COP290

ASSIGNMENT 1 SUBTASK 1

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STOP-LOSS IN PAIRS TRADING STRATEGY

Our understanding of the statement :

In the realm of pairs trading strategy, we frequently encounter undesirable positions that impede our ability to take advantage of new opportunities and realize profits, especially when considering our imposed constraint on maximum positions. To address this issue, we integrate a stop-loss mechanism into our strategy. Specifically, we delve into the Loss-based Stop-Loss Strategy.

Within the framework of our Pairs Trading Strategy with Stop-Loss, if a positive position is established and a SELL signal is received, we promptly close the preceding position. This approach aligns consistently with our overarching strategy. We initially assess the feasibility of generating a SELL signal; upon confirmation, we proceed to liquidate the earliest acquired

position. Following this, we evaluate the stop-loss threshold condition for all existing positions.

It is noteworthy that within our portfolio, all shares of a given company are either bought or sold exclusively. This is predicated on four potential scenarios:

- Should all shares of Company 1 have been purchased and a directive to acquire more arises, the new stock is simply added to the existing list of purchases.
- In the event that all shares of Company 1 have been acquired and a directive to sell emerges, the earliest purchased stock is promptly removed from the list.
- If all shares of Company 1 have been divested and a directive to sell arises, the new stock is directly added to the list of sales.
- Conversely, if all shares of Company 1 have been sold and a directive to buy is received, the earliest sold stock is immediately removed from the list.

These scenarios ensure the integrity of our strategy. Additionally, it is imperative to maintain records of the mean and standard deviation pertaining to the day of acquisition or sale for each stock.

Moving forward, when determining whether transactions are warranted on a particular trading day, we commence by calculating the z-score for that day. This calculation leads to three potential outcomes:

- Should the z-score surpass the positive threshold, a sell signal is generated, necessitating the sale of Stock 1 and the purchase of Stock 2, in accordance with the predefined rules.

- Conversely, if the z-score exceeds the negative threshold, a buy signal is triggered, prompting the purchase of Stock 1 and the sale of Stock 2, following the established guidelines.
- If neither of the aforementioned conditions is met, no trading activity is initiated at present.

Subsequently, our focus narrows to Stock 1 exclusively, as any alterations affecting Stock 1 will correspond inversely with Stock 2. The list of stocks is updated following any transaction, after which we iterate over all stocks. The following scenarios may transpire:

- In the event that Stock 1 was purchased due to the z-score crossing the negative threshold, yet subsequently exceeds the negative stop-loss threshold contrary to our expectations, we opt to close this position, thereby selling the stock at today's prevailing price to mitigate further losses.
- Conversely, if Stock 1 was sold owing to the z-score surpassing the positive threshold, but later exceeds the positive stop-loss threshold contrary to projections, we choose to close this position by purchasing the stock at the current price to avert additional losses.
- In the absence of the aforementioned scenarios, no adjustments are made to the portfolio.

Regarding implementation, we have employed a vector of structures to store pertinent information regarding stocks, including the mean and standard deviation for the relevant day, as well as indicators of purchase or sale status.