

Звіт про виконання практичних завдань до лекцій з курсу Технології програмування на мові Python **Посилання на github**

<https://github.com/Danylo-Tykhonov/TP-Danylo-Tykhonov-K6-242>

Звіт до Теми №1

Функції та змінні

Текст програми:

```
def reverse_string(s: str) -> str:  
    return s[::-1]  
  
print(reverse_string("Hello!"))
```

1)

```
peremenaya = "    hello world    "  
  
print("strip():", peremenaya.strip())  
print("capitalize()", peremenaya.capitalize())  
print("title()", peremenaya.title())  
print("upper()", peremenaya.upper())  
print("lower()", peremenaya.lower())
```

2)

```
def discriminant(a: float, b: float, c: float) -> float:  
    return b**2 - 4*a*c  
  
print(discriminant(1, -3, 2))
```

3)

Звіт до Теми №2

Умовний перехід

```

1 import math
2
3 def discriminant(a: float, b: float, c: float) -> float:
4     return b**2 - 4*a*c
5
6 def korni(a: float, b: float, c: float):
7     D = discriminant(a, b, c)
8     if D > 0:
9         x1 = (-b + math.sqrt(D)) / (2*a)
10        x2 = (-b - math.sqrt(D)) / (2*a)
11        return x1, x2
12    elif D == 0:
13        x = -b / (2*a)
14        return x,
15    else:
16        return None
17
18 a, b, c = 1, -3, 2
19 roots = korni(a, b, c)
20 print("Корні рівняння:", roots)
21
• 1) ...
def add(x, y): return x + y
def subtract(x, y): return x - y
def multiply(x, y): return x * y
def divide(x, y): return x / y if y != 0 else "Ділення на 0"

def calculator(x, y, op):
    if op == "+":
        return add(x, y)
    elif op == "-":
        return subtract(x, y)
    elif op == "*":
        return multiply(x, y)
    elif op == "/":
        return divide(x, y)

print(calculator(5, 2, "+"))
print(calculator(5, 2, "/"))
print(calculator(5, 2, "-"))
print(calculator(5, 2, "*"))

```

2)

```
1  def add(x, y):
2      return x + y
3
4  def subtract(x, y):
5      return x - y
6
7  def multiply(x, y):
8      return x * y
9
10 def divide(x, y):
11     if y == 0:
12         return "Ділення на 0!"
13     return x / y
14
15 def calculator(x, y, op):
16     match op:
17         case "+":
18             return add(x, y)
19         case "-":
20             return subtract(x, y)
21         case "*":
22             return multiply(x, y)
23         case "/":
24             return divide(x, y)
25         case _:
26             return "Невідома операція"
27
28 print(calculator(5, 2, "*"))
29 print(calculator(5, 0, "/"))
30 print(calculator(5, 2, "+"))
31 print(calculator(5, 2, "-"))
32
```

3)

Звіт до Теми №3

Цикли

```

pr3> ● task1py> ...
1  def add(x, y):
2      return x + y
3
4  def subtract(x, y):
5      return x - y
6
7  def multiply(x, y):
8      return x * y
9
10 def divide(x, y):
11     if y == 0:
12         return "Деление на 0!"
13     return x / y
14
15 def calculator(x, y, op):
16     match op:
17         case "+":
18             return add(x, y)
19         case "-":
20             return subtract(x, y)
21         case "*":
22             return multiply(x, y)
23         case "/":
24             return divide(x, y)
25         case _:
26             return "Невідома операція!"
27
28 def res():
29     print("Калькулятор запущено. Введіть 'exit' щоб завершити.")
30     while True:
31         a = input("Введіть перше число: ")
32         if a.lower() == "exit":
33             print("Вихід з програми.")
34             break
35
36         b = input("Введіть друге число: ")
37         if b.lower() == "exit":
38             print("Вихід з програми.")
39             break
40
41         op = input("Введіть операцію (+, -, *, /): ")
42         if op.lower() == "exit":
43             print("Вихід з програми.")
44             break
45
46     try:
47         a = float(a)
48         b = float(b)

```

```

49         result = calculator(a, b, op)
50         print(f"Результат: {result}")
51     except ValueError:
52         print("Помилка!")
53
54     res()
55

```

1)

