Name : Brian Kheng

Student ID : A0290248B (e1324741)

Data Structures

Hash Map: mapping between instrument and orderbook also mapping between id and orderbook.

Priority Queue: orderbook is using this data structure and set the priority based on the price and timestamp.

Synchronization Primitives

Mutexes:

1. Mutex for the instrument_to orderbook hash map.
2. Mutex for the id_to_orderbook hash map.
3. Mutex for each instrument's orderbook.

Level of Concurrency

Instrument level: the mutex is used for each of the instrument's orderbook. So, different threads could still be able to access the other instrument's orderbook that aren't currently used by other threads.

Testing Methodology

I used my hand-written test cases that cover 40+ clients, race condition, data races, and using the grader provided to check whether my program was able to pass the given test cases.