Objective: build and serve consolidated market book for all US equities

Description:

US equities can be traded on multiple exchanges. You can subscribe to market data feed from each exchange to track the book for a security. We want to build a consolidated book that merges the per-exchange books.

There are two types of market feeds

1.       Top of the book. Each message from the exchange has SYMBOL, BEST\_BID\_PRICE, BEST\_BID\_SIZE, BEST\_OFFER\_PRICE, BEST\_OFFER\_SIZE

2.       Order based book. Messages can be

a.       NEW\_ORDER: SYMBOL, LIMIT\_PRICE, SIDE (BUY/SELL), QUANTITY, ORDER\_ID

b.       CANCEL\_ORDER: ORDER\_ID

c.       MODIFY\_ORDER: ORDER\_ID, NEW\_QUANTITY (modifications allow changing the quantity only)

Consume the market data feed (top-of-the-book style and order-based-book style) from multiple exchanges, and build a consolidated book per symbol such that

Level 0: Bid Size, Bid Price, Offer Price, Offer Size

Level 1: Bid Size, Bid Price, Offer Price, Offer Size

…

Such that Level 0 is the BEST (highest Bid price, lowest offer price), Level 1 is the next best, and so on.

The Size at each level is the sum of the sizes at all the exchanges at that price.

Serve the top 5 levels of the consolidated book. There are many readers – all simultaneously requiring the top 5 levels of the consolidated book by symbol.

Use any programming language. Provide test cases.