

Notes Python

<https://www.tutorialspoint.com/python3/index.htm>

Bases

```
#!/usr/bin/python3

# output
print ("Hello, Python!")
print(x, end=" ") # Appends a space instead of a newline in
Python 3

# input
x = input("something:")

# raise exception
raise IOError("file error") #this is the recommended syntax
in Python 3
```

```
# Quotation in Python
word = 'word'
sentence = "This is a sentence."
paragraph = """This is a paragraph. It is
made up of multiple lines and sentences."""
```

Variable Types

```
# Simple Assignment
counter = 100          # An integer assignment
miles   = 1000.0       # A floating point
value   = 3e+26J       # A complex
name    = "John"       # A string

# Multiple Assignment
a = b = c = 1
```

```
a, b, c = 1, 2, "john"
```

```
# deletion
```

```
a, b, c = 1, 2, "john"
```

```
str = 'Hello World!'
```

```
print (str)           # Prints complete string
print (str[0])        # Prints first character of the string
print (str[2:5])      # Prints characters starting from 3rd
to 5th
print (str[2:])       # Prints string starting from 3rd
character
print (str * 2)       # Prints string two times
print (str + "TEST") # Prints concatenated string
```

```
list = [ 'abcd', 786 , 2.23, 'john', 70.2 ]
```

```
tinylist = [123, 'john']
```

```
print (list)          # Prints complete list
print (list[0])       # Prints first element of the list
print (list[1:3])     # Prints elements starting from 2nd
till 3rd
print (list[2:])      # Prints elements starting from 3rd
element
print (tinylist * 2)  # Prints list two times
print (list + tinylist) # Prints concatenated lists
```

```
tuple = ( 'abcd', 786 , 2.23, 'john', 70.2 )
```

```
tinytuple = (123, 'john')
```

```
print (tuple)         # Prints complete tuple
print (tuple[0])      # Prints first element of the tuple
print (tuple[1:3])    # Prints elements starting from 2nd
till 3rd
print (tuple[2:])     # Prints elements starting from 3rd
element
print (tinytuple * 2) # Prints tuple two times
print (tuple + tinytuple) # Prints concatenated tuple
```

```
dict = {}
```

```
dict['one'] = "This is one"
dict[2]     = "This is two"

tinydict = {'name': 'john', 'code':6734, 'dept': 'sales'}

print (dict['one'])      # Prints value for 'one' key
print (dict[2])          # Prints value for 2 key
print (tinydict)         # Prints complete dictionary
print (tinydict.keys())  # Prints all the keys
print (tinydict.values()) # Prints all the values
```

#Data Type Conversion

```
int(x [,base]) #Converts x to an integer. The 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.
repr(x) # Converts object x to an expression string.
eval(str) # Evaluates a string and returns an object.
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.
frozenset(s) # Converts s to a frozen set.
chr(x) # Converts an integer to a character.
unichr(x) # Converts an integer to a Unicode character.
ord(x) # Converts a single character to its integer value.
hex(x) # Converts an integer to a hexadecimal string.
oct(x) # Converts an integer to an octal string.
```

Basic Operators

```
# Python Arithmetic Operators
c = a % b # Modulus
c = a ** b # Exponent
c = a // b # Floor Division

# Python Membership Operators
x in y
```

```
x not in y

# Python Identity Operators
x is y
x is not y
```

Decision Making

```
# if statement
if expression:
    statement(s)

# if else statement
if expression:
    statement(s)
else:
    statement(s)

# nested if statements
if expression1:
    statement(s)
elif expression:
    statement(s)
else:
    statement(s)

# Single Statement if
if ( var == 100 ) : print ("Value of expression is 100")
```

Decision Making

```
# while loop
while expression:
    statement(s)

while count < 5:
    count = count + 1
else:
```

```

    print (count, " is not less than 5")

# for loop
for iterating_var in sequence:
    statements(s)

>>> range(5)
range(0, 5)
>>> list(range(5))
[0, 1, 2, 3, 4]

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

for num in numbers:
    if num%2 == 0:
        print ('the list contains an even number')
        break
else:
    print ('the list doesnot contain even number')

# Loop Control Statements
break
continue
pass

