Simple Calculator

With Basic Python: Using Loops, Condition, Exceptions, Functions, Modules, Oops Concept

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Basic Expectation:

- Simple calculator which should perform basic arithmetic operations.
- Interactive user interaction for option selection & repetitive option.
- Handle exception error if user enter input other than numerical.
- Try to Incorporate:
  - Loops: While Loop or for loop or both
  - Conditions- if, if-else, if-elif-else/ if else ladder
  - Exceptions: try except finally
  - Functions
  - Modules
  - oops

Followed Procedure:

1. Create display menu
2. Create use choice 1 to 8
3. Get 2 numbers from user
4. Import modules into another file which we created in arithmetic.py file
5. Create logic for arithmetic operations
6. Execution as per choice between 1 to 8
7. display result

Step 1: Create display menu

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```
# Display Menu-> for user
'''
Below created is function which user defined function.
here we are achieving a menu which user going to see when program
get started

here to define function -keyword -def to be used
& we defined to function display_menu()

synatx:
def function_name():
    function_body

indentation to write function_body to be taken care of, which
can be seen below.

i have created 7 selections which will do airthmetic operations
& last select to break/exit out of program.
'''
def display_menu():
    print("--- Welcome to the Simple Calculator ---")
    print("--> Select 1 for Addition")
    print("--> Select 2 for Subtraction")
    print("--> Select 3 for Multiplication")
    print("--> Select 4 for Division")
    print("--> Select 5 for Power")
    print("--> Select 6 for True Quotient")
    print("--> Select 7 for Remainder")
    print("--> Select 8 for Exit")
```

Step 2:Create use choice 1 to 8:

```
# User choice->
'''
to achieve this we have created function with while loop & with
boolean condition.
also we have handled exception which can occur while handling
user choice at the output end , if use enter invalid input such
as if user enter letter "one" instead of 1 digit then error will
occure & we wont be able process further.
so to handle this first we have to check which error comes when user
enter word.

# Testing for calculator project
choice = int(input("Enter your choice (1/2/3/4/5/6/7/8): "))

while choice>=1 and choice<=8:
    print("Correct choice")

hence to handle this logical error we have used exception method,
which is try-except-finally

also to select between 1 to 8 choice- we have used logical operator
here that is and operator, if both i/p's turn 1 or true it will
process further

here return is keyword which will hold the result but wont display
at the output, which can used later if we want.
'''

def get_choice():
    while True:
        try:
            choice = int(input("Enter your choice (1/2/3/4/5/6/7/8): "))
            if choice>=1 and choice<=8: #Logical operator- and logic - it will see if both choice condition turn out be true then only it will
                return choice
            else:
                print("Invalid choice, Please select a choice number between 1 to 8!!.")
        except ValueError:          #ValueError: Logical error-if exception error (logical error) has any spelling mistake in wont work,hence b
            print("Select choice in digit format only!")

```

Step 3:Get 2 numbers from user:

```
# Get two numbers from user->
'''
here to achieve, getting 2 numbers from user we have created an
function with while loop & boolean true condition, which we mentioned
as a True which execute the try-except-finally exception loop.

where
try : is holding logic which will accept user 2 inputs n1,n2
and hold n1,n2

where
except followed by error names, here we have taken care of 2 errors.
will get handled if occur.

'''
def get_numbers():
    while True:
        try:
            n1 = float(input("Enter Number 1: "))
            n2 = float(input("Enter Number 2: "))
            return n1,n2
        except ZeroDivisionError:   # if exception error (logical err
            print("Denominator can not be Zero!")
        except ValueError:          # if exception error (logical err
            print("Enter number in digit format only!")

```

Step 4:Import modules into another file which we created in arithmetic.py file

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```
#Importing modules from another file
'''
Here, in this file we are going to achieve calculator function &
run choice at the o/p , but we have created display menu,
user choice & get 2 numbers in our arithmetic.py file.

so to incorporate those in this file , we are using concept called
modules concept-> which will import another file to another file or
many as per programmer needs.
here we have used user defined modules-> means we are importing
modules which we created in our airthmetic.py file
'''
from arithmetic import display_menu, get_choice, get_numbers
```

