Python Programming for Beginners (version - 3.6)

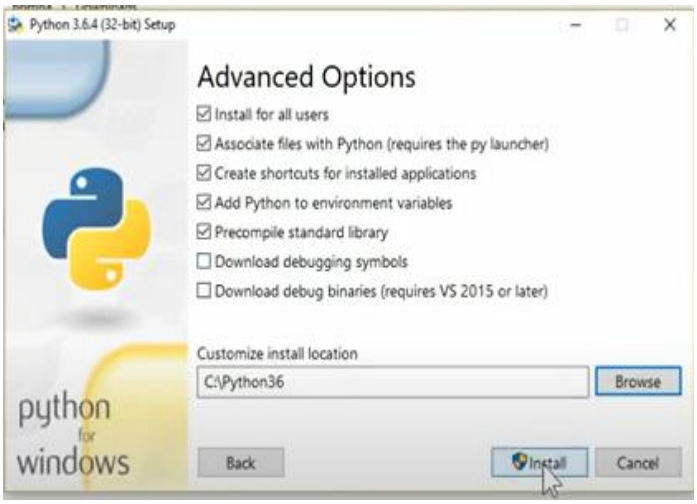
-Hardik Patel

++

SECTION 1: GETTING STARTED

1 | How to Install Python (4:46m)

Welcome to Python.org -> Downloads -> Download python 3 version.




```
C:\Users\HP>python

Python 3.6.8
Type "help", "copyright", "credits" or
"license" for more information.
>>> ^Z


C:\Users\HP>python --version
Python 3.6.8
```

After installation is completed, check python version in cmd.
To quit: *CTRL + Z*

2 | First Basic Program in Python (7:2m)

Python is an interpreter language, it generates/modifies pyc file(a cache file to avoid checks unless code is changed) whenever there's some code change.
Resource: basics.py
To run in CMD: C:\Users\HP>python *location\of\the\file*\basics.py

3 | Python Data Types(Number, String, List, Tuple, Dictionary) (7:23m)

Immutable -> Number: int, float, long, complex
String: unicode strings
Tuple
Mutable-> List
Dictionary.

++

```
C:\Users\HP>python
# number
>>> num = 10
>>> type(num)
<class 'int'>
>>> float(num)
10.0

# string
>>> message = "Hello world"
>>> type(message)
<class 'str'>
>>> message = u"Hello world"
>>> type(message)
<class 'str'>

>>> a = 10
>>> a = 1

# tuple
>>> tup = ('Tom', 'Jerry')
>>> tup
('Tom', 'Jerry')
>>> type(tup)
<class 'tuple'>
>>> tup[0]
'Tom'
>>> tup[1]
'Jerry'
>>> del tup[0]
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
TypeError: 'tuple' object doesn't support item deletion
>>> tup[0] = 'Jack'
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
TypeError: 'tuple' object does not support item assignment

# list
>>> list = ['Tom', 'Jerry']
>>> list[0]
'Tom'
>>> list[1]
'Jerry'
```

++

```
>>> list[1] = 'Jack'
>>> list[1]
'Jack'
>>> del list[0]
>>> list
['Jack']

# dictionary
>>> dic1 = {}
>>> dic2 = dict()
>>> type(dic1)
<class 'dict'>
>>> dic2["one"] = 1
>>> dic2
{'one': 1}
```

4 | Python Operators (9:39m)

```
C:\Users\HP>python
>>> a = 10
>>> b = 2
# Basic operators
>>> a + b
12
>>> a - b
8
>>> a * b
20
>>> a / b
5.0
>>> a // b
5
>>> a / 3
3.3333333333333335
>>> a // 3
3
>>> a % b
0
>>> a ** b
100

 #Assignment operators
>>> a += b
>>> a
```

```
12
>>> a -= b
>>> a
10
>>> a /= b
>>> a
5.0
>>> a //= b
>>> a
2.0
>>> a *= b
>>> a
4.0
>>> a %= b
>>> a
0.0
>>> a = 5
>>> a **= b
>>> a
25

#Conditional operators
>>> a == b
False
>>> a < b
False
>>> a > b
True
>>> a != b
True

#Logical operators
>>> t = True
>>> f = False
>>> t & f
False
>>> t and f
False
>>> t | f
True
>>> t or f
True
```

++

```
#Identity operator
>>> a is 25
True
>>> a is not 25
False

#Membership operator
>>> list = [1,3,5,7,9]
>>> 1 in list
True
>>> 1 not in list
False
```

