МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ «ЛЬВІВСЬКА ПОЛІТЕХНІКА»

ІНСТИТУТ КОМП'ЮТЕРНИХ НАУК ТА ІНФОРМАЦІЙНИХ ТЕХНОЛОГІЙ

Кафедра ІСМ

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Звіт

до лабораторної роботи №1

На тему “Введення в Python”

З дисципліни “Спеціалізовані мови програмування”

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*Львів - 2023*

**Мета роботи:** створення консольної програми-калькулятора за допомогою основних синтаксичних конструкцій Python, з іншим завданням на заміну тестуванню та валідації.

**Хід роботи**

**Програмний код:**

/math\_operations/math\_operations

import math

def calculate(operation, decimals):

first\_number, second\_number, operator = operation

try:

if operator == "+":

operation.append(first\_number + second\_number)

elif operator == "-":

operation.append(first\_number - second\_number)

elif operator == "\*":

operation.append(first\_number \* second\_number)

elif operator == "/":

operation.append(first\_number / second\_number)

elif operator == "^":

operation.append(first\_number\*\*second\_number)

elif operator == "%":

operation.append(first\_number % second\_number)

elif operator == "sqrt":

print("Warning: Square root function takes only first number")

operation.pop(1)

operation.append(math.sqrt(first\_number))

print("Result: " + str(round(operation[-1], decimals)))

return operation

except ZeroDivisionError:

print("error: you can not divide by zero")

def check():

operation = []

while True:

try:

first\_number = float(input("Enter the first number: "))

second\_number = float(input("Enter the second number: "))

if not (

isinstance(first\_number, (int, float))

and isinstance(second\_number, (int, float))

):

raise ValueError("Both inputs must be numbers (int or float).")

operation = [first\_number, second\_number]

except ValueError as e:

print(f"Error: {e}")

continue

while len(operation) == 2:

try:

operator = input("Enter the operator (+, -, /, \*, ^, %, sqrt): ")

if operator not in ("+", "-", "/", "\*", "^", "%", "sqrt"):

raise ValueError(

"Invalid operator. Please enter one of: +, -, /, \*, ^, %, sqrt"

)

operation.append(operator)

return operation

except ValueError as e:

print(f"Error: {e}")

continue

def calculator(decimals):

operation = check()

result = calculate(operation, decimals)

return result

def get\_operation(history, decimals):

while True:

try:

index = int(input("Insert number of operation from history: "))

if index < 1 or index > len(history):

print("Error: Index is out of range. Please enter a valid index.")

continue

operation = history[index - 1]

if len(operation) == 3:

print(

f"{index}. {operation[1]} {round(operation[0], decimals)} = {round(operation[-1], decimals)}"

)

else:

print(

f"{index}. {round(operation[0], decimals)} {operation[2]} {round(operation[1], decimals)} = {round(operation[-1], decimals)}"

)

return 0

except ValueError as e:

print(f"Error: {e}")

continue

def append\_history(history, operation, history\_limit):

history.append(operation)

if len(history) > history\_limit:

history = history[-history\_limit:]

return history

def print\_history(history):

print("Calculations history:")

indexes = [0, 2, 1]

index\_number = 1

for item in history:

if len(item) == 3:

print(f"{index\_number}. {item[1]} {item[0]} = {item[-1]}")

elif len(item) == 4:

formatted\_item = " ".join([str(item[i]) for i in indexes])

print(f"{index\_number}. {formatted\_item} = {item[-1]};")

index\_number += 1

def settings(history\_limit, decimals):

while True:

print(

f"""

===SETTINGS===

1 - Set history limit | Current: {history\_limit}

2 - Set number of decimal digits | Current: {decimals}

0 - Exit to the menu

"""

)

choice = input("Insert a value: ")

if choice == "1":

# Set history limit

history\_limit = int(input("Enter history limit: "))

print(f"History limit set to {history\_limit}")

elif choice == "2":

# Set number of decimal digits

decimals = int(input("Enter the number of decimal digits: "))

print(f"Decimal digits set to {decimals}")

elif choice == "0":

break

else:

print("Choose a correct option.")

return decimals, history\_limit

def menu():

# default settings

decimals = 1

history\_limit = 10

history = []

while True:

print(

"""

Welcome to calculator!

Menu:

1 - Make a calculation

2 - Show history

3 - Show specific operation from history

4 - Settings

0 - Exit

"""

)

choice = input("Insert a value: ")

if choice == "1":

operation = calculator(decimals)

history = append\_history(history, operation, history\_limit)

elif choice == "2":

print\_history(history)

elif choice == "3":

get\_operation(history, decimals)

elif choice == "4":

decimals, history\_limit = settings(history\_limit, decimals)

elif choice == "0":

return 0

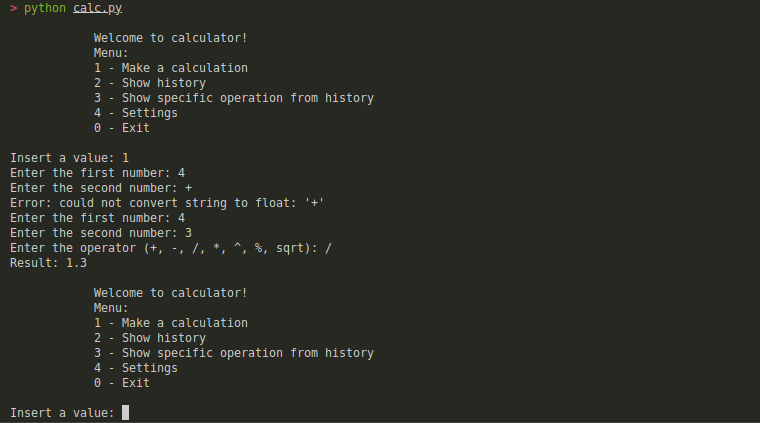
else:

print("Choose a correct option.")

if \_\_name\_\_ == "\_\_main\_\_":

menu()

Результат виконання програми:



**Висновок:** Під час виконання даної лабораторної роботи було створено консольну програму-калькулятор за допомогою основних синтаксичних конструкцій Python.