Step 5:Create logic for arithmetic operations

```
from arithmetic import display_menu, get_choice, get_numbers

#Created Class name "Calculator" to perform mathimatical operation
'''
Here to perfom arithmetic operation we have created fuction &
incorporated in class which an oops(object oriented programing system)

syntax : to create class
class classname:
    properties

also we have incorporated constructor at start of class, which will
initialize & get called automatically.

synatx: to call constructor
__init__()

here self is compulosory while using class or it will throw an
error.

also incorporated exception with try- except- finally method.

also we have incoroprated destructor- which will release the
memory once operation ends
syntax:
__del__()
'''
```

Continue step 5..

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```
class Calculator:
    def __init__(self):
        print("Program started!!")

    def add(self,n1,n2):
        res=n1+n2
        return res

    def subtract(self,n1,n2):
        res=n1-n2
        return res

    def multiply(self,n1,n2):
        res=n1*n2
        return res

    def divide(self,n1,n2):
        try:
            res=n1/n2
            return res
        except ZeroDivisionError:
            return "Error: Division by zero is not allowed."

    def power(self,n1,n2):
        res=n1**n2
        return res

    def truequo(self,n1,n2):
        try:
            res=n1//n2
            return res
        except ZeroDivisionError:
            return "Error: Division by zero is not allowed."

    def remain(self,n1,n2):
        try:
            res=n1%n2
            return res
        except ZeroDivisionError:
            return "Error: Division by zero is not allowed."

    def __del__(self):
        print("Program Ended!!")
```

Step 6:Excecution as per choice between 1 to 8

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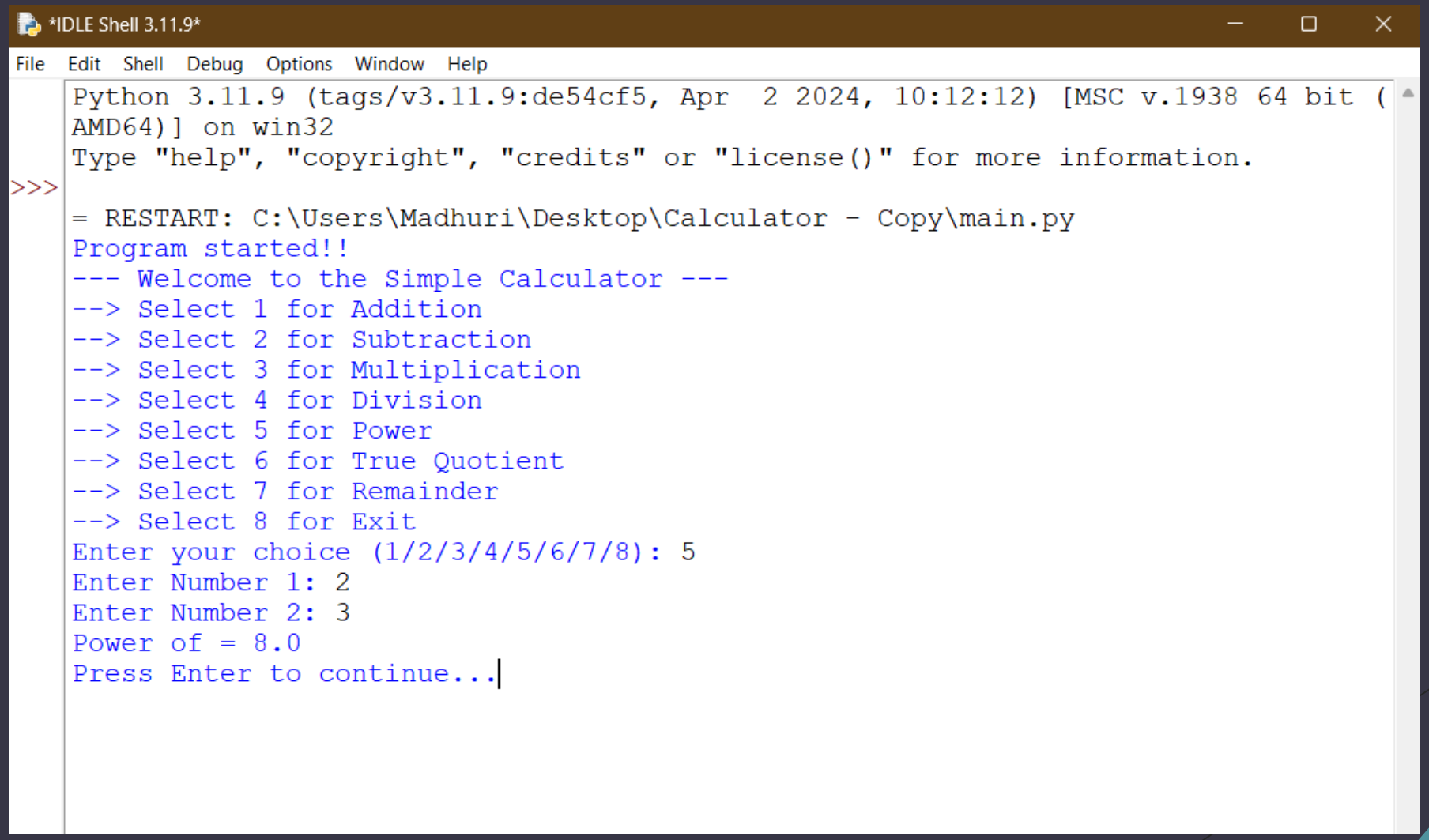
```
# Excecution as per choice between 1 to 8:
'''
here we have craeted "domath()" class, which will get recalled
when user select appropriate choice input between 1 to 8