5 | Python Numbers and Methods (11:39m)

Install IPython: *pip install ipython*
IPython is a python shell that provides all available functions with a value on *TAB* keypress or *?*.
Use *exit* to exit ipython shell

```
C:\Users\HP>ipython
IPython 7.16.3 -- An enhanced Interactive Python. Type '?' for help.

In [1]: a = 10

In [2]: type(a)
Out[2]: int

In [3]: a = 10.0

In [4]: type(a)
Out[4]: float

In [5]: complex?
Init signature: complex(self, /, *args, **kwargs)
Docstring:
complex(real[, imag]) -> complex number

Create a complex number from a real part and an optional imaginary part.
This is equivalent to (real + imag*1j) where imag defaults to 0.
Type:           type
Subclasses:

In [6]: i = 2

In [7]: c = complex(a,i)
```

++

```
In [8]: c
Out[8]: (10+2j)

In [9]: c.imag
Out[9]: 2.0

In [10]: c.imag
Out[10]: 2.0
```

```
In [11]: c.
         conjugate()
         imag
         real
```

Complex number methods

```
In [11]: float(10)
Out[11]: 10.0

In [12]: int(10.0)
Out[12]: 10

In [13]: import math

In [14]: math.trunc(10.01)
Out[14]: 10
```

```
In [24]: math.
acos()      ceil()      erfc()      frexp()     isfinite()  log1p()     sin()
acosh()     copysign()  exp()       fsum()      isinf()     log2()      sinh()
asin()      cos()       expm1()     gamma()     isnan()     modf()      sqrt()
asinh()     cosh()      fabs()      gcd()       ldexp()     nan         tan()
atan()      degrees()   factorial() hypot()     lgamma()    pi          tanh()
atan2()     e           floor()     inf         log()       pow()       tau
atanh()     erf()       fmod()      isclose()   log10()     radians()   trunc()
```

```
In [20]: import random

In [21]: random.choice(['Play', 'Watch TV', 'Sleep'])
Out[21]: 'Sleep'

In [22]: random.choice(range(0,100))
Out[22]: 33
```

```
In [24]: random.
betavariate()     gauss()           NV_MAGICCONST     RECIP_BPF         SystemRandom
BPF               getrandbits()     paretovariate()   sample()          triangular()
choice()          getstate()        randint()         seed()            TWOPI
choices()         LOG4              Random            setstate()        uniform()
expovariate()     lognormvariate()  random()          SG_MAGICCONST     vonmisesvariate()
gammavariate()    normalvariate()   randrange()       shuffle()         weibullvariate()
```

6 | Python Strings and Methods (14:17m)

```
C:\Users\HP>ipython

In [1]: s = "how are you?"

In [2]: "how" in s
Out[2]: True

In [3]: "how" not in s
Out[3]: False

In [5]: l = "*"

In [6]: l*20
Out[6]: '********************'

In [8]: l *=20

In [9]: l
Out[9]: '********************'
```

Escape Characters: \n, \t, \r, \s, etc. Refer official docs.

```
In [10]: p = "new\nline"

In [11]: p
Out[11]: 'new\nline'

In [12]: p.splitlines()
Out[12]: ['new', 'line']
```

Formatting:

```
In [13]: s = "name: %s , age: %d" %("Alice", 10)

In [14]: s
Out[14]: 'name: Alice , age: 10'

In [15]: s = "name is {1}, age is {0}".format(10, "Alice")

In [16]: s
Out[16]: 'name is Alice, age is 10'

In [17]: s.split()
Out[17]: ['name', 'is', 'Alice,', 'age', 'is', '10']
```

++

```
In [18]: s.split(",")
Out[18]: ['name is Alice', ' age is 10']

In [19]: s.startswith("n")
Out[19]: True
```

```
In [21]: s.
capitalize() encode       format      isalpha     islower     istitle     lower       replace     rpartition  splitlines  title
casefold     endswith     format_map  isdecimal   isnumeric   isupper     lstrip      rfind       rsplit      startswith  translate
center       expandtabs   index       isdigit     isprintable join        maketrans   rindex      rstrip      strip       upper
count        find         isalnum     isidentifier isspace    ljust       partition   rjust       split       swapcase    zfill
```

7 | Python List and Tuple (11:47m)

