AI Programming (CB2001103-059) HW01

Note

For the following problems, write a program to solve the problem and display the answer. A possible output is shown in a example I/O section and responses to input statements appear **green**. Make sure you run scripts using Python 3.

Submission format

HW01_(NAME)**.zip** included:

- HW01_A_(NAME)**.py – CODE** for Problem A and sufficient **COMMENTS.**
- HW01_B_(NAME)**.py – CODE** for Problem B and sufficient **COMMENTS**
- HW01_C_(NAME)**.py – CODE** for Problem C and sufficient **COMMENTS**
- HW01_D_(NAME)**.py – CODE** for Problem D and sufficient **COMMENTS**
- HW01_(NAME)**.pdf - SCREEN SHOT** of terminal that run example case.

Homework Policy

Late penalty: 20 points per 12 hours

Any cheating → 0 point for anyone involved

- Copying from a fellow student
- Copying from the Web or ChatGPT/ChatGPT-like apps.
- Working together with a group of students on this non-group assignment.

Problem A. Marketing Terms [25 points]

Problem

The markup of an item is the difference between its selling price and its purchase price. Two other marketing terms are

$$percentage\ markup = \frac{markup}{purchase\ price} \text{ and } profit\ margin = \frac{markup}{selling\ price}$$

where the quotients are expressed as percentages. Write a program that computes the markup, percentage markup, and profit margin of an item. Notice that when the purchase price is tripled, the percentage markup is 200%.

Restrictions

Use the format method to display the following outputs.
Match the decimal notation to the **example I/O.**

Example I/O

```
Enter purchase price: 150
Enter selling price: 570
Markup: $420.0
Percentage markup: 280.0%
Profit margin: 73.68%
```

Submit format

HW01_A_(NAME).py

Problem B. Change in Salary [25 points]

Problem

Common misconception is that if you receive four successive 5% pay raises, then your original salary will have increased by 20%. Request a salary as input and then display the salary after receiving four successive 5% pay raises. The program also should display the percentage change in salary.

Restrictions

Do not use any loop.

Use the format method to display the following outputs.

Match the decimal notation to the **example I/O.**

Example I/O

```
Enter beginning salary: 25000
New salary: $30,387.66
Change: 21.55%
```

Submit format

HW01_B_(NAME).py

Problem C. Digit Sum [25 points]

Problem

Write a program to calculate the total sum of the digits of odd numbers from 1 to a million.

Restrictions

Use only for-loop (no while-loop)

Use the format method to display the following outputs.

Example I/O

```
The sum of the digits of odd numbers
From 1 to one million is 13,750,000.
```

Submit format

HW01_C_(NAME).py

Problem D. Bouncing Ball [25 points]

Problem

The coefficient of restitution of a ball, a number between 0 and 1, specifies how much energy is conserved when the ball hits a rigid surface. A coefficient of .9, for instance, means a bouncing ball will rise to 90% of its previous height after each bounce. Write a program to input a coefficient of restitution and an initial height in meters, and report how many times a ball bounces when dropped from its initial height before it rises to a height of less than 10 centimeters. Also report the total distance traveled by the ball before this point.

Restrictions

Use only while-loop (no for-loop)

Use the format method to display the following outputs.

Example I/O

```
Enter coefficient of restitution: .8
Enter initial height in meters: 10
Number of bounces: 21
Meters traveled: 89.08
```

Submit format

HW01_D_(NAME).py