Министерство образования Республики Беларусь

Учреждение образования

«Брестский государственный технический университет»

Кафедра ИИТ

Лабораторная работа №4

По дисциплине: «Языки программирования»

За 3 семестр

**Тема:** «Язык Python и его особенности»

Выполнил:

Студент 2 курса

Группы ПО-7(2)

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**Цель работы:**

Ознакомится с принципами работы языка программирования Python

**Ход работы:**

**Задание 1**

**Текст программы:**

import numpy as np

import pandas as pd

import random

def task1\_1():

a = int(input("Enter the number A: "))

if a == 0:

a = int(input("Change count A: "))

b = int(input("Enter the number B: "))

if b == 0:

b = int(input("Change count B:"))

c = int(input("Enter the number C: "))

k = int(input("Enter the number K: "))

sum = (((a\*\*2)/(b\*\*2))+(c\*\*2)\*(a\*\*2))/(a+b+c\*(k-a/(b\*\*3)))+c+(k/b-k/a)\*c

if sum < 0:

print(abs(sum))

else:

print(sum)

def task1\_2():

list\_a = []

list\_b = []

for i in range(10):

list\_a.append(random.randint(0, 10))

print(list\_a)

for i in list\_a:

if i % 2 == 0:

list\_b.append(i)

print(list\_b)

def task1\_3():

strcount = [1, 4, 12, 7, 5, 13, 7, 10]

sum1 = []

print(strcount)

for i in strcount:

if i >= 10:

sum1.append(i)

print(sum1)

print(sum(sum1))

def task1\_4():

strcount = [1, 4, 12, 7, 5, 13, 7, 10]

print(max(strcount))

def task2\_1():

my\_number = 5

user\_number = int(input("Enter the number"))

if my\_number == user\_number:

print("This is 5")

else:

print("Try again")

input(user\_number)

def task2\_2():

list\_str = ['world', 'Space', 'Documentation', 'Unreal Engine']

i = 0

while len(list\_str) > i:

if len(list\_str[i]) > 5 :

if len(list\_str[i]) < 10:

print(list\_str[i])

i += 1

def task2\_4():

text = [random.choice('abc123') for \_ in range(10)]

text[5] = random.choice('ABC')

random\_string = ''.join(text)

print(random\_string)

str2 = ''

for c in random\_string:

if c not in ('abcABC'):

str2 = str2 + c

print(str2)

def task3\_1():

matrix = np.array([[1, 2, 3, 4, 5, 6, 7, 8],

[8, 7, 6, 5, 4, 3, 2, 1,],

[2, 3, 4, 5, 6, 7, 8, 9],

[9, 8, 7, 6, 5, 4, 3, 2],

[1, 3, 5, 7, 9, 7, 5, 3],

[3, 1, 5, 3, 2, 6, 5, 7],

[1, 7, 5, 9, 7, 3, 1, 5],

[2, 6, 3, 5, 1, 7, 3, 2]])

print(matrix)

new\_matrix = matrix\*matrix

print(new\_matrix)

def task3\_2():

matrix = np.array([[1, 2, 3, 4, 5, 6, 7, 8],

[8, 7, 6, 5, 4, 3, 2, 1,],

[2, 3, 4, 5, 6, 7, 8, 9],

[9, 8, 7, 6, 5, 4, 3, 2],

[1, 3, 5, 7, 9, 7, 5, 3],

[3, 1, 5, 3, 2, 6, 5, 7],

[1, 7, 5, 9, 7, 3, 1, 5],

[2, 6, 3, 5, 1, 7, 3, 2]])

print(matrix)

for row in matrix:

print(np.sum(row))

def task3\_3():

matrix = np.array([[1, 2, 3, 4, 5, 6, 7, 8],

[8, 7, 6, 5, 4, 3, 2, 1,],

[2, 3, 4, 5, 6, 7, 8, 9],

[9, 8, 7, 6, 5, 4, 3, 2],

[1, 3, 5, 7, 9, 7, 5, 3],

[3, 1, 5, 3, 2, 6, 5, 7],

[1, 7, 5, 9, 7, 3, 1, 5],

[2, 6, 3, 5, 1, 7, 3, 2]])

print(matrix)

for row in matrix:

row\_matrix = row

print(np.prod(np.array(row\_matrix)))

def task3\_4():

matrix = np.array([[1, 2, 3, 4, 5, 6, 7, 8],

[8, 7, 6, 5, 4, 3, 2, 1,],

[2, 3, 4, 5, 6, 7, 8, 9],

[9, 8, 7, 6, 5, 4, 3, 2],

[1, 3, 5, 7, 9, 7, 5, 3],

[3, 1, 5, 3, 2, 6, 5, 7],

[1, 7, 5, 9, 7, 3, 1, 5],

[2, 6, 3, 5, 1, 7, 3, 2]])

print(matrix)

for row in matrix:

for el in row:

if el == 5:

matrix[matrix == el] = el\*el

print(matrix)

def task3\_5():

