Python akademie - lekce 8 - 28.11.2024

1 2 3 4 Calculator

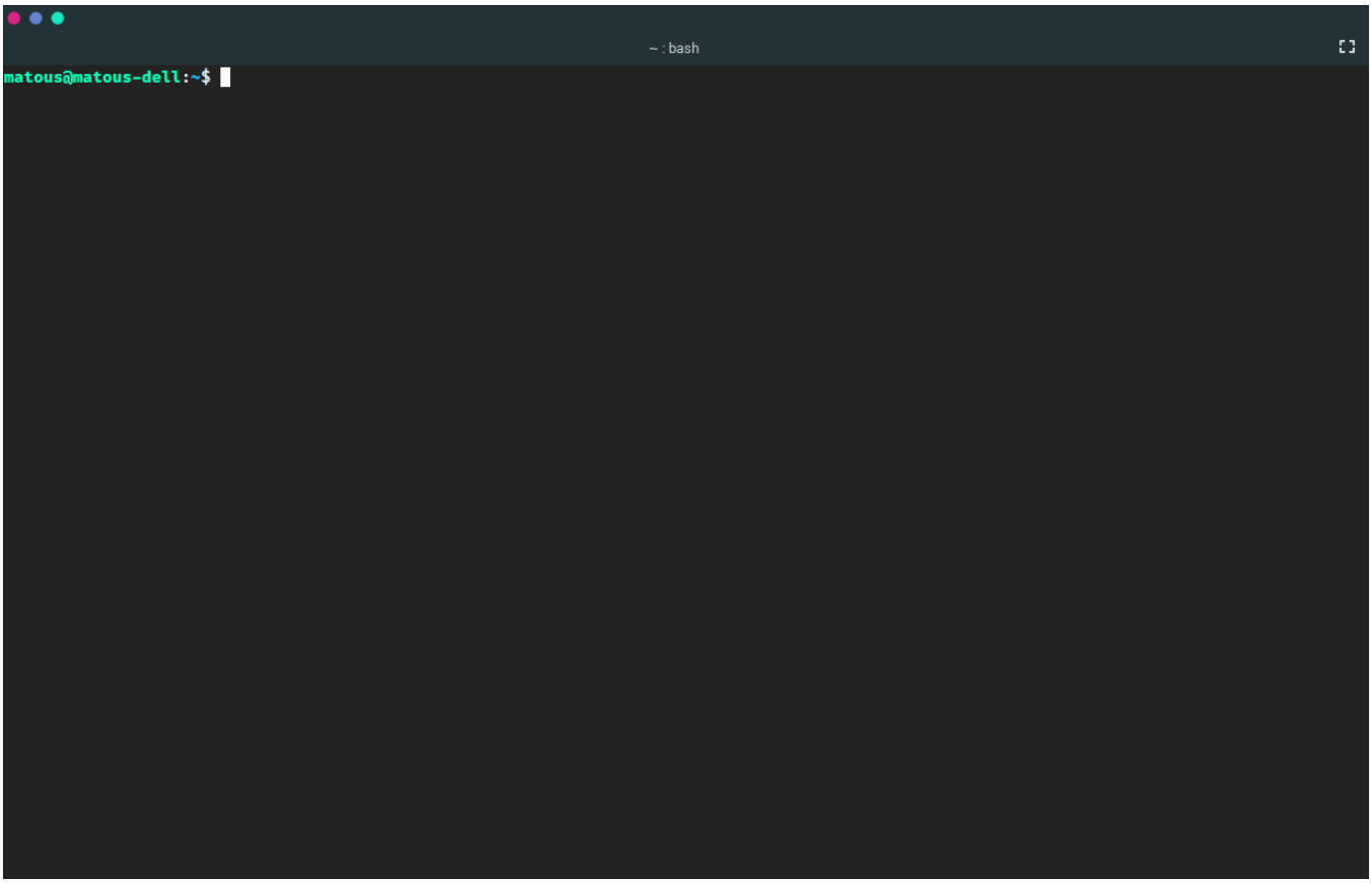
(praktická úloha na závěr 8. lekce)

Upravíte dvojitým kliknutím (nebo stisknutím klávesy Enter)

Zadání

S pomocí znalostí funkcí, pojďme zkusit napsat naši vlastní **kalkulačku** v **příkazovém řádku**.

Kalkulačka bude umět **sčítat**, **odčítat**, **násobit** a **dělit**. Dále musí umět **umocnit** libovolné číslo libovolným mocnitelem a vypočítat **průměrnou hodnotu** z různě dlouhé sekvence čísel.



Obecné spuštění (`Main function`)

```
def calculator() -> str:
    """
    Main function
    """
    print('Lets calculate!')


calculator()
```

+ Kód + Text

Výpis nabídky (`selection listing`)

Očekáváme:

```
$ python3 calculator.py
-------------------------------
+ | - | * | / | sum | pow | quit
-------------------------------
```

Upravíte dvojitým kliknutím (nebo stisknutím klávesy Enter)

💻 Kód:

```
def show_selection(*args) -> None:
    """
    Description:
    Connects values from *args with .join method.
    Then adds separator before and after parameters.

    Example:
    args = ("a", "b", "c")

    Result:
    ---------
    a | b | c
    ---------
    """
    joined = ' | '.join(*args)
    separator = "-" * len(joined)
    print(separator, joined, separator, sep="\n")
```

Umocňování (power)

Očekáváme:

```
Base: 5
Exponent: 2
5 ** 2 = 25
```

Začněte programovat nebo generovat kód s AI.

