Volatility Voyage

Assignment 1

Before moving to what is expected of you, get introduced to the following two terms : **SMA**(simple moving average) and **EMA**(exponential moving average).

Simple Moving Average (SMA):
Think of the Simple Moving Average as the average marks you've scored in the last few tests — say the last 5. You just add them up and divide by 5. In trading, we do the same but with closing prices of a stock. For instance, if the last 5 days' closing prices of a stock were ₹100, ₹102, ₹101, ₹98, and ₹99, then the 5-day SMA would be (100 + 102 + 101 + 98 + 99) / 5 = ₹100. This average helps smooth out random daily ups and downs and lets us see the underlying trend more clearly. If the SMA is rising, it's a sign that the stock might be generally moving upward and vice versa. It's a really simple but powerful way to remove the "noise" and just look at the bigger picture.

Exponential Moving Average (EMA):
Now imagine you had five tests, but your teacher says the most recent test is more important for your final grade. That's the idea behind the Exponential Moving Average. EMA also calculates an average of prices, but it gives more importance to the recent days. So if a stock's price has just started rising quickly, EMA will react faster than SMA and start going up more sharply. For example, traders might use a 20-day EMA to quickly catch a rising trend or a sudden fall, and even use it along with a 50-day EMA , if the 20-day EMA crosses above the 50-day EMA, it's often a signal to consider buying. This quick response makes EMA super useful in fast-moving markets like crypto or intraday trading.

Part 1 :

All of you should perform basic EDA for the data provided (number of parameters you generate is up to your convenience) and analyse the data provided.

Once this is done, add two columns to the existing dataset. One should be that of simple moving average and the other is that of exponential moving average (over two different time intervals n=20 and 50 days).
Name them SMA, EMA_20, EMA_50 respectively.

Now we move to the most straightforward way to understand volatility :

Volatility is a measure of how much the price of a stock or asset moves over time. Think of it like mood swings in the market — some days are calm, others are wild. A stock that jumps ₹10 one day and drops ₹12 the next is considered more volatile than one that moves only ₹1 or ₹2 each day. Traders care about volatility because it helps them understand the level of risk they are dealing with more price movement usually means more opportunity, but also higher chances of loss.

One simple way to **quantify volatility** is through **standard deviation**. Standard deviation measures how much the price deviates from its average value. If prices are tightly clustered around the mean, the standard deviation is low — meaning the stock is stable. If prices are spread out, the standard deviation is high indicating more volatility. So, it gives us a clear, numeric way to understand how "wild" a stock has been during a particular time frame.

Part 2 :

Find out the standard deviation of the prices over each 6 month period. Assess and print the “most” volatile one out of all.

Submit both questions in the same ipynb file and upload it to your local repository.
Format in which you name the ipynb file is as follows : name-rollno-VolatilityVoyage1

#Note : For the sake of this assignment, work with the closing prices in the data.