2)

```
prj > task2.py > test_list_functions
1  def test_list_functions():
2      nums = [3, 1, 4]
3      print("Початковий список:", nums)
4
5      nums.append(5)
6      print("append(5):", nums)
7
8      nums.extend([7, 8])
9      print("extend([7,8]):", nums)
10
11     nums.insert(1, 9)
12     print("insert(1,9):", nums)
13
14     nums.remove(4)
15     print("remove(4):", nums)
16
17     copy_nums = nums.copy()
18     print("copy():", copy_nums)
19
20     nums.sort()
21     print("sort():", nums)
22
23     nums.reverse()
24     print("reverse():", nums)
25
26     nums.clear()
27     print("clear():", nums)
28
29 test_list_functions()
30
```

3)

```
1  def test_dict_functions():
2      print("\nТестування функцій словників")
3      student = {"name": "Danylo", "age": 18}
4      print("Початковий словник:", student)
5
6      student.update({"grade": "A"})
7      print("update({'grade': 'A'}):", student)
8
9      del student["age"]
10     print("del age:", student)
11
12     print("keys():", list(student.keys()))
13     print("values():", list(student.values()))
14     print("items():", list(student.items()))
15
16     student.clear()
17     print("clear():", student)
18
19 test_dict_functions()
```

4)

```
task4.py > ...
1  def find_insert_position(sorted_list, new_element):
2      for i in range(len(sorted_list)):
3          if new_element < sorted_list[i]:
4              return i
5      return len(sorted_list)
6
7  def test_insert_position():
8      nums = [1, 3, 5, 7, 9]
9      print("\nВідсортований список:", nums)
10     x = int(input("Введи новий елемент: "))
11     pos = find_insert_position(nums, x)
12     print(f"Елемент {x} слід вставити на позицію {pos}")
13
14 test_insert_position()
15
```

Звіт до Теми №4

Виняткові ситуації

```
pr4 > task1.py > ...
1 def add(x, y):
2     return x + y
3
4 def subtract(x, y):
5     return x - y
6
7 def multiply(x, y):
8     return x * y
9
10 def divide(x, y):
11     try:
12         result = x / y
13         return result
14     except ZeroDivisionError:
15         return "Помилка: ділення на нуль!"
16
17 def calculator(x, y, op):
18     try:
19         match op:
20             case "+":
21                 return add(x, y)
22             case "-":
23                 return subtract(x, y)
24             case "*":
25                 return multiply(x, y)
26             case "/":
27                 return divide(x, y)
28             case _:
29                 return "Невідома операція!"
30     except Exception as e:
31         return f"Сталася помилка: {e}"
32
33 def run_calculator():
34     print("Калькулятор запущено. Введи 'exit' щоб завершити.")
35     while True:
36         try:
37             a = input("Введи перше число: ")
38             if a.lower() == "exit":
39                 print("Вихід з програми.")
40                 break
41
42             b = input("Введи друге число: ")
43             if b.lower() == "exit":
44                 print("Вихід з програми.")
45                 break
46
47             op = input("Введи операцію (+, -, *, /): ")
48             if op.lower() == "exit":
```

1)

```

47         op = input("Введи операцію (+, -, *, /): ")
48         if op.lower() == "exit":
49             print("Вихід з програми.")
50             break
51
52         a = float(a)
53         b = float(b)
54
55         result = calculator(a, b, op)
56         print(f"Результат: {result}")
57
58     except ValueError:
59         print("Помилка: введено не число!")
60     except Exception as e:
61         print(f"Невідома помилка: {e}")
62
63 run_calculator()
64

```

Звіт до Теми №5

Бібліотеки

1)

```

import random

def game():
    options = ["rock", "scissor", "paper"]
    user_choice = input("Введіть свій вибір (rock, scissor, paper): ").lower()

    if user_choice not in options:
        print("Невірне значення")
        return

    computer_choice = random.choice(options)
    print(f"Комп'ютер обрав: {computer_choice}")

    if user_choice == computer_choice:
        print("Нічия")
    elif (user_choice == "stone" and computer_choice == "scissor") or \
        (user_choice == "scissor" and computer_choice == "paper") or \
        (user_choice == "paper" and computer_choice == "rock"):
        print("Ви перемогли")
    else:
        print("Комп'ютер переміг")

if __name__ == "__main__":
    game()