matrix = np.array([[1, 2, 3, 4, 5, 6, 7, 8],

[8, 7, 6, 5, 4, 3, 2, 1,],

[2, 3, 4, 5, 6, 7, 8, 9],

[9, 8, 7, 6, 5, 4, 3, 2],

[1, 3, 5, 7, 9, 7, 5, 3],

[3, 1, 5, 3, 2, 6, 5, 7],

[1, 7, 5, 9, 7, 3, 1, 5],

[2, 6, 3, 5, 1, 7, 3, 2]])

print(matrix)

def task3\_6():

matrix = np.array([[1, 2, 3, 4, 5, 6, 7, 8],

[8, 7, 6, 5, 4, 3, 2, 1,],

[2, 3, 4, 5, 6, 7, 8, 9],

[9, 8, 7, 6, 5, 4, 3, 2],

[1, 3, 5, 7, 9, 7, 5, 3],

[3, 1, 5, 3, 2, 6, 5, 7],

[1, 7, 5, 9, 7, 3, 1, 5],

[2, 6, 3, 5, 1, 7, 3, 2]])

print(matrix)

set = []

for row in matrix:

for el in row:

if el == 3:

set.append(el)

print(len(set))

def task3\_7():

matrix = np.array([[1, 2, 3, 4, 5, 6, 7, 8],

[8, 7, 6, 5, 4, 3, 2, 1,],

[2, 3, 4, 5, 6, 7, 8, 9],

[9, 8, 7, 6, 5, 4, 3, 2],

[1, 3, 5, 7, 9, 7, 5, 3],

[3, 1, 5, 3, 2, 6, 5, 7],

[1, 7, 5, 9, 7, 3, 1, 5],

[2, 6, 3, 5, 1, 7, 3, 2]])

print(matrix)

a = int(input('Enter the line number: '))

b = int(input('Enter the column number: '))

print(matrix[a,b])

def task4\_1():

str = 'Cold, Summer, Brest, Toyota, Pen, Pencil, Python, C++, C#'

new\_str = str.split()

for word in new\_str:

if len(word) > 6:

print(word)

def task4\_2():

my\_string = 'Full Name; Age; Category; Praktika; Daniil; Olegovich; 18 Years; student 2rd year university student; Osmush; Artur; Igorevich; 18 years; student 3rd year university student'

spisok = pd.DataFrame({

"ФИО ": ['Praktika Daniil Olegovich', 'Osmush Artur Igorevich'],

"Категория": ['student 2rd year university student', 'student 3rd year university student'],

"Возраст": ['18 Years', '18 years']

})

print(spisok)

def task4\_3():

my\_len = (

"Full Name;Age;Category;"

"\_Ivan Ivanov Ivanovich;22 Years;student 2rd year university student;"

"\_Petr Molo Ivanovich;22 Years;student 2rd year university student;"

"\_Max Lolo Ivanovich;22 Years;student 3rd year university student;"

"\_Igor Solo Ivanovich;22 Years;student 2rd year university student;"

"\_Daniil Void Ivanovich;22 Years;student 3rd year university student;"

"\_Denis Salat Ivanovich;22 Years;student 2rd year university student;"

)

students = my\_len.split(";\_")

data\_new = []

info = []

for row in students:

data\_new.append(row.split(";"))

for i in data\_new:

if "Lolo" in i[0]:

info.append(i)

for i in info:

print(" ".join(i))

def task4\_4():

s = 'Короче, Меченый, я тебя спас и в благородство играть не буду: ' \

'выполнишь для меня пару заданий — и мы в расчете.' \

' Заодно посмотрим, как быстро у тебя башка после амнезии прояснится. ' \

'А по твоей теме постараюсь разузнать. Хрен его знает, на кой ляд тебе этот Стрелок сдался, ' \

'но я в чужие дела не лезу, хочешь убить, значит есть за что...'

print(len(s.split()))

print(len(s))

def task6\_1():

matrix1 = np.random.randint(10, size=(4, 4))

print(matrix1)

print(np.sum(matrix1))

def task6\_2():

my\_set = []

my\_set1 = []

for i in range(10):

my\_set.append(random.randint(0,100))

print(my\_set)

del my\_set[0]

del my\_set[0]

print(my\_set)

my\_set.append(555555555555)

my\_set.append(0)

print(my\_set)

def task6\_3():

group = [["БО-331101", ["Акулова Алена", "Бабушкина Ксения"]], ["БО-402000", ["Альфа Миша", "Альфа Рома"]]]

number = 'БО-331101'

result = pd.Series(['БО-331101: ', 'Акулова Алена ', 'Бабушкина Ксения'])

print(result)

def menu():

print("1 - Task 1.1")

print("2 - Task 1.2")

print("3 - Task 1.3")

print("4 - Task 1.4")

print("0 - Exit")

a = int(input("Enter number: "))

if a==1:

task1\_1()

if a==2:

task1\_2()

if a==3:

task1\_3()

if a == 4:

task1\_4()

if a == 0:

print("Exit")

print("Do you want to continue?")

b = input("Yes/No\n")

if b == "Yes":

menu()

if b == "No":

exit()

menu()

**Вывод:** В ходе выполнения лабораторной работы я ознакомился с принципами работы языка программирования Python