Python Practice Tasks

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1 Variables

1. The assignment operator += is used to modify (by incrementing by the value on the right) an already defined variable. Write a program that defines a variable, n, and then increases its value by 1.

2. Write a program that asks for the user's name and then insults them.

3. Write a program that asks a user for a number and prints the square of that number.

4. Write a program that prints the roots of a quadratic equation if given, a, b, and c, where

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \tag{1.1}$$

5. Modify the above program to print the roots of the quadratic equation if given q, e, r, and k where $(qx + e)(rx + k)$.

2 Functions & Control

1. Take your program that finds the roots of the quadratic equation given a, b, and c, and write it as a function. *Hint: as the return keyword only returns one object, you will need to find a way to combine your two x values into one object*

2. Write a function that asks for the user's age, and then gives them information about what they can or can't do at that age.

3. Write a function that returns the sum of the internal angles of a regular n-polygon.

4. Write a function that insults the user based on their favourite subject.

5. Write a function that returns the sum of the positive numbers up to n.

6. Write a function that returns the nth Fibonacci number, where the Fibonacci sequence is defined as

$$F_n = F_{n-1} + F_{n-2} \tag{2.1}$$

   with $F_0 = 0$ & $F_1 = 1$.

7. Write a function that calculates the factorial of a number, where the factorial function is defined for positive integers as

$$n! = \begin{cases} n\,(n-1)! & \text{if } n \geq 2 \\ 1 & \text{otherwise} \end{cases} \tag{2.2}$$

8. Write a function that tests the users ability to time a short period. The python module `datetime` has a function that gets the current computer time. You can import the module by using the line `import datetime as dt` and then using the function `dt.datetime.now()` to get the current time. You can add or subtract times in the usual way, and you can add or subtract intervals of time by using `dt.timedelta(seconds=10)`, shown here the time interval 10 seconds.

3 Loops & Lists

1. Write a function that takes as its argument a list of values and returns a sum of that list.
2. Write a function that counts down from 10.
3. Define a function `maximum()` that takes two numbers as arguments and returns the largest of them.
4. Modify your function that returns the sum of the positive numbers up to n so that it uses a loop instead of recursion.
5. Write a function that prints out a table of positive integers, their squares, and cubes. Your table should be nicely formatted to allow the display of at least the first 10 integers.
6. Write a function that takes a list of values as its argument and returns the sum of the even elements minus the sum of the odd elements.