```

```

# Iterators
list = [1,2,3,4]
it = iter(list) # this builds an iterator object
print (next(it)) #prints next available element in iterator

# Iterator object can be traversed using regular for
statement
for x in it:
    print (x, end=" ")

# or using next() function
while True:
    try:
        print (next(it))

```

```
except StopIteration:
    sys.exit() #you have to import sys module for this
```

```
# Generators
```

```
import sys
def fibonacci(n): #generator function
    a, b, counter = 0, 1, 0
    while True:
        if (counter > n):
            return
        yield a
        a, b = b, a + b
        counter += 1
f = fibonacci(5) #f is iterator object

while True:
    try:
        print (next(f), end=" ")
    except StopIteration:
        sys.exit()
```

Numbers

```
number = 1 # int
number = 1.2 # float
number = -32.54e100
number = 1 + 2j #complex
number = 0xA0F #Hexa-decimal = 2575
number = 0o37 #Octal = 31
```

```
# Number Type Conversion
```

```
int(x)
long(x)
float(x)
complex(x)
complex(x, y)
```

```
# Mathematical Functions
```

```
abs(x)
```

```
ceil(x)
cmp(x, y) # Deprecated
exp(x)
fabs(x)
floor(x)
log(x)
log10(x)
max(x1, x2,...)
min(x1, x2,...)
modf(x)
pow(x, y)
round(x [,n])
sqrt(x)

# Random Number Functions
choice(seq)
randrange ([start,] stop [,step])
random()
seed([x])
shuffle(lst)
uniform(x, y)

# Trigonometric Functions
acos(x)
asin(x)
atan(x)
atan2(y, x)
cos(x)
hypot(x, y)
sin(x)
tan(x)
degrees(x)
radians(x)

# Mathematical Constants
pi
e
```

Strings

```
var1 = 'Hello World!'
var2 = "Python Programming"
```

```
# substrings
```

```
var1[0]
var2[1:5]
```

```
# String Special Operators
```

```
a + b
```

```
a * n
```

```
a[n] # slice
```

```
a[n:m] # range slice
```

```
a in b
```

```
a in not b
```

```
r'...' # raw string
```

```
R'...' # raw string
```

```
# String Formatting Operator
```

```
print ("My name is %s and weight is %d kg!" % ('Zara', 21))
```

```
%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
```

```
* argument specifies width or precision
```

```
- left justification
```

```
+ display the sign
```

```
<sp> leave a blank space before a positive number
```

```
# add the octal leading zero ( '0' ) or hexadecimal
```

```
leading '0x' or '0X',
```

```
depending on whether 'x' or 'X' were used.
```

0 pad from left with zeros (instead of spaces)
% '%' leaves you with a single literal '%'
(var) mapping variable (dictionary arguments)
m.n. m is the minimum total width and n is the number of digits to display
after the decimal point (if appl.)

Triple Quotes

```
para_str = """this is a long string that is made up of  
several lines and non-printable characters such as  
TAB ( \t ) and they will show up that way when displayed.  
the variable assignment will also show up.  
"""
```

Unicode String

```
capitalize()  
center(width, fillchar)  
count(str, beg = 0, end = len(string))  
decode(encoding = 'UTF-8', errors = 'strict')  
encode(encoding = 'UTF-8', errors = 'strict')  
endswith(suffix, beg = 0, end = len(string))  
expandtabs(tabsize = 8)  
find(str, beg = 0, end = len(string))  
index(str, beg = 0, end = len(string))  
isalnum()  
isalpha()  
isdigit()  
islower()  
isnumeric()  
isspace()  
istitle()  
isupper()  
join(seq)  
len(string)  
ljust(width[, fillchar])  
lower()  
lstrip()  
maketrans()  
max(str)  
min(str)  
replace(old, new [, max])  
rfind(str, beg = 0, end = len(string))
```

```

rindex( str, beg = 0, end = len(string))
rjust(width,[, fillchar])
rstrip()
split(str="", num=string.count(str))
splitlines( num=string.count('\n'))
startswith(str, beg=0,end=len(string))
strip([chars])
swapcase()
title()
translate(table, deletechars="")
upper()
zfill (width)
isdecimal()

