

# Homework #1 - Due 29 September 2023

FE-570

September 18, 2023

## Problem 1.1

Assume that the limit order book is as shown in the table below.

- 1) What is the bid-ask spread in cents?
- 2) If you buy 100 shares with a market order, and immediately sell them also with a market order, what is your P&L (profit/loss)?
- 3) A limit order to buy 250 shares at \$25.50 arrives in the market. What transactions occur, and what is the resulting bid-ask spread in cents?
- 4) A limit order buy order for 2000 shares at \$25.54 arrives. List all transactions, and determine the bid-ask spread after the order is executed.

Orders	Shares	Price
offer	2000	25.56
offer	1500	25.55
offer	1200	25.53
offer	400	25.52
offer	200	25.51
bid	1000	25.48
bid	1100	25.47
bid	1400	25.45
bid	1500	25.44
bid	2200	25.42

**Problem 1.2**

Assume that the buy and sell orders shown in the table below have been submitted prior to an auction.

A single-price auction is conducted at a price  $p_*$ , chosen such that the number of exchanged shares is maximal.

- 1) What is the auction price  $p_*$ , and how many shares exchange hands?
- 2) What is the resulting Limit Order Book after the auction?

Buyers		Order Price	Sellers	
Order	Size		Order	Size
		50.3	S1	500
B1	80	50.2	S2	350
B2	110	50.1	S3	300
B3	120	50.0		
B4	250	49.9	S4	100
B5	500	49.8	S5	50
B6	750	49.7		

Figure 1: Orders submitted for an auction.