List indexing: L->R: 0, 1, …. R->L: -1,-2, ….

```
In [1]: l = ["Tom", 50, "Jerry", 20.5]

In [2]: m = ['Alice', 'apple']

In [3]: l += m

In [4]: l
Out[4]: ['Tom', 50, 'Jerry', 20.5, 'Alice', 'apple']
```

```
In [5]: len(l)
Out[5]: 6

In [6]: l.insert(2, '&')

In [7]: l
Out[7]: ['Tom', 50, '&', 'Jerry', 20.5, 'Alice', 'apple']

In [8]: l.pop(2)
Out[8]: '&'

In [9]: l
Out[9]: ['Tom', 50, 'Jerry', 20.5, 'Alice', 'apple']
```

```
In [10]: l.
append()  count   insert   reverse
clear     extend  pop      sort
copy      index   remove
```

```
In [1]: t = ()

In [2]: t
Out[2]: ()
```

++

```
In [3]: t = ("tom") #this will define a string

In [4]: t
Out[4]: 'tom'

In [5]: t = ("tom",) #this will define a tuple

In [6]: t
Out[6]: ('tom',)
In [7]: t = ("sat", "sun")

In [8]: t = ("fri", "sat", "sun")

In [9]: t1 = t[1:]
```

```
In [19]: t.
         count() index()
```

```
In [14]: t
Out[14]: ('tom',)

In [15]: l = list(t)

In [16]: l
Out[16]: ['tom']

In [17]: t = tuple(l)

In [18]: t
Out[18]: ('tom',)
```

8 | Slicing in Python (14:32m)

Slicing can be done on strings, tuples and lists.

```
In [1]: l = [1,3,5,7,11,13]

In [2]: l[-6::2]
Out[2]: [1, 5, 11]

In [3]: l[-1::-2]
Out[3]: [13, 7, 3]

In [4]: l[::-1] #to reverse a string
Out[5]: [13, 11, 7, 5, 3, 1]
```

```
# deepcopy
In [1]: l = [1,2,3,4,5]

In [2]: m = l

In [3]: m.append(6)

In [4]: l
Out[4]: [1, 2, 3, 4, 5, 6]

In [5]: m
Out[5]: [1, 2, 3, 4, 5, 6]

In [6]: import copy

In [7]: n = copy.deepcopy(l)

In [8]: n = copy.deepcopy(m)

In [9]: m.append(7)

In [10]: m
Out[10]: [1, 2, 3, 4, 5, 6, 7]

In [11]: n
Out[11]: [1, 2, 3, 4, 5, 6]

In [12]: l
Out[12]: [1, 2, 3, 4, 5, 6, 7]

In [13]: n.append(8)

In [14]: n
Out[14]: [1, 2, 3, 4, 5, 6, 8]

In [15]: m
Out[15]: [1, 2, 3, 4, 5, 6, 7]
```

9 | Python Dictionary (9:36m)

```
PS C:\Users\HP> ipython

In [1]: d = {"name": "Tom", "animal": "cat"}
```

++

```
In [2]: d
Out[2]: {'name': 'Tom', 'animal': 'cat'}

In [3]: d["name"]
Out[3]: 'Tom'

In [4]: d["age"] #will face error when accessing non-existing keys
---------------------------------------------------------------------------
KeyError                                  Traceback (most recent call last)
<ipython-input-4-351cab8a0992> in <module>
----> 1 d["age"]

KeyError: 'age'

In [5]: d.get("animal")
Out[5]: 'cat'

In [6]: d.get("age", 10)
Out[6]: 10

In [7]: d
Out[7]: {'name': 'Tom', 'animal': 'cat'}

In [8]: d["age"] = 10

In [9]: d
Out[9]: {'name': 'Tom', 'animal': 'cat', 'age': 10}

In [10]: d.setdefault("type", "cartoon")
Out[10]: 'cartoon'

In [11]: d
Out[11]: {'name': 'Tom', 'animal': 'cat', 'age': 10, 'type': 'cartoon'}

In [12]: d.setdefault("gender")

In [13]: d
Out[13]: {'name': 'Tom', 'animal': 'cat', 'age': 10, 'type': 'cartoon', 'gender': None}

In [14]: del d["type"]

In [15]: d
Out[15]: {'name': 'Tom', 'animal': 'cat', 'age': 10, 'gender': None}
```

