```
In [1]: 3+6
Out[1]: 9

In [2]: a = 3

In [3]: a
Out[3]: 3

In [4]: a = 3+1

In [5]: b = a + 1

In [6]: b
Out[6]: 5

In [7]: a=2

In [8]: a = a + 1

In [9]: a
Out[9]: 3

In [10]: a
Out[10]: 3

In [11]: a = 'mitsos'

In [12]: a = 1

In [13]: a = a + 1

In [14]: a
Out[14]: 2

In [15]: a += 1

In [16]: a
Out[16]: 3

In [17]: a += 5

In [18]: a = a + 5 # a += 5

In [19]: 'the result is: ' + 5
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
<ipython-input-19-167711dab34c> in <module>
```

```
----> 1 'the result is: ' + 5

TypeError: can only concatenate str (not "int") to str
```

In [20]:
```
'the result is: ' + str(5)
```

Out[20]:
```
'the result is: 5'
```

In [21]:
```
str(5)
```

Out[21]:
```
'5'
```

In [22]:
```
int('5')
```

Out[22]:
```
5
```

In [23]:
```
'the result is: {}'.format(5)
```

Out[23]:
```
'the result is: 5'
```

In [24]:
```
'the result is: a={} b={}'.format(5,4)
```

Out[24]:
```
'the result is: a=5 b=4'
```

In [25]:
```
'the result is: a={value_1} b={value_2}'.format(value_1=5,value_2=4)
```

Out[25]:
```
'the result is: a=5 b=4'
```

In [26]:
```
value_1=5
value_2=8
```

In [27]:
```
'the result is: a={value_1} b={value_2}'
```

Out[27]:
```
'the result is: a={value_1} b={value_2}'
```

In [28]:
```
f'the result is: a={value_1} b={value_2}'
```

Out[28]:
```
'the result is: a=5 b=8'
```

functions

In [29]:
```
def f(x):
    return x+1
```

In [30]:
```
f(5)
```

Out[30]:
```
6
```

In [31]:
```
a = f(5)
```

In [32]:
```
44
55
66
77
88
99
```

Out[32]: 99

In [33]:
```
33
```

Out[33]: 33

In [34]:
```
a=33
```

In [38]:
```
def f(x):
    return x+1
```

In [39]:
```
f(4)
```

Out[39]: 5

In [40]:
```
a=f(4)
```

In [56]:
```
def f_1(x):
    print(x+1)

def f_2(x):
    return(x+1)
```

In [57]:
```
print (f_1(4))
```

```
5
None
```

In [66]:
```
def f_1(x):
    a = 1/x
    return a
```

In [67]:
```
b = f_1(0)
```

```
---------------------------------------------------------------------------
ZeroDivisionError                         Traceback (most recent call last)
<ipython-input-67-35e28f46ee6f> in <module>
----> 1 b = f_1(0)

<ipython-input-66-c95a100a34ae> in f_1(x)
      1 def f_1(x):
----> 2     a = 1/x
      3     return a

ZeroDivisionError: division by zero
```

In [44]:
```
f_1(4)
```

```
5
```

In [45]:
```
f_2(4)
```

Out[45]: 5

In [49]:
```
a = f_1(4)
```

```
5
```

In [50]:
```
b = f_2(4)
```

In [51]:
```
b
```

Out[51]: 5

In [53]:
```
print (a)
```

None

In [54]:
```
True
```

Out[54]: True

In [55]:
```
False
```

Out[55]: False

In [68]:
```
def f(a,b):
    return a+b
```

In [69]:
```
f(5,3)
```

Out[69]: 8

In [70]:
```
def f():
    return 'alex'
```

In [71]:
```
f()
```

Out[71]: 'alex'

In [72]:
```
def my_precious_thesis():
    read_data()
    do_amazing_analysis()
```

In [73]:
```
def f(x):
    return x+1, x-1
```

In [74]:
```
a,b = f(4)
```

In [75]:
```
a
```

Out[75]: 5

In [76]:
```
b
```

Out[76]: 3

In [85]:
```
def f(x):
    return x+1
    #print(x+1)

def g(x):
    #return f(x)*10
    print (f(x)*10)

a = g(3)
print(f'a={a}')
```

```
40
a=None
```

In [ ]:

In [ ]:

In [78]:
```
def f(a,b=4):
    return a+b
```

In [79]:
```
f(5)
```

Out[79]:
```
9
```

In [80]:
```
f(1,2)
```

Out[80]:
```
3
```

In [81]:
```
None * 10
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
<ipython-input-81-fa0e44c8132b> in <module>
----> 1 None * 10

TypeError: unsupported operand type(s) for *: 'NoneType' and 'int'
```

In [86]:
```
a=2
def f():
    a=3

f()
print (a)
```

```
2
```

In [87]:
```
a=22
def f():
    print (a)

f()
```

```
22
```

In [90]:
```
a=22
def f():
    print (a)
    a=2

f()
```

```
---------------------------------------------------------------------------
UnboundLocalError                         Traceback (most recent call last)
<ipython-input-90-8c323de482ac> in <module>
      4     a=2
      5
----> 6 f()

<ipython-input-90-8c323de482ac> in f()
      1 a=22
      2 def f():
----> 3     print (a)
      4     a=2
      5

UnboundLocalError: local variable 'a' referenced before assignment
```