above class step we have created class "Calculator()", which we
are calling here means we have created object for that class which
also called as "Instantiation"

with while loop & by bool True condition=1, we are calling functions
which we made in previous file & also imported which is:
display_menu() & get_choice()

once we recevied choice from user, we called get_numbers() to accept
n1,n2.
'''
```

Step 6:Continue

```
def domath():
    calc = Calculator()  # Created an ojbect/instance of the Calculator class

    while True:
        display_menu()  # Display the menu
        choice = get_choice()  # Get the user's choice

        if choice == 8:
            print("Exit.")
            break  # Exit the loop if the user chooses to exit

        a, b = get_numbers()  # Get the two numbers from the user

        if choice == 1:
            #print(f"Result: {a} + {b} = {calc.add(a, b)}")
            print("Addition =",calc.add(a,b))
        elif choice == 2:
            #print(f"Result: {a} - {b} = {calc.subtract(a, b)}")
            print("Subtraction =",calc.subtract(a,b))
        elif choice == 3:
            #print(f"Result: {a} * {b} = {calc.multiply(a, b)}")
            print("Multiplication =",calc.multiply(a,b))
        elif choice == 4:
            #print(f"Result: {a} / {b} = {calc.divide(a, b)}")
            print("Division =",calc.divide(a,b))
        elif choice == 5:
            #print(f"Result: {a} ** {b} = {calc.power(a, b)}")
            print("Power of =",calc.power(a,b))
        elif choice == 6:
            #print(f"Result: {a} // {b} = {calc.truequo(a, b)}")
            print("True Quotient =",calc.truequo(a,b))
        elif choice == 7:
            #print(f"Result: {a} % {b} = {calc.remain(a, b)}")
            print("Remainder =",calc.remain(a,b))


        input("Press Enter to continue...")

domath() # calling function to run choice menu
```

Step 7: display result 1



Step 7: display result 2