CSC 1301 – FALL 2022
HOMEWORK #01
DUE 09/13/2022 11.59 PM

CS 1301 Program 1 - Compound Interest

Design and Test Cases Due:
Source Code Due:
Use the I-college link for submitting both files. Both files should be .py files.

Note about collaboration: As stated in the syllabus and on the first day of class, you are allowed to choose ONE other student from this class and work with them as a partner. Either student must NOT have already worked with someone else in the class on this assignment. Pairs are allowed, not triples nor chains nor rings! Choose partners BEFORE the due date. You do not want to make your partner late too! You must reference your partner AND they must reference you in the submitted work of both of work, regardless of which direction the "help" went. All program source code and designs will be checked for similarity. If similarity is found and no references are given, it will be investigated for plagiarism.

Assignment total points = Design (20 points) + Test Case Answers (15 points) + Runs given test cases successfully (15 points) + Implementation correctly written (55 points) = 105 points using formatting in print statements.

Problem Description:

When a bank account pays compound interest, it pays interest not only on the principal amount that was deposited into the account, but also on the interest that has accumulated over time. Follow this link for more information.

Given the principal amount originally deposited (P), the annual interest rate (r), the number of times per year that the interest is compounded (n), and the number of years (t), this equation will calculate the balance of account after a specified number of years (A).

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

Sample Run

```
     ***  Compound Interest  ***

What is the principal amount? ($) 2500.00
What is the annual interest rate? (%) 6.0
What is the number of times per year is the interest applied? 12
What is the number of years interest applied? 2

The total amount accrued, principal plus interest, with compound interest on
a principal $2500.00 at a rate of 6% per year compounded 12 times per year
over 2 years is $2817.90.
```

Sample Run

```
     ***  Compound Interest  ***

What is the principal amount? ($) 15500.00
What is the annual interest rate? (%) 4.5
What is the number of times per year is the interest applied? 6
What is the number of years interest applied? 4

The total amount accrued, principal plus interest, with compound
interest on a principal $15500.00 at a rate of 4.5% per year
compounded 6 times per year over 4 years is $18544.91.
```

Test Plan (30 points) Make sure your program gives these results. Part of our grading process will be to run your program with these cases. You get 15 points for working the results for A., B., and C. by hand. You get 15 points when your program gives the same results when we run them.

Description	**Inputs P, r, n, t**	**Expected Outputs Amount**
Normal and boundary cases		
Normal case	10,000, 3.65, 12, 7.5	A.
Normal case	5080, 4.95, 365, 3	B.
Normal case	45000, 9, 1, 4	C.

(20 points) Design:

Write the design for the program in pseudocode as comments and submit it to I-college as "design1.py". **NOTE that we do not want Python code in this file!** Just comments which can be used in the implementation later.

- Give the three P's (purpose, pre- and post-conditions) and author info as usual. **The steps do NOT have to be numbered**.
- `# supply program prolog (3 P's)`
- `#  main function`
- `# Display introductory message`
- `Your design here…….`

(55 points) Implementation:

Write a Python program to implement your design. Start by making a copy of the Python file you have that has the design in it (possibly modified with improvements you or your partner came up with) and write your Python code between the commented lines of the design. Make sure you eliminate any syntax and semantics errors. Here is where test cases are important!

Specifications for the implementation

- This program uses input; you will have to prompt the user for the inputs. The inputs can be assumed to be floats.
- You must use at least one function.
- Format the calculated final amount to 2 places.
- You should have a main function and all code except for the import statement should be inside the main function definition.
- Make sure you format the lines of the output as described. The line breaks and the punctuation should be as shown. The output messages should be **exactly** as given.