```

2)

```
import requests

def get_exchange_rate(currency_code):
    url = f"https://bank.gov.ua/NBUStatService/v1/statdirectory/exchange?valcode={currency_code}&json"
    response = requests.get(url)
    if response.status_code == 200:
        data = response.json()
        if data:
            return data[0]['rate']
    print("Не вдалося отримати курс валют")
    return None

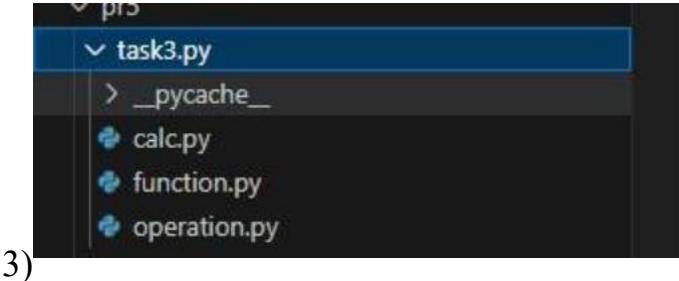
def convert():
    supported = ["EUR", "USD", "PLN"]
    currency = input("Введіть валюту (EUR, USD, PLN): ").upper()

    if currency not in supported:
        print("Ця валюта не підтримується")
        return

    try:
        amount = float(input(f"Введіть кількість {currency}: "))
    except ValueError:
        print("Невірне число")
        return

    rate = get_exchange_rate(currency)
    if rate:
        uah = amount * rate
        print(f"{amount} {currency} = {uah:.2f} UAH за курсом {rate:.2f}")

if __name__ == "__main__":
    convert()
```



3)

```
r5 > task3.py > calc.py
1  from operation import perform_operation
2
3  if __name__ == "__main__":
4      perform_operation()
5
```

```
r5 > task3.py > function.py > divide
1  def add(a, b):
2      return a + b
3
4  def subtract(a, b):
5      return a - b
6
7  def multiply(a, b):
8      return a * b
9
10 def divide(a, b):
11     if b == 0:
12         return "Ділення на нуль неможливе"
13     return a / b
14
```

```
> task3.py > operation.py > ...
1  from function import add, subtract, multiply, divide
2
3  def numbers():
4      a = float(input("Введіть перше число: "))
5      b = float(input("Введіть друге число: "))
6      return a, b
7
8  def perform_operation():
9      print("Оберіть операцію: +, -, *, /")
10     operation = input("Операція: ")
11
12     a, b = numbers()
13
14     if operation == '+':
15         print(f"Результат: {add(a, b)}")
16     elif operation == '-':
17         print(f"Результат: {subtract(a, b)}")
18     elif operation == '*':
19         print(f"Результат: {multiply(a, b)}")
20     elif operation == '/':
21         print(f"Результат: {divide(a, b)}")
22     else:
23         print("Невідома операція")
24
```

Звіт до Теми №6

Робота з файлами

1)

The screenshot shows two instances of the Visual Studio Code (VS Code) interface. Both instances have the same file structure in the Explorer sidebar:

- TP-DANYLO-TYKHONOV-K6-242
- pr3: task2.py, task3.py, task4.py
- pr4: task1.py
- pr5: task3.py, task1.py, task2.py
- pr6: task1 (containing __pycache__, calc.py, function.py, log.txt, logger.py, operation.py, task2.py), README.md

Left Editor (calc.py):

```
1  from function import add, subtract, multiply, divide
2  from operation import get_numbers, get_operation
3  from logger import write_log
4
5  def main():
6      a, b = get_numbers()
7      op = get_operation()
8
9      if op == '+':
10         result = add(a, b)
11     elif op == '-':
12         result = subtract(a, b)
13     elif op == '*':
14         result = multiply(a, b)
15     elif op == '/':
16         result = divide(a, b)
17     else:
18         print("Невідома операція")
19         return
20
21     write_log(a, b, op, result)
22     print(result)
23
24
25 if __name__ == "__main__":
26     main()
```

Right Editor (function.py):

```
1  def add(a, b):
2      return a + b
3
4  def subtract(a, b):
5      return a - b
6
7  def multiply(a, b):
8      return a * b
9
10 def divide(a, b):
11     if b == 0:
12         return "Ділення на нуль неможливе"
13     return a / b
14
```

The screenshot shows a code editor interface with two tabs open: `logger.py` and `operation.py`.

logger.py:

```
pr6 > task1 > logger.py > write_log
1   from datetime import datetime
2
3   def write_log(a, b, oper, result):
4       with open("log.txt", "a", encoding="utf-8") as file:
5           time = datetime.now().strftime("%Y-%m-%d %H:%M:%S")
6           file.write(f"{time} | {a} {oper} {b} = {result}\n")
```

operation.py:

```
pr6 > task1 > operation.py > ...
1  def get_numbers():
2      a = float(input("Введіть перше число: "))
3      b = float(input("Введіть друге число: "))
4      return a, b
5
6  def get_operation():
7      return input("Оберіть операцію (+, -, *, /): ")
8
```

The left side of the interface shows a file explorer with a tree view of files and folders. The current folder is `TP-DANYLO-TYKHONOV-K6-242`. The `logger.py` tab is active, and the `operation.py` tab is also visible.

