Assignment 1

Your assignment is to create a Python program that performs a "random walk" stock market simulation. The random walk hypothesis argues that the stock prices randomly increase or decrease each day relative to their prices the previous day, and these changes in price cannot be predicted.

To perform the simulation, first ask the user for:

1. the initial price of the stock
2. How many days they would like to simulate

Then, each day, assume that the change in stock price will be random and range from a 3 percent increase to a 3 percent decrease relative to the previous day. Ensure that your program captures the daily change in stock price. In addition, also keep track of how many days the stock price increased, how many days the stock price decreased, and how many days the stock price stayed the same. At the end of the simulation, report (print) the new stock price and the number of days that the stock price increased, decreased, and stayed the same.

Each time you make an adjustment to the stock price, ensure that the new price reflects an appropriate percentage change relative to the previous day. For example, suppose that your stock has an initial price of $10.00. If the stock price increases by 3 percent the first day, the new stock price is calculated as $10.00 x 1.03 = $10.3. If the stock price decreases by 3 percent the second day, then the new stock price is calculated as $10.3 x 0.97 = $9.991. In other words, ensure that the change in stock price each day is calculated based on the stock price from the previous day.

Once a simulation is complete, the program should ask the user if they would like to run the simulation again and allow the user to run the simulation an unlimited number of times.

Your program should:

1. Write the results of the simulation to an output CSV file called randwalk.csv. Create a "header row" at the top of your CSV file to title each column ("Initial price", "Days" refers to the Number of days simulated, "Final price", "Price increased" refers to Number of days price increased, and "Price decreased" refers to the Number of days price decreased.
2. Each time a simulation is run, create a new row in your CSV file containing the initial price, number of days simulated, final price, Number of days price increased, and Number of days price decreased for that simulation.

Please use the following as a template for the tool's expected functionality:

What is the initial price of the stock? 10

How many days would you like to simulate? 50

After 50 days, 8.83280353362247 is the new stock price. The stock price increased 16 time(s), decreased 24 time(s), and stayed the same 10 time(s).

Would you like to perform another simulation (yes/no)? yes

What is the initial price of the stock? 20

How many days would you like to simulate? 10

After 10 days, 21.2198304752784 is the new stock price. The stock price increased 6 time(s), decreased 1 time(s), and stayed the same 3 time(s).

Would you like to perform another simulation (yes/no)? no

An output file called randwalk.csv should be created and resemble the following:

Initial price	Days	Final price	Price increased	Price Decreased
10	50	8.83280353362247	16	24
20	10	21.2198304752784	6	1

Some considerations to note:

- Feel free to import an appropriate module
- You may assume that the user indicates both the initial stock price and the number of days to simulate
- When generating a (pseudo)random value for the change in stock price each day, you may determine the level of decimal precision that you would like to use.
- Ensure that your prompts and output are crisp, professional, and well-formatted. For example, ensure that you have used spaces appropriately and checked your spelling.
- Adding comments in your code is encouraged. You may decide how best to comment your code. At minimum, please use a comment at the start of your code to describe its basic functionality.