In [91]:
```
a=2
def f():
    a=3
    print (a)
f()
print (a)
```

```
3
2
```

In [95]:
```
a=2
def f():
    global a # ίουουουουου
    print (a)
f()
print (a)
```

```
2
2
```

In [96]:
```
a=3
def f():
    a=4
    def g():
        a=5
        print(a)

    g()

f()
```

```
5
```

In [97]:
```
a=3
def f():
    a=4
    def g():
        #a=5
        global a
        print(a)

    g()

f()
```

```
3
```

In [98]:
```
a=3
def f():
    a=4
    def g():
        #a=5
        #global a
        nonlocal a
        print(a)

    g()

f()
```

4

In [101…
```
a=3
def f():
    a=4
    def g():
        a=5
        def e():
            a=6
            def h():
                #a=7
                #global a
                nonlocal a
                print (a)
            h()
        e()
    g()
f()
```

6

In [102…
```
def f(x):
    def g(y):
        return y+1
    return g(2*x)

f(3)
```

Out[102… 7

In [103…
```
a=3
b=a
a=4
print (b)
```

3

In [104…
```
def f(x):
    return x+1

g=f

g(4)
```

Out[104… 5

In [106…
```
def f(x):
    return x+1

g=f

def f(x):
    return x+2

#f(2)
g(2)
```

Out[106… 3

In [107…
```
a=3
def f(x):
    return x+1
```

In [108…
```
callable(f)
```

Out[108… True

In [109…
```
callable(a)
```

Out[109… False

In [110…
```
callable(g)
```

Out[110… True

In [111…
```
a=3
```

In [112…
```
a(4)
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
<ipython-input-112-331eaaf84436> in <module>
----> 1 a(4)

TypeError: 'int' object is not callable
```

if

In [113…
```
a=3
if a > 1:
    print ('ok')
```

ok

In [114…
```
a=0
if a > 1:
    print ('ok')
```

In [115…
```
a=0
if a > 1:
    print ('ok')
else:
    print ('hello')
```

```
hello
```

In [116…
```
a=0
if a > 1:
    print ('ok')
elif a>2:
    print ('alex')
else:
    print ('hello')
```

```
hello
```

In [117…
```
c
```

```
ok
```

In [118…
```
a=2.5
if a > 1:
    print ('ok')
elif a>2:
    print ('alex')
else:
    print ('hello')
```

```
ok
```

In [119…
```
a=1.5
if a>2:
    print ('alex')
elif a > 1:
    print ('ok')
else:
    print ('hello')
```

```
ok
```

In [121…
```
a=1.5
if a>2:
    print ('alex')
elif a > 1:
    print ('ok')
elif a == 1.5:
    print ('sdsds')
else:
    print ('hello')
```

```
ok
```

In [123…
```
def f(x):
    return (x+1)
```

In [ ]:
```
if a>1:
    print ('ok')
```

In [125…
```
def f():
    return 5
```

In [136…
```
a = None

if a:
    print ('ok')
else:
    print ('not ok')
```

```
not ok
```

In [137…
```
a = 3

b = a > 3
print (b)
```

```
False
```

In [138…
```
def f(x):
    return x+1

if f:
    print ('ok')
```

```
ok
```

In [139…
```
bool(f)
```

Out[139… True

In [142…
```
a = 2
if a = 3:
    print ('ok')
```

```
  File "<ipython-input-142-4d5f1fe04051>", line 2
    if a = 3:
         ^
SyntaxError: invalid syntax
```

In [143…
```
def f(n):
    if n%2 == 0:
        return True
    else:
        return False
```

In [144…
```
f(5)
```

Out[144… False

In [145…
```
f(4)
```

Out[145… True

In [146…
```
def f(n):
    if n%2 == 0:
        return True
    return False
```

In [147…
```
f(5)
```

Out[147… False

In [148…
```
f(4)
```

Out[148… True

In [150…
```
5 % 2 == 0
```

Out[150… False

In [151…
```
4 % 2 == 0
```

Out[151… True

In [153…
```
def f(n):
    return n % 2 == 0
```

In [154…
```
def disekto(n):
    if n%4 == 0:
        if n%100 == 0:
            if n%400 == 0:
                return True
            else:
                return False
        else:
            return True
    else:
        return False
```

In [159…
```
disekto(2000)
```

Out[159… True

In [162…
```
def bmi(weight, height):
    b = weight / (height**2)

    if b<18.5:
        return 'underweight'
    elif b>=18.5 and b<25:
        return 'normal'
    else:
        return 'overweight'
```

In [163…
```
bmi(18.5 ,1)
```

Out[163… 'normal'

In [164…
```
def bmi(weight, height):
    b = weight / (height**2)

    if b<18.5:
        return 'underweight'
    elif b<25:
        return 'normal'
    else:
        return 'overweight'
```

In [167…

```
def bmi(weight, height):

    def c_bmi():
        return weight / (height**2)

    b = c_bmi()
    print (b)

    if b<18.5:
        return 'underweight'
    elif b<25:
        return 'normal'
    else:
        return 'overweight'
```

In [170…

```
bmi(70, 1.5)
```

```
31.11111111111111
```

Out[170…

```
'overweight'
```

In [ ]: