28. Python (Introduction)

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Циклы и условные операторы:

```
x = 0;

for x in range (1,100, 10):
    print (x)
    if x>50:
        break


y = 10;
while y<100:
    print(y)
    y+=1



age = 27
if (age<10):
    print("You are baby")
elif (age>10) and (age<20):
    print ("you are teenager")
else:
    print("you are old")

name ="Линар"
h=1.76
w=78
bmi = w / (h**2)
print ("Индекс массы тела" +" "+ name + "а"+' '+ "равен" +" "+ str(bmi))

if bmi<25:
```

```
    print (name +" " +"дрищ")
else:
    print (name +" "+ "масса")

mybool=10<5
print (mybool)

c = 5
d = 4
if c < d:
    print(' с меньше д')
else:
    print('с либо больше чем д, либо равняется d')
    print('asdf')

print('вне блока if')

my_list = [7, 5, 4, 4, 3, 2, 1, -5, -10, -15]

sum3 = 0
i2 = 0

while my_list[i2] > 0:
    sum3 += my_list[i2]
    i2 += 1

sum4 = 0
for element in my_list:
    if element <= 0:
        break

    sum4 += element

print(sum3)
print(sum4)

my_list4 = [7, 5, 4, 4, 3, 2, 1, -5, -10, -15, -18, -20, -23]
totalit = 0
for b in range(len(my_list4) - 1, -1, -1):
    if my_list4[b] > 0:
        break
    totalit += my_list4[b]
print(totalit)

word = ["Яблоко", "Груша", "Тыква", "Ананас", "Стоп", "Банан", "Апельсин"]
i12 = 0
while word[i12] != "Стоп":
    print(word[i12])
    i12 += 1

for w in range(len(word)):
    if word[w] == "Стоп":
        break
    print(word[w])

names = ['Mike', 'Ann', 'Bob', 'Tom']
for element in names:
    print(element)

for i in range(0, len(names), 1):
    print(names[i])

for h in range(len(names)):
    for j in range(h + 1):
        print(names[h])


sum4 = 0
```

```
def qqq (n, k):
    if n > 20:
        sum4 = 0
        print (list(range(1, n)))
        print("sum4"+" =" +" "+ str(sum4))
        print(n)
        print(k)
    elif n <= 20:
        sum4 = 0
        for i in range (1, n):
            if i % 2 == 0:
                sum4 = sum4 + i ** k
                print (i)
        print('n='+ ' '+ str(n))
        print('k='+ ' '+ str(k))
        print(("sum4"+" =" +" "+ str(sum4)))
```

Массивы:

```
words = ["Hello", "Hey", "Goodbye", "piano", "banana", "apple"]
words2 = [word for word in words if len(word) < 6]
print(words2)

cities = ["New York", "London", "Berlin", "Toronto"]
print(cities)
print(cities[1])
print(cities[-2].title())
print(cities[-2].upper())

cities.append("Zagreb")
print(cities)

cities.insert(0,"Milano")
print (cities)

del cities[2]
print(cities)

cities.remove("Zagreb")

cities.pop()
print(cities)

print(cities.sort(reverse=True))
cities.reverse()

cars = ["bmw", "honda", "vw", "toyota"]
for x in cars:
    print (x.upper())

arr_2d = [[1, 2, 3],
          [4, 5, 6],
          [7, 8, 9]]
print(arr_2d)
arr_2d_2 = [[1,2,3], [4,5,6,-1,-5], [7]]
print(arr_2d_2)

def print_matrix(arr_2d):
    for arr in arr_2d:
        for el in arr:
            print(el, end=" ")
        print()

print_matrix(arr_2d)
```

```
def print_matrix2(arr_2d):
    for i in range (len(arr_2d)):
        for j in range (len(arr_2d[i])):
            print(arr_2d[i][j], end = ' ')
        print()
print_matrix2(arr_2d)
```

Тип даных List:

```
a = [3, 5, 20]
print(a)

a.append(15)
print(a)

a.append('Hi!')
print(a)

a.append([5, 6])
print(a)
a.pop()
print(a)



print(a[3])

a[0]=100
print(a)

a.pop(2)
print(a)

b = ["Hello", "Goodbye", "Hey"]
temp = b[0]
b[0] = b[2]
b[2] = temp

b[0], b[2] = b[2], b[0]
print(b)
a, b, c, e = 1, 2, 3, 4
print(a)
print(b)
print(c)
print(e)


a = [1, 2, 3, 4, 5]
b = []
for num in a:
    b.append(num * 2)
print(b)

c = [num * 2 for num in a]
print(c)

range3 = [num * 3 for num in range(1, 6)]
print(range3)

range_el = []
for num in range(1,6):
    range_el.append(num * 3)
print(range_el)


t = []
for num in a:
```

```
    if num < 10:
        t.append(num)
print(t)

t2 = [num for num in a if num < 10]
print(t2)

t3 = [num ** 2 for num in a if num < 10]
print(t3)

myList = list(range(1,10))
print(myList)

myNewList = myList[1:3]
myNewNewList = myList[:]
print (myNewList)

print(list(range(1, 100)))
```

Dictionaries (словари):

```
person = {"name" : "Linar",
          "surname":"Latypov",
          "age":27,
         "salary":1500}
print(person)
person["salary"] = 2000
print (person)

employees = []
employees.append(person)
print(employees)
employees[0]["salary"] = 3000
print(employees)

d = {"Alex" : 25, "Petr": 50, "Kate" : 30, "Tom" : 15}
print(d)
len(d)
d["Ann"] = 100, 150
print(d)
d["Kate"] = 40
print(d["Kate"])
print(d)
for k, v in d.items():
    print(k)
    print(v)

for key, value in d.items():
    print ("Ключ: " + str(key) + " , значение: " + str(value))
```

Набор данных Set:

```
a = set()
print(a)

a = set([1, 10, 5, 'Hello'])
print(a)

b = {1, 10, "Hello", "Hey"}
print(b)

a = {}
print(type(a))

a = set()
print(a)
```

```python
a.add(1)
print(a)

a.add (2)
a.add('Hello')
a.add(10)

for el in a:
    print(el)

My_list = [1, 2, 1, 1, 5, "Hello", "hello"]
My_set = set()
for el in My_list:
    My_set.add(el)
print(My_set)

My_set = set(My_list)
print(My_set)

My_list = list(My_set)
print(My_list)

a = {'Hello', 'Hey', 1, 10, 5}
print(5 in a)

5 in a

print(3 in a)

print(5 not in a)

my_list = [1, 1, 2, 5, 10, 10, 10]
my_set = set(my_list)
total = 0
for num in my_set:
    total = total + num
print(sum)

my_list = [1, 1, 2, 5, 10, 10, 10]
print(sum(set(my_list)))

def qaz(set, list):
    if len(list) > len (set):
        print("Falsee")
    key = 1
    for el in list:
        if el in set:
            key1 = 1
            key = key * key1
        else:
            key1 = 0
            key = key * key1
    print(key)
    if key == 1:
        print('True')
    else:
        print('False')


def qwe(set, list):
    if len(list) > len(set):
        return False
    for el in list:
        if el not in set:
            return False
    return True
```

```
qaz({1,2,3,4,5}, [1,3,5])

qwe({1,2,3,4,5}, [1,3,5])
```

Функции:

```
def function1():
    print("dlfjge")
    print("ыыыыы")

function1()

def function2(x):
    return 2*x
a = function2(5)
print(a)


def sumtwo(x,y):
    return x+y
sa = sumtwo(500,600)
print (sa)


def fun5(some):
    print(some)
    print("sgawrgwerg")

def fun6():
    return 5

def fun8(x):
    print(x)
    print("krsljgha")
    return 3*x

b = fun8(10)
print(b)

n1 = "Том"
h1 = 1.90
w1 = 80

n2 = "Джери"
h2 = 1.50
w2 = 40

n3 = "Стюарт"
h3 = 1.60
w3 = 150


def calc(name, height, weight):
    bmi = weight / (height ** 2)
    print("Индекс мт:" + " " + str(bmi))

    if bmi < 25:
        return name + " не страдает избыточным весом"
    else:
        return name + " имеет лишний вес"
bmi1 = calc(n1, h1, w1)
bmi2 = calc(n2, h2 ,w2)
bmi3 = calc(n3, h3, w3)

print (bmi1)
print(bmi2)
print(bmi3)
```

```
def convmil():
    miles = km / 1.609
    print("В "+str(km)+" километрах " + str(miles)+ " миль")
km=2500
convmil()

def is_even(x):
    c = x % 2
    if c == 0  :
        return str(x) + " число четное"
    else:
        print ("число нечетное")

is_even(560)
```

Импорт модулей:

```
import MOD

MOD.aaa()

MOD.bbb()
```

Регулярные выражения:

```
import re

myText = "ksdgkgfkd11212 weqfdhq 32131 hello kggfjgf 111" \
         "ehofdwhof hello google yandex apple kitten dog" \
         "eat tea hjhdjsd 2388 0kfhohf 0988 oh lh l h Aksjdfks" \
         "ldlfh Jspdjfpsdjf lhkljfhw.wdpfij google.com"

pattern = r"hello"
allResults = re.findall(pattern, myText)
print(allResults)

print(re.findall(r"\d\d\d",myText))
print(re.findall(r"[0-9]{4}",myText))
print(re.findall(r"\w",myText))
print(re.findall(r"\w{6}\s",myText))
print(re.findall(r"[A-Z][a-z]+",myText))
print(re.findall(r"\w+\.\w+",myText))
```

