

Functions Challenge 32: The Python Calculator App

Description:

You are responsible for writing a program that simulates a calculator application that will take in any two numbers, and a basic mathematical operation (addition, subtraction, multiplication, division, or exponentiation), perform that operation, print a lexical statement of the operation, and return a mathematical statement that describes the mathematical results. Upon completion, your program will print out a history of all calculations performed including any error messages that may have occurred such as division by zero.

Step By Step Guide:

Defining your functions:

- Define a function `add()` which takes two parameters, the two numbers you would like to add.
 - Perform the appropriate arithmetic rounded to 4 decimals.
 - Print a lexical statement describing the operation using the word sum.
 - Return a mathematical statement such as " $4 + 2 = 6$ " based off the numbers provided as arguments.
- Define a function `subtract()` which takes two parameters, the two numbers you would like to subtract.
 - Perform the appropriate arithmetic rounded to 4 decimals.
 - Print a lexical statement describing the operation using the word difference.
 - Return a mathematical statement such as " $4 - 2 = 2$ " based off the numbers provided as arguments.
- Define a function `multiply()` which takes two parameters, the two numbers you would like to multiply.
 - Perform the appropriate arithmetic rounded to 4 decimals.
 - Print a lexical statement describing the operation using the word product.
 - Return a mathematical statement such as " $5 * 8 = 40$ " based off the numbers provided as arguments.
- Define a function `divide()` which takes two parameters, the two numbers you would like to divide.
 - If the 2nd parameter is not equal to zero:
 - Perform the appropriate arithmetic rounded to 4 decimals.
 - Print a lexical statement describing the operation using the word quotient.
 - Return a mathematical statement such as " $10 / 2 = 5$ " based off the numbers provided as arguments.
 - Else if the 2nd parameter is zero:
 - Print a message stating that you cannot divide by zero.
 - Return an error message such as "DIV ERROR".

- Define a function `exponent()` which takes two parameters, the two numbers you would like to use in your exponential.
 - Perform the appropriate arithmetic rounded to 4 decimals.
 - Print a lexical statement describing the operation using the words “raised to the power of”.
 - Return a mathematical statement such as “ $2 ** 3 = 8$ ” based off the numbers provided as arguments.

Your main code:

- Print a welcome message.
- Create a blank list called `history`.
- Create an active flag variable and set it to `True`.
- Use this variable to control a while loop.
- Get user input for two numbers and an operation.
 - Allow the user to enter in either the operation name or a single letter.
 - For example, the following input should result in a call to the addition function: `addition`, `Addition`, `ADDITION`, `A`, or `a`.
- Use an `if`, `elif`, `else` chain to make the appropriate function call depending on the users input.
- Append the return value from your function call to the list `history`.
- For an invalid operation such as square root, append an error message such as “`OPP ERROR`”.
- Get user input for if they would like to continue the program.
- If not, print a summary of all calculations and errors performed.
- Print a thank you and end the program.
- Use at least 2 comments to describe sections of your code.
- “Chunk” your code so that is readable.
- Use appropriate and informative variable names.
- Format your output as below.

Example Output:

Welcome to The Python Calculator App

Enter two numbers and an operation and the desired operation will be performed.

Enter a number: 5

Enter a number: 8

Enter an operation (addition, subtraction, multiplication, division, or exponentiation): addition

The sum of 5.0 and 8.0 is 13.0.

Would you like to run the program again (y/n): y

Enter a number: 14

Enter a number: 22

Enter an operation (addition, subtraction, multiplication, division, or exponentiation): s

The difference of 14.0 and 22.0 is -8.0.

Would you like to run the program again (y/n): y

Enter a number: 3.25

Enter a number: .6

Enter an operation (addition, subtraction, multiplication, division, or exponentiation):

Multiplication

The product of 3.25 and 0.6 is 1.95.

Would you like to run the program again (y/n): y

Enter a number: 4

Enter a number: 0

Enter an operation (addition, subtraction, multiplication, division, or exponentiation): D

You cannot divide by zero.

Would you like to run the program again (y/n): y

Enter a number: 4

Enter a number: 2.5

Enter an operation (addition, subtraction, multiplication, division, or exponentiation): d

The quotient of 4.0 and 2.5 is 1.6.

Would you like to run the program again (y/n): y

Enter a number: 5

Enter a number: 15

Enter an operation (addition, subtraction, multiplication, division, or exponentiation): square root

That is not a valid operation. Try again.

Would you like to run the program again (y/n): y

Enter a number: 4

Enter a number: 3

Enter an operation (addition, subtraction, multiplication, division, or exponentiation):

exponentiation

The result of 4.0 raised to the 3.0 power is 64.0.

Would you like to run the program again (y/n): n

Calculation Summary:

$5.0 + 8.0 = 13.0$

$14.0 - 22.0 = -8.0$

$3.25 * 0.6 = 1.95$

DIV ERROR

$4.0 / 2.5 = 1.6$

OPP ERROR

`4.0 ** 3.0 = 64.0`

Thank you for using The Python Calculator App. Goodbye.