The screenshot shows a code editor interface with a dark theme. On the left is the Explorer sidebar displaying a project structure with several folders (pr3, pr4, pr5, pr6) and files (task1.py, task2.py, task3.py, calc.py, function.py, operation.py, log.txt, logger.py, README.md). In the center is the main editor area showing the content of `task2.py`. The code defines a list of student data and a function to sort it by name or grade.

```
pr6 > task2.py > ...
1 students_data = [
2     {'name': 'Daria', 'grade': 73},
3     {'name': 'Ivan', 'grade': 89},
4     {'name': 'Svitlana', 'grade': 94},
5     {'name': 'Taras', 'grade': 58},
6     {'name': 'Roman', 'grade': 81},
7     {'name': 'Yulia', 'grade': 100},
8     {'name': 'Bohdan', 'grade': 66},
9     {'name': 'Iryna', 'grade': 77},
10    {'name': 'Serhi', 'grade': 91},
11    {'name': 'Nadia', 'grade': 84}
12 ]
13
14 while True:
15     c = input("Select the column by which you want to sort information about")
16     if c == "name" or c == "grade":
17         break
18     else:
19         print("\nYou entered something wrong in the name of the column to be sorted")
20
21 def sort_dicts(list, name_col):
22     sorted_dict = sorted(list, key=lambda dict: dict[name_col])
23     if name_col == "grade":
24         print("\nSorted by grade\n")
25         sorted_dict.reverse()
26         for col in sorted_dict:
27             print(f'{col["name"]}: {col["grade"]}')
28     else:
29         print("\nSorted by name\n")
30         for col in sorted_dict:
31             print(f'{col["name"]}: {col["grade"]}')
32
33 sort_dicts(students_data, c)
```

Звіт до Теми №7

Об'єктно-орієнтоване програмування

1)

```
1  class Student:
2      def __init__(self, name, age):
3          self.name = name
4          self.age = age
5
6      def __str__(self):
7          return f'{self.name} {self.age}'
8
9
10 class StudentData:
11     def __init__(self, students):
12         self.students = students
13
14     def sort_students(self, column):
15         if column == "name":
16             sorted_students = sorted(self.students, key=lambda student: student.name)
17             print("\nSorted by name:\n")
18
19         elif column == "age":
20             sorted_students = sorted(self.students, key=lambda student: student.age)
21             print("\nSorted by age:\n")
22
23         else:
24             print("\nIncorrect column. Try again\n")
25             return
26
27         for student in sorted_students:
28             print(student)
29
30
31
32 students = [
33     Student('Daria', 18),
34     Student('Oleh', 19),
35     Student('Sofia', 20),
36     Student('Mark', 22),
37     Student('Iryna', 21),
38     Student('Tim', 23),
39     Student('Helena', 19),
40     Student('Leon', 24),
41     Student('Karina', 20),
42     Student('Natalia', 21),
43     Student('Pavel', 22),
44     Student('Olga', 20),
45     Student('Andrey', 24),
46     Student('Viktoriya', 19),
47     Student('Mikhail', 23),
48     Student('Elena', 21),
49     Student('Dmitriy', 22),
50     Student('Tatiana', 20),
51     Student('Ivan', 24),
52     Student('Maria', 19),
53     Student('Oleg', 21),
54     Student('Anna', 22),
55     Student('Vladimir', 20),
56     Student('Yuliya', 24),
57     Student('Svetlana', 19),
58     Student('Dmitriy', 23),
59     Student('Olga', 21),
60     Student('Pavel', 22),
61     Student('Viktoriya', 20),
62     Student('Andrey', 24),
63     Student('Tatiana', 21),
64     Student('Ivan', 23),
65     Student('Maria', 22),
66     Student('Oleg', 20),
67     Student('Anna', 24),
68     Student('Vladimir', 21),
69     Student('Yuliya', 23),
70     Student('Svetlana', 22),
71     Student('Dmitriy', 20),
72     Student('Viktoriya', 24),
73     Student('Olga', 21),
74     Student('Pavel', 23),
75     Student('Tatiana', 22),
76     Student('Ivan', 24),
77     Student('Maria', 21),
78     Student('Oleg', 20),
79     Student('Anna', 23),
80     Student('Vladimir', 24),
81     Student('Yuliya', 21),
82     Student('Svetlana', 22),
83     Student('Dmitriy', 23),
84     Student('Viktoriya', 20),
85     Student('Olga', 24),
86     Student('Pavel', 21),
87     Student('Tatiana', 22),
88     Student('Ivan', 23),
89     Student('Maria', 24),
90     Student('Oleg', 20),
91     Student('Anna', 21),
92     Student('Vladimir', 22),
93     Student('Yuliya', 23),
94     Student('Svetlana', 24),
95     Student('Dmitriy', 21),
96     Student('Viktoriya', 20),
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98     Student('Pavel', 23),
99     Student('Tatiana', 24),
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102    Student('Oleg', 22),
103    Student('Anna', 23),
104    Student('Vladimir', 24),
105    Student('Yuliya', 21),
106    Student('Svetlana', 22),
107    Student('Dmitriy', 23),
108    Student('Viktoriya', 20),
109    Student('Olga', 24),
110    Student('Pavel', 21),
111    Student('Tatiana', 22),
112    Student('Ivan', 23),
113    Student('Maria', 24),
114    Student('Oleg', 20),
115    Student('Anna', 21),
116    Student('Vladimir', 22),
117    Student('Yuliya', 23),
118    Student('Svetlana', 24),
119    Student('Dmitriy', 21),
120    Student('Viktoriya', 20),
121    Student('Olga', 22),
122    Student('Pavel', 23),
123    Student('Tatiana', 24),
124    Student('Ivan', 21),
125    Student('Maria', 20),
126    Student('Oleg', 22),
127    Student('Anna', 23),
128    Student('Vladimir', 24),
129    Student('Yuliya', 21),
130    Student('Svetlana', 22),
131    Student('Dmitriy', 23),
132    Student('Viktoriya', 20),
133    Student('Olga', 24),
134    Student('Pavel', 21),
135    Student('Tatiana', 22),
136    Student('Ivan', 23),
137    Student('Maria', 24),
138    Student('Oleg', 20),
139    Student('Anna', 21),
140    Student('Vladimir', 22),
141    Student('Yuliya', 23),
142    Student('Svetlana', 24),
143    Student('Dmitriy', 21),
144    Student('Viktoriya', 20),
145    Student('Olga', 22),
146    Student('Pavel', 23),
147    Student('Tatiana', 24),
148    Student('Ivan', 21),
149    Student('Maria', 20),
150    Student('Oleg', 22),
151    Student('Anna', 23),
152    Student('Vladimir', 24),
153    Student('Yuliya', 21),
154    Student('Svetlana', 22),
155    Student('Dmitriy', 23),
156    Student('Viktoriya', 20),
157    Student('Olga', 24),
158    Student('Pavel', 21),
159    Student('Tatiana', 22),
160    Student('Ivan', 23),
161    Student('Maria', 24),
162    Student('Oleg', 20),
163    Student('Anna', 21),
164    Student('Vladimir', 22),
165    Student('Yuliya', 23),
166    Student('Svetlana', 24),
167    Student('Dmitriy', 21),
168    Student('Viktoriya', 20),
169    Student('Olga', 22),
170    Student('Pavel', 23),
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172    Student('Ivan', 21),
173    Student('Maria', 20),
174    Student('Oleg', 22),
175    Student('Anna', 23),
176    Student('Vladimir', 24),
177    Student('Yuliya', 21),
178    Student('Svetlana', 22),
179    Student('Dmitriy', 23),
180    Student('Viktoriya', 20),
181    Student('Olga', 24),
182    Student('Pavel', 21),
183    Student('Tatiana', 22),
184    Student('Ivan', 23),
185    Student('Maria', 24),
186    Student('Oleg', 20),
187    Student('Anna', 21),
188    Student('Vladimir', 22),
189    Student('Yuliya', 23),
190    Student('Svetlana', 24),
191    Student('Dmitriy', 21),
192    Student('Viktoriya', 20),
193    Student('Olga', 22),
194    Student('Pavel', 23),
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841    Student('Olga', 22),
842    Student('P
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32 ✓ students = [
33     Student('Daria', 18),
34     Student('Oleh', 19),
35     Student('Sofia', 20),
36     Student('Mark', 22),
37     Student('Iryna', 21),
38     Student('Tim', 23),
39     Student('Helena', 19),
40     Student('Leon', 24),
41     Student('Karina', 20),
42     Student('Robert', 26)
43 ]
44
45 ✓ while True:
46     column = input("Choose the column (name, age): ")
47     ✓ if column in ("name", "age"):
48         break
49     ✓ else:
50         print("\nSomething went wrong\n")
51
52 student_data = StudentData(students)
53 student_data.sort_students[column]
```

