

## Interest

When a bank account pays compound interest, it pays interest not only on the principal amount that is deposited into the account, but also on the interest that has accumulated over time. Suppose you want to deposit some money into a savings account, and let the account earn compound interest for a certain number of years. The formula for calculating the balance of the account after a specified number of years is:

$$FV = P(1 + r/n)^{nt}.$$

In this formula,  $FV$  is the future value, in other words, the amount of money in the account after the specified number of years,  $P$  is the principal amount that was originally deposited into the account,  $r$  is the annual interest rate,  $n$  is the number of times per year that the interest is compounded, and  $t$  is the specified number of years.

Write a program that performs this calculation for you. The program should ask the user to input the following:

- the amount of principal originally deposited into the account
- the annual interest rate paid by the account, in percent
- the number of times per year that the interest is compound (For example, if interest is compounded monthly, enter 12. If interest is compound quarterly, enter 4.)
- the number of years the account will be left to earn interest

Note: The user should enter the interest rate as a percentage. For example, 2% would be entered as 2, not as .02. The program will then have to divide the input by 100 to move the decimal point to the correct position.

Once the input data has been entered, the program should calculate and display the amount of money that will be in the account after the specified number of years. The precision of output must be set to 2, the output must be formatted with comma separators and with the '\$' sign. For example, if the result of your program is 357689.237, then the output should be formatted as \$357,689.24.

Test your program with the following data:

Input				Output
$P$	$r$	$n$	$t$	$FV$
10000	4.9	4	3	\$11,573.20
80000	0.25	12	1.5	\$80,300.53
10000000	0.25	2	1.5	\$10,037,546.89

Finally, format your program to match the sample below. Your output should exactly match the sample output, character for character, including all white space and punctuation. User input in the sample has been highlighted in **Pappy's Purple** to distinguish it from the program's

output, but your user input does not need to be colored. Save your program as `interest.py`, and submit it along with a screenshot showing a run of each of the test cases.

#### Terminal

```
$ python interest.py
Please enter the following quantities.
How much is the initial deposit? 10000
What is the annual interest rate in percent? 4.9
How many times per year is the interest compounded? 4
How many years will the account be left to earn interest? 3

At the end of 3.0 years, the account will be worth $11,573.20.
```