💻 Kód:

```
    def power() -> int:
        """
        Description:
        Takes two inputs as parameters:
        1. input is base
        2. input is exponent

        Example:
        input1 = 5
        input2 = 2

        Result:
        5 ** 2 = 25
        """
        input1 = int(input('Base: '))
        input2 = int(input('Exponent: '))
        print(f'{input1} ** {input2} = {input1 ** input2}')


    # power()
```

Průměrná hodnota (`count average`)

Očekáváme:

```
Number: 1
Number: 2
Number: 3
Number: 4
Number: 5
Number: =
Average is 3.0
```

💻 Kód:

```
    # TODO Average
    def count_average() -> None:
        """
        Description:
        Takes values from input and stores them to list.
        Values must be numeric.
        If input '=', func calculates average as sum/lengh of list.

        Example:
        numbers = [1, 2, 3, 4, 5]
```

```
    Result:
    Average = 3
    """
    numbers = list()

    while (value := input('Number: ')) != '=':
        if value.isnumeric():
            numbers.append(int(value))

    result = sum(numbers) / len(numbers)

    print(f'Average is {result}')


# count_average()
```

```
Number: 1
Number: 2
Number: 3
Number: 4
Number: 5
Number: =
Average is 3.0
```

Počítání se základními aritm. operátory (`basic arithmetic operators`)

Očekáváme:

```
Select number or operator, "=" for result: 5
Select number or operator, "=" for result: +
Select number or operator, "=" for result: 5
Select number or operator, "=" for result: -
Select number or operator, "=" for result: 4
Select number or operator, "=" for result: =
5+5-4 = 6
```

💻 Kód:

```
# TODO Basic arithmetic operators
def calculate_arithmetic_op() -> None:
    entry = ''

    while True:
```

```
        button = input('Select number or operator, "=" for result: ')

        if button.isnumeric() or button in ('+', '-', '*', '/'):
            entry += button
        elif button == '=':
            print(f'{entry} = {eval(entry)}')
            break


# calculate_arithmetic_op()
```

```
Select number or operator, "=" for result: 5
Select number or operator, "=" for result: +
Select number or operator, "=" for result: 5
Select number or operator, "=" for result: -
Select number or operator, "=" for result: 4
Select number or operator, "=" for result: =
5+5-4 = 6
```

Main function:

Očekáváme:

```
---------------------------------
+ | - | * | / | pow | sum | quit
---------------------------------
Select operation: pow
Base: 10
Exponent: 10
10 ** 10 = 10000000000
---------------------------------
+ | - | * | / | pow | sum | quit
---------------------------------
Select operation: quit
Good bye
```

💻 Kód:

```
# TODO main function
import os

def calculator() -> str:
    selection = ('+', '-', '*', '/', 'pow', 'sum', 'quit')

    while True:
```

```
        show_selection(selection)
        choice = input('Select operation: ')
        os.system('cls')

        if choice == 'quit':
            print('Good bye')
            break
        elif choice in ('+', '-', '*', '/'):
            calculate_arithmetic_op()
        elif choice in 'pow':
            power()
        elif choice in 'sum':
            count_average()


# calculator()
```

```
--------------------------------
+ | - | * | / | pow | sum | quit
--------------------------------
Select operation: pow
Base: 10
Exponent: 10
10 ** 10 = 10000000000
--------------------------------
+ | - | * | / | pow | sum | quit
--------------------------------
Select operation: quit
Good bye
```

Whole script:

```
# TODO imports
import os

# TODO main function
def calculator() -> str:
    selection = ('+', '-', '*', '/', 'pow', 'avg', 'quit')

    while True:
        show_selection(selection)
        choice = input('Select operation: ')
        os.system('cls')

        if choice == 'quit':
            print('Good bye')
            break
        elif choice in ('+', '-', '*', '/'):
            calculate_arithmetic_op()
        elif choice in 'pow':
            power()
        elif choice in 'avg':
```

```
            count_average()



# TODO Selection listing
def show_selection(*args) -> str:
    """
    Description:
    Connects values from *args with .join method.
    Then adds separator before and after parameters.

    Example:
    args = ("a", "b", "c")

    Result:
    ---------
    a | b | c
    ---------
    """
    joined = ' | '.join(*args)
    separator = "-" * len(joined)
    print(separator, joined, separator, sep="\n")


# TODO power
def power() -> None:
    """
    Description:
    Takes two inputs as parameters:
    1. input is base
    2. input is exponent

    Example:
    input1 = 5
    input2 = 2

    Result:
    5 ** 2 = 25
    """
    input1 = int(input('Base: '))
    input2 = int(input('Exponent: '))
    print(f'{input1} ** {input2} = {input1 ** input2}')


# TODO Average
def count_average() -> None:
    """
    Description:
    Takes values from input and stores them to list.
    Values must be numeric.
    If input '=', func calculates average as sum/lengh of list.

    Example:
    numbers = [1, 2, 3, 4, 5]
```

```
        Result:
        Average = 3
        """
        # numbers = list()

        # while (value := input('Number: ')) != '=':
        #     if value.isnumeric():
        #         numbers.append(int(value))

        # result = sum(numbers) / len(numbers)

        # print(f'Average is {result}')
        numbers = list()
        value = int()
        while value != "quit":
            value = input('Value: ')
            if value.isnumeric():
                numbers.append(int(value))

        result = sum(numbers) / len(numbers)

        print(f'Average is {result}')


    # TODO Basic arithmetic operators
    def calculate_arithmetic_op() -> None:
        entry = ''

        while True:
            button = input('Select number or operator, "=" for result: ')

            if button.isnumeric() or button in ('+', '-', '*', '/'):
                entry += button
            elif button == '=':
                print(f'{entry} = {eval(entry)}')
```