```

List

```

list1 = ['physics', 'chemistry', 1997, 2000]
list2 = [1, 2, 3, 4, 5 ]
list3 = ["a", "b", "c", "d"]

# get
list1[0]
list2[1:5]
L[2]
L[-2]
L[1:]

# set
list[2] = 2001

# remove
del list[2]

# Basic List Operations
len([1, 2, 3])           # length
[1, 2, 3] + [4, 5, 6]    # concatenation
['Hi!'] * 4              # repetition
3 in [1, 2, 3]           # membership

for x in [1,2,3] : print (x,end = ' ')

```

```

# Built-in List Functions and Methods
cmp(list1, list2) # obsolete
len(list)
max(list)
min(list)
list(seq)

list.append(obj)
list.count(obj)
list.extend(seq)
list.index(obj)
list.insert(index, obj)
list.pop(obj = list[-1])
list.remove(obj)
list.reverse()
list.sort([func])

```

Tuples

```

tup1 = ('physics', 'chemistry', 1997, 2000)
tup2 = (1, 2, 3, 4, 5 )
tup3 = "a", "b", "c", "d"

tup1 = (); # empty tuple
tup1 = (50,)

# Accessing Values in Tuples
tup1[0]
tup2[1:5]

# Updating Tuples
tup3 = tup1 + tup2 # concatenate
del tup

# Basic Tuples Operations
len((1, 2, 3))           # Length
(1, 2, 3) + (4, 5, 6)    # concatenation
('Hi!',) * 4             # repetition
3 in (1, 2, 3)           # membership

```

```

for x in (1,2,3) : print (x, end = ' ')

# Indexing, Slicing, and Matrixes
T[2]
T[-2]
T[1:]

# Built-in Tuple Functions
cmp(tuple1, tuple2)
len(tuple)
max(tuple)
min(tuple)
tuple(seq)

```

Dictionary

```

dict = {'Name': 'Zara', 'Age': 7, 'Class': 'First'}
dict['Age']

# Updating Dictionary
dict['Age'] = 8; # update existing entry
dict['School'] = "DPS School" # Add new entry

# Delete Dictionary Elements
del dict['Name'] # remove entry with key 'Name'
dict.clear()     # remove all entries in dict
del dict         # delete entire dictionary

```

Objects

```

#!/usr/bin/python

class Employee:
    'Common base class for all employees'
    empCount = 0

```

```

def __init__(self, name, salary):
    self.name = name
    self.salary = salary
    Employee.empCount += 1

def displayCount(self):
    print "Total Employee %d" % Employee.empCount

def displayEmployee(self):
    print "Name : ", self.name, ", Salary: ", self.salary

"This would create first object of Employee class"
emp1 = Employee("Zara", 2000)
"This would create second object of Employee class"
emp2 = Employee("Manni", 5000)
emp1.displayEmployee()
emp2.displayEmployee()
print "Total Employee %d" % Employee.empCount

```

Built-In Class Attributes

```

print "Employee.__doc__:", Employee.__doc__
print "Employee.__name__:", Employee.__name__
print "Employee.__module__:", Employee.__module__
print "Employee.__bases__:", Employee.__bases__
print "Employee.__dict__:", Employee.__dict__

```

Class Inheritance

```

class Parent:      # define parent class
    parentAttr = 100
    def __init__(self):
        print "Calling parent constructor"

    def parentMethod(self):
        print 'Calling parent method'

    def setAttr(self, attr):
        Parent.parentAttr = attr

    def getAttr(self):
        print "Parent attribute :", Parent.parentAttr

```

```

class Child(Parent): # define child class
    def __init__(self):
        print "Calling child constructor"

    def childMethod(self):
        print 'Calling child method'

c = Child()           # instance of child
c.childMethod()       # child calls its method
c.parentMethod()      # calls parent's method
c.setAttr(200)        # again call parent's method
c.getAttr()           # again call parent's method

```

Overriding Methods

```

class Parent:         # define parent class
    def myMethod(self):
        print 'Calling parent method'

class Child(Parent): # define child class
    def myMethod(self):
        print 'Calling child method'

c = Child()           # instance of child
c.myMethod()          # child calls overridden method

```