2)

```
ask3.py pr7 U X calc.py ...\\task4 U X function.py ...\\task4 U operation.py ...\\task4 U . D v q [ ] ...  
pr7 > task4 > calc.py > ...  
1 import operation  
2 import function  
3 print("Calculator Program")  
4 print("Enter 'q' at any time to leave\\n")  
5  
6 while True:  
7     a = operation.getNumber("Enter the first number: \\n")  
8     if a == 'Q' or a == 'q':  
9         operation.log('q')  
10        print("You left the program")  
11        break  
12  
13     b = operation.getNumber("Enter the second number: \\n")  
14     if b == 'Q' or b == 'q':  
15         operation.log('q')  
16        print("You left the program")  
17        break  
18  
19     op = operation.getOperations("Choose an operation (+, -, *, /): \\n")  
20     if op == 'Q' or op == 'q':  
21         operation.log('q')  
22        print("You left the program")  
23        break  
24  
25     if op == '+':  
26         result = function.plus(a, b)  
27         operation.log(a, b, op, result)  
28         print(f"Answer: {result}")  
29     elif op == '-':  
30         result = function.minus(a, b)  
31         operation.log(a, b, op, result)  
32         print(f"Answer: {result}")  
33     elif op == '*':  
34         result = function.multiply(a, b)  
35         operation.log(a, b, op, result)  
36         print(f"Answer: {result}")  
37     elif op == '/':  
38         result = function.divide(a, b)  
39         operation.log(a, b, op, result)  
40         print(f"Answer: {result}")  
41  
42     if a == "q" or b == "q":  
43         break
```

A screenshot of a code editor showing four tabs: 'task3.py' (marked as pr7 U), 'calc.py' (...\\task4 U), 'function.py' (...\\task4 U X), and 'operation.py' (...\\task4 U). The 'function.py' tab is active, displaying the following Python code:

```
pr7 > task4 > function.py > divide
1 def plus(a: int | float, b: int | float):
2     return float(a) + float(b)
3
4 def minus(a: int | float, b: int | float):
5     return float(a) - float(b)
6
7 def multiply(a: int | float, b: int | float):
8     return float(a) * float(b)
9
10 def divide(a: int | float, b: int | float):
11     try:
12         return float(a) / float(b)
13     except ZeroDivisionError:
14         return "Error: Division by zero is not allowed."
```

```
pr7 > task4 > operation.py > getNumber
  1 import datetime
  2
  3 def getNumber(prompt):
  4     while True:
  5         number = input(prompt)
  6         if number == 'Q' or number == 'q':
  7             return 'q'
  8         else:
  9             try:
 10                 return float(number)
 11             except ValueError:
 12                 print("You entered something wrong! Please try again!")
 13                 log("err_num")
 14
 15 def getOperations(prompt):
 16     while True:
 17         op = input(prompt)
 18         if op == 'Q' or op == 'q' or op == '+' or op == '-' or op == '*' or op == '/':
 19             return op
 20         else:
 21             print("Error!!! You entered something wrong! No operation can be done")
 22             log("err_op")
 23
 24 def log(a=None, b=None, op=None, result=None):
 25     time = datetime.datetime.now().strftime('%d.%m.%Y %H:%M:%S')
 26
 27     if a == "err_num":
 28         logging = f"\n{time} User entered letters or other characters except numbers"
 29         with open('calc.log', 'a') as logs:
 30             logs.write(logging)
 31
 32     elif a == "err_op":
 33         logging = f"\n{time} User entered some characters that are different from +, -, *, /"
 34         with open('calc.log', 'a') as logs:
 35             logs.write(logging)
 36
 37     elif a == "q" or a == "Q":
 38         logging = f"\n{time} User left the program!"
 39         with open('calc.log', 'a') as logs:
 40             logs.write(logging)
```

```
42  v      elif a == "0":  
43      |     logging = f"\n{time} User left the program!"  
44  v      |     with open('calc.log', 'a') as logs:  
45      |     |     logs.write(logging)  
46  
47  v      else:  
48      |     logging = f"\n{time} User entered value of a = {a} and value of b = {b}  
49  v      |     with open('calc.log', 'a') as logs:  
50      |     |     logs.write(logging)
```