



## MGT 201: Winter 2023 (Homework #2)

Due on Tuesday, February 28<sup>th</sup>, 2023 (11:59pm)

Submit the following files:

1. Jupyter Notebook (ipynb) file
2. PDF and/or HTML file that shows your code and output

When you write your program, please add applicable comments with the hashtag (#) and/or with markdown cells so the grader can follow your work. You are expected to use the concepts that we've learned this semester.

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### Part A

You have graduated from UTM and now have a great job in Downtown Toronto. You want to calculate how much you will need to save monthly until you turn 60 to retire comfortably. You will create a program in which you can enter the total amount you want saved when you turn 60. You will also enter the age in which you want to start saving (e.g., 25, 26, etc.,) as well as the interest rate assumption.

For example, your program will ask you to enter the following (see **RED** text as the input):

1. Amount to save at age 60: **\$1,500,000**
2. Age in years to start saving: **30**
3. Interest rate assumption (i.e., Discount rate) -> Stated annual rate with monthly compounding (%): **12** (note: 12%/12 = 1% is the effective monthly rate)

Hint:

$$Present\ Value = \frac{Monthly\ Savings}{Discount\ rate} \left[ 1 - \frac{1}{(1 + Discount\ rate)^n} \right]$$

Where the "present value" is the total amount saved as of today's present value. The "discount rate" is the effective rate per period (i.e., monthly) so 12%/12 is the effective rate per month. Lastly, "n" represents the total number of months of savings.

The "future value" is the following:

$$Future\ Value = Present\ Value (1 + Discount\ Rate)^n$$

In this example, the "Future Value" is \$1,500,000, the "Discount Rate" is 1% or calculated as 0.01, and "n" is 360 months (i.e., "60 - 30" x 12 months). The monthly savings will turn out to be, \$429.19.

Please use appropriate error checking (e.g., no negative numbers).

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## Part B

You will create a CSV file with two columns. The headings of the columns will be: (i) Month and (ii) Sales (\$). Your CSV file can contain as many months as possible that you desire to enter, and the sales (\$) cannot be negative.

For example, you run a Beaver Tail food truck business and you have recorded the following monthly sales for the last twelve months.

Month	Sales (\$)
February '22	4,500
March '22	4,750
April '22	4,100
May '22	3,900
June '22	4,050
July '22	4,500
August '22	5,200
September '22	5,150
October '22	6,250
November '22	6,800
December '22	6,650
January '23	7,200

1. Create a program that should be able to write the data to a CSV file.
2. Create a program that can read the CSV file into a data structure of your choice and then can calculate the total sales (\$), the total number of months recorded and the average monthly sales.