

ENGRECE 12: Assignment-3

January 22, 2004

Due Wednesday 2/4/2004 12:00pm

1 Exercise Time Value of Money [20 points]

Given initial principal amount, monthly payment amount (monthly installment), APR (Annual Percentage Rate), number of years. Write a Python program that computes and prints the interest and total value at the end of every month. For example, if

Principal Value = \$1200
APR = 1.5% (Floating point value 1.5)
Monthly Payment = \$20
Number of Years = 2

Your Program should compute and print following data as below:

no.	year/mo	balance	payment	interest	total
1	1/01	1200.00	20.00	1.50	1221.50
2	1/02	1221.50	20.00	1.53	1243.03
3	1/03	1243.03	20.00	1.55	1264.58
.
10	1/10	1394.47	20.00	1.74	1416.21
11	1/11	1416.21	20.00	1.77	1437.98
12	1/12	1437.98	20.00	1.80	1459.78
13	2/01	1459.78	20.00	1.82	1481.61
14	2/02	1481.61	20.00	1.85	1503.46
15	2/03	1503.46	20.00	1.88	1525.34
.
22	2/10	1657.19	20.00	2.07	1679.26
23	2/11	1679.26	20.00	2.10	1701.36

24	2/12	1701.36	20.00	2.13	1723.49
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Summary:

Total Months	Init. Balance	Tot. Payment	Tot. Interest	Total Balance
24	1200.00	480.00	43.49	1723.49

The First Column is the "Number of Month". For example, If the number of years = 2, then this column will run from 1 to 24. If number of years = 5, then it runs from 1 to 60 and so on..

The second column is the year and the month. It starts with 1/1, meaning first year and first month.

The Third column is the "balance" at the start of every month. For the very first month Principal Value becomes the "balance". For the subsequent months, previous month's "total" will become the "balance".

The fourth column is the monthly payment which will be constant in this case.

The fifth column is the interest earned by the "balance". The values in this column are computed as:

$$interest = balance * (apr/100)/12$$

The sixth column is the total amount at the end of the month. It is computed as

$$total = balance + payment + interest$$

Implement this problem in Python and get the results for the following two cases:

- savings account example: Principal Value = \$1200, APR = 1.5%, monthly deposit = \$20
What is the value after 5 years?
- mortgage example: Borrowed Amount = \$-290000, APR = 6.5%, monthly pament = \$1800
What is the amount still owed to the bank after 10 years?

2 Exercise 4.7 (page 152) Guess A Number [20 points]

HINT

Your program can use random.randrange() function to generate the initial number. More details about the usage of this function is given in pg.127, Section: 4.6

For **5 extra credits**, How many steps atmost does it take for a "Good Guesser" Algorithm to guess a number between 1 and 5000

3 What to turn in

Use the command

```
% python ~ece12/tools/submit.pyc
```

to turn in your homework. Your files should be a level above the hw3 directory. You should have the following files:

- tvn.py
- tvn.script
- 4.7.py

- 4.7.txt (For Extra Credits)
- 4.7.script