Ввод данных с клавиатуры, объект Input:

```
name = input("Please enter your name: ")
print ("Привет, " + name)

num1 = input("Enter x: ")
num2 = input("Enter y: ")
sum = int(num1) + int(num2)
print(sum)

password = " "
while (password != "111"):
    password = input("Enter password: ")


myList = []
msg = ""
```

```
while  msg!= "stop".upper():
    msg = input("Enter new item, or \"STOP\" to finish: ")
    myList.append(msg)
print(msg)
print(myList)
```

Обработка исключений:

```
filename = "123.txt"

try:
    print("Try Block")
    myfile = open(filename, mode="r", encoding="Latin-1")
except Exception:
    print("Except block")
    print("Error")
else:
    print("Else block")
    print(myfile.read())
finally:
    print("Finally block")
```

Аргументы командной строки:

```
import os
import sys

print("Hello")

x = len(sys.argv)
print(sys.argv)

if x>1:
    if sys.argv[1] == "/?":
        print("Help requested")
    print("Arguments entered:" + str(sys.argv))

else:
    print("Arguments not provided")

os.system("dir > test.txt")
os.mkdir("new dir")
sys.exit()
```

Работа с файлами:

```
inputfile = "ABC.txt"
myFile = open (inputfile, mode="r", encoding="latin_1")
print(myFile.read())
myFile.close()

myFile2 = open (inputfile, mode="r", encoding="latin_1")
myList = []
for line in myFile2:
    print("Hello " + line)
    myList.append(line)
myFile2.close()

myFile3 = open(inputfile, mode="r", encoding="latin_1")
for num, line in enumerate(myFile3, 1):
    print(str(num) + " Hello " + line)
myFile3.close()


myFile4 = open(inputfile, mode="r", encoding="latin_1")
```

```
for num, line in enumerate(myFile4, 1):
    if "X" in line:
        print(str(num) + " Hello " + line)
myFile4.close()


outputfile = "newFile.txt"
myFile5 = open(outputfile, mode="w", encoding="latin_1")
myFile5.write("New line")
myFile5.close()
```

Json объекты:

```
import json
filename = "users.txt"

myfile = open(filename, mode="w", encoding="Latin-1")
person1 = {
    "name":"Tom",
    "age": 27
}

person2 = {
    "name" : "Katy",
    "age" : 35
}

persons = []
persons.append(person1)
persons.append(person2)

json.dump(persons, myfile)
myfile.close()

myFile2 = open(filename, mode="r",encoding="Latin-1")
jsonData = json.load(myFile2)
for section in jsonData:
    print("Name: " + str(section["name"]))
    print("Age: " + str(section["age"]))
```

Классы и объекты:

```
class Person():
    def __init__(self, name, surname, age, salary):
        self.name = name
        self.surname = surname
        self.age = age
        self.salary = salary

    def getInfo(self):
        info = "Name: " + self.name + ", surname: " + self.surname + ", age: " +
str(self.age) + ", salary " + str(self.salary)
        print(info)

    def salaryUp(self):
        self.salary += 1000

person1 = Person("Linar", "Latypov", 27, 1500)

person1.getInfo()
person1.salaryUp()
person1.getInfo()
```

Рекурсивный вызов метода:

```python
def privet(x):
    if x == 0:
        return
    else:
        print("Hello")
        privet(x-1)

privet(10)

def sum(x):
    if x == 0:
        return 0
    elif x == 1:
        return 1
    else:
        return x + sum(x-1)

z = sum(5)
print(z)

def factorial(x):
    if x == 0:
        return 1
    else:
        return x * factorial(x-1)

a = factorial(10)
print(a)

def fibonacci(x):
    if x == 0:
        return 0
    elif x == 1:
        return 1
    else:
        return fibonacci(x-1) + fibonacci(x-2)

s = fibonacci(10)
print(s)
```

Бинарный поиск:

```python
list = [10, 12, 14, 29, 37, 55, 67, 81, 132]

def binarySearch(myList, find, start, stop):
    if start > stop:
        return False
    else:
        mid = (start+stop)//2
        if find == myList[mid]:
            return mid
        elif find < myList[mid]:
            return binarySearch(myList, find, start, mid-1)
        else:
            return binarySearch(myList, find, mid+1, stop)

find = 29
start = 0
stop = len(list)
x = binarySearch(list, find, start, stop)
if x == False:
    print("Not found")
else:
    print (find, " Found at index ", x )
```

Bubble-сортировка:

```
list = [10, 75, 123, 45, 65, 52]

def bubbleSort(myList):
    lastItem = len(myList)-1
    for i in range(0, lastItem):
        for y in range(0, lastItem):
            if myList[y] > myList[y+1]:
                myList[y], myList[y+1] = myList[y+1], myList[y]
    return myList

print(bubbleSort(list))
```