loops

continue statement

- The continue statement stops the current loop and starts next loops.

```
for letter in 'Python':
        if letter == 'h':
                continue
        print('Current Letter :', letter)
```

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Numbers

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Numbers

Numerical types

- int (signed integers)
- long (long integers)
- float (floating point real values)
- complex (complex numbers with the form a + bJ)

They are immutable data types

Numbers

Number Type Conversion

- int(x) to convert x to a plain integer.
- long(x) to convert x to a long integer.
- float(x) to convert x to a floating-point number.
- complex(x) to convert x to a complex number with real part x and imaginary part zero.
- complex(x, y) to convert x and y to a complex number with real part x and imaginary part y. x and y are numeric expressions.

Numbers

Mathematical Functions

- abs(x): The absolute value of x
- ceil(x): The ceiling of x
- exp(x): The exponential of x
- floor(x): The floor of x (the largest integer not greater than x)
- log(x): The natural logarithm of x, for x> 0
- log10(x): The base-10 logarithm of x for x> 0.
- max(x1, x2,...): The largest of its arguments
- min(x1, x2,...): The smallest of its arguments
- pow(x, y): The value of x**y.
- round(x [,n]): x rounded to n digits from the decimal point.
- sqrt(x): The square root of x for x > 0

Numbers

Random numbers

- choice(seq) A random item from a list, tuple, or string.
- randrange ([start,] stop [,step]) A randomly selected element from range(start, stop, step)
- random() A random float r, such that 0 is less than or equal to r and r is less than 1
- seed([x]) Sets the integer starting value used in generating random numbers.
- shuffle(lst) Randomizes the items of a list in place.
- uniform(x, y) A random float r, such that x is less than or equal to r and r is less than y

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Strings

Strings

Quotes

- String is the most popular data type in Python.
- Single quotes are the same as double quotes.

```python
language = 'Python'
schoolName = "Fresher Academy"
paragraph = """The training duration is more than 10 weeks.
       It will prepare all basic knowledge."""
```

Strings

Escape Characters

Backslash notation	Description
\b	Backspace
\e	Escape
\n	Newline
\r	Carriage return
\s	Space
\t	Tab

Strings

String Special Operators

```
a = "Hello"
b = "Python"
```

Operator	Example
+	a + b will give HelloPython
*	a*2 will give -HelloHello
[]	a[1] will give e
[:]	a[1:4] will give ell
in	H in a will give 1
not in	M not in a will give 1

Strings

String Formatting Operator (%)

Format Symbol	Conversion
%c	character
%s	string conversion via str() prior to formatting
%i	signed decimal integer
%d	signed decimal integer
%u	unsigned decimal integer
%o	octal integer
%x	hexadecimal integer (lowercase letters)
%X	hexadecimal integer (UPPERcase letters)
%e	exponential notation (with lowercase 'e')
%E	exponential notation (with UPPERcase 'E')
%f	floating point real number
%g	the shorter of %f and %e
%G	the shorter of %f and %E

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Strings

Built-in String Methods

- `capitalize()`
- `find(str, beg=0 end=len(string))`
- `index(str, beg=0, end=len(string))`
- `isnumeric()`
- `join(seq)`
- `len(string)`
- `lower()`
- `max(str)`
- `min(str)`
- `replace(old, new [, max])`
- `rfind(str, beg=0,end=len(string))`
- `rindex( str, beg=0, end=len(string))`
- `split(str="", num=string.count(str))`
- `startswith(str, beg=0,end=len(string))`
- `title()`
- `upper()`

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Happy Analyzing!

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