++

```
In [17]: d["gender"] = "male"

In [18]: d
Out[18]: {'name': 'Tom', 'animal': 'cat', 'age': 10, 'gender': 'male'}

In [20]: d.items()
Out[20]: dict_items([('name', 'Tom'), ('animal', 'cat'), ('age', 10), ('gender', 'male')])

In [21]: m = {}

In [22]: l = ['a', 'b', 'c']

In [23]: m = m.fromkeys(l)

In [24]: m
Out[24]: {'a': None, 'b': None, 'c': None}

In [25]: d.update(m)

In [26]: d
Out[26]:
{'name': 'Tom',
 'animal': 'cat',
 'age': 10,
 'gender': 'male',
 'a': None,
 'b': None,
 'c': None}
```

```
In [27]: d.
         clear()     get()       pop()       update()
         copy()      items()     popitem()   values()
         fromkeys()  keys()      setdefault()
```

10 | Conditional and decision making Operators in Python (14:11m)

Resource: if_else.py

11 | For and While Loops in Python | by Hardik Patel (13:24m)

Resource: loops.py

12 | Functions and Arguments, Lambda function in Python (13:43m)

Resource: functions.py

13 | Modules, import statement, variable scopes in Python (14:29m)

++

Resource: calc
local variable has more scope than global variable. global variable can be used anywhere.

14 | Python Package, Inbuilt methods (11m)

__init__.py : add this file to create a folder as package
Resource: calc

15 | Class, Instance, Method concepts using Account application in Python (20:15m)

Resource: user/user.py

```
...\resources> ipython

In [1]: from user.user import Account

In [2]: a = Account() #creates instance of a class
constructor is called

In [3]: a.accounts
Out[3]: []

In [4]: a.create({})
Provide username

In [5]: a.create({"username": "Zack"})

In [6]: a.accounts
Out[6]: [{'username': 'Zack', 'id': 1}]

In [7]: a.create({"username": "Zack"})
Only one account can be created

In [8]: a.get()
Out[8]: {'username': 'Zack', 'id': 1}

In [9]: a.update(password="123")

In [10]: a.accounts
Out[10]: [{'username': 'Zack', 'id': 1, 'password': '123'}]

In [11]: a.delete()

In [12]: a.accounts
Out[12]: []
```

++

16 | Custom decorators in Python with examples (20:43m)

Resource: decorators.py

Resource: user/decorators.py

```
...\resources> ipython
In [1]: from user.user import Account

In [2]: a = Account()
constructor is called

In [3]: Account.accounts
Out[3]: []

In [4]: a.create({})
Provide username

In [5]: a.create({"username": "Zack"})

In [6]: Account.accounts
Out[6]: [{'username': 'Zack', 'id': 1}]

In [7]: a.create({"username": "Zack"})
Only one account can be created

In [8]: b = Account()
constructor is called

In [9]: b.create({"username": "Zack"})
Only one account can be created
```

17 | Setup Python virtual environment in Linux (9:14m)

18 | Setup python virtual environment in Windows (5:38m)

...path> python --version
Python 3.6.8
...path > pip freeze
virtualenv==20.16.5
...path > virtualenv my_env
...path > my_env\Scripts\activate
(my_env) ...path>deactivate

19 | Handling Exceptions and Create Custom Exception in Python (9:2m)

Resource: exceptions.py

20 | File operations in python (15:48m)

++

f = open(filename, mode, encoding)
modes: r, w, w+(write&create), a+(append), x(if file not available)

Resource: text.txt

```
In [1]: f = open('text.txt')

In [2]: f.read()
Out[2]: 'my text file\nthis is next line'

In [3]: f.seek(0)
Out[3]: 0

In [4]: f.read(2)
Out[4]: 'my'

In [5]: f.tell()
Out[5]: 2

In [6]: f.seek(0)
Out[7]: 0

In [8]: print(f.read())
my text file
this is next line

In [9]: f.seek(0)
Out[9]: 0

In [10]: for line in f.readlines():
   ...:     print(line, end="")
   ...:
my text file
this is next line

In [11]: f.close()

In [12]: with open('text.txt') as f:
   ...:     f.read()
   ...:
#write
In [13]: f = open('text.txt', 'w+', encoding="utf-8")

In [14]: f.write("Hello")
Out[14]: 5
```

++

```
In [15]: f.writelines('\nworld')

In [16]: f.seek(0)
Out[16]: 0

In [17]: print(f.read())
Hello
world
```

```
In [37]: f.
         buffer          detach()        fileno()        line_buffering  newlines        readline()      seekable()      writable()
         close()         encoding        flush()         mode            read()          readlines()     tell()          write()
         closed          errors          isatty()        name            readable()      seek()          truncate()      writelines()
```