

optiverΔ



# ALGORITHMIC TRADING INTRODUCTION

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# WHAT THIS TALK IS ABOUT

## PART 1

Basics of financial markets and algorithmic trading

## PART 2

Discuss the challenge

## PART 3

Demo Optibook (our virtual exchange)

# PART 1: MARKETS & ALGORITHMIC TRADING

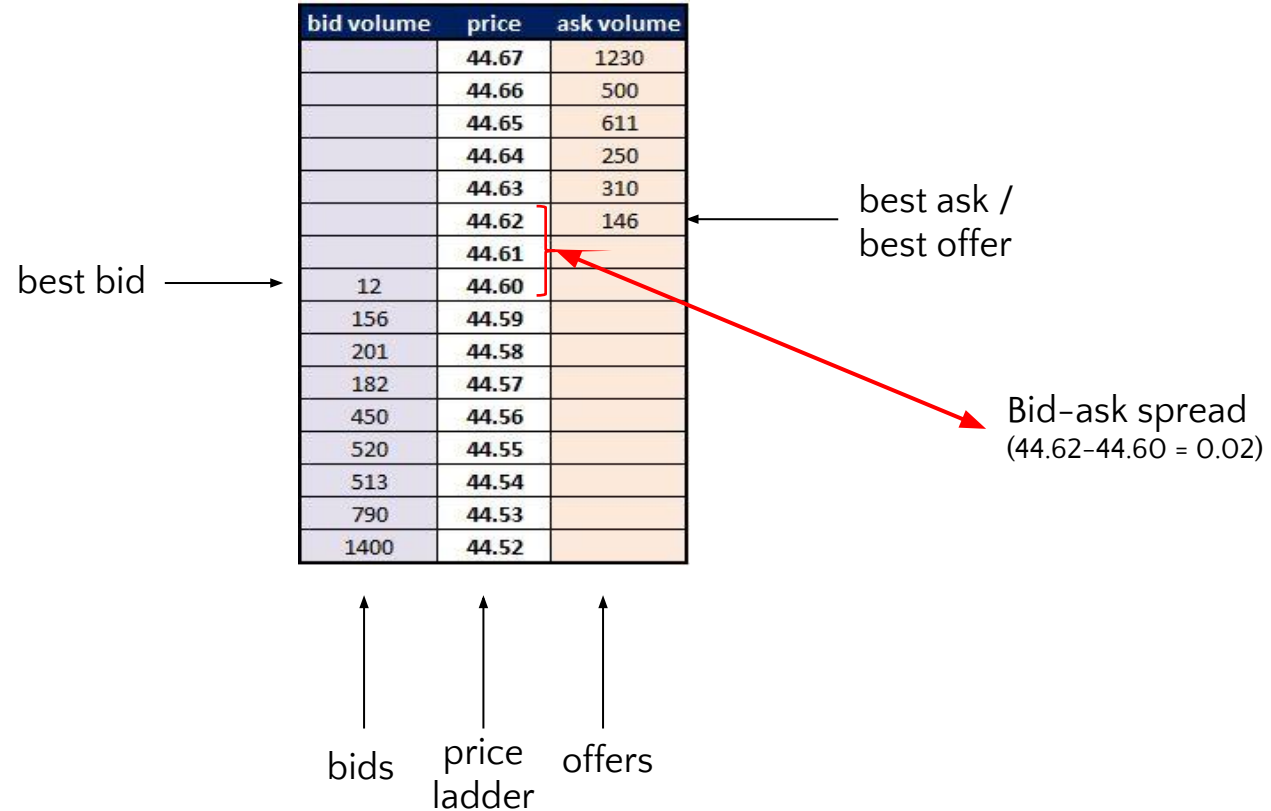
# FINANCIAL INSTRUMENTS

Any object that is traded on an exchange, e.g.:

- a stock
- a future
- an option
- an ETF
- more...

Today we are only trading stocks.

# ORDER BOOKS



# LIQUIDITY

liquid

bid volume	price	ask volume
	<b>44.67</b>	8539
	<b>44.66</b>	10551
	<b>44.65</b>	3677
	<b>44.64</b>	6800
	<b>44.63</b>	9061
	<b>44.62</b>	6693
	<b>44.61</b>	6573
2049	<b>44.60</b>	
5176	<b>44.59</b>	
1080	<b>44.58</b>	
5000	<b>44.57</b>	
16776	<b>44.56</b>	
2000	<b>44.55</b>	
15349	<b>44.54</b>	
7800	<b>44.53</b>	
11327	<b>44.52</b>	

illiquid

bid volume	price	ask volume
	<b>44.67</b>	745
	<b>44.66</b>	496
	<b>44.65</b>	
	<b>44.64</b>	400
	<b>44.63</b>	14
	<b>44.62</b>	
	<b>44.61</b>	
	<b>44.60</b>	
	<b>44.59</b>	
	<b>44.58</b>	
	<b>44.57</b>	
	<b>44.56</b>	
202	<b>44.55</b>	
	<b>44.54</b>	
421	<b>44.53</b>	
846	<b>44.52</b>	

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- Volume
- Bid-ask spread

illiquid

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# MARKET MAKING

## PRIMARY ROLE

Provide Liquidity

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		44.61	6573
quote here →	2049	44.60	← quote here
	5176	44.59	
	1080	44.58	
	5000	44.57	
	16776	44.56	
	2000	44.55	
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→ Bid-ask spread becomes profit for a market-maker

# ORDER TYPES

Define how your order is executed on exchanges

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## OPTIBOOK ORDER TYPES

- Limit Order
- Immediate or Cancel

## ORDER TYPES ON EXCHANGES

- Market Order
- Quote
- Fill or Kill
- Stop (Limit) Order
- Iceberg Order

# ORDER TYPES

Sending a buy order for 20 lots:

- Limit order ("passive")
- Immediate or cancel, or IOC order ("active")

Limit order @ 151

bid #	price	ask #
	155	54
	154	60
	153	53
	152	37
2	151	
	150	
1	149	
13	148	
24	147	
47	146	
64	145	
56	144	

Start situation

bid #	price	ask #
	155	54
	154	60
	153	53
	152	37
	151	15
	150	3
1	149	
13	148	
24	147	
47	146	
64	145	
56	144	

IOC order @ 151

bid #	price	ask #
	155	54
	154	60
	153	53
	152	37
	151	
	150	
1	149	
13	148	
24	147	
47	146	
64	145	
56	144	

## PART 2: THE CHALLENGE

# DUAL LISTING PROBLEM

One stock is trading on two different exchanges (i.e. in two different order books).

Since both order books concern the same stock, the value of the stocks should be the same. A difference in their price triggers a trading opportunity.



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Stock ABC on exchange 1		
bid volume	price	ask volume
	44.63	1000
	44.62	1000
	44.61	1000
1000	44.60	
1000	44.59	
1000	44.58	

Stock ABC on exchange 2		
bid volume	price	ask volume
	44.63	200
100	44.62	
300	44.61	
500	44.60	
600	44.59	
700	44.58	



# HEDGING

A dual listing is “market neutral”: we do not care whether the price of the stock goes up or down.

We ensure this “hedging” our trades. For each trade in one order book, we do the opposite trade in the other order book to ensure that our overall position remains 0 or close to 0.



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TL;DR: Make sure that your net position across all instruments is close to 0.

# SHORT SELLING

In Optibook, you can sell something you do not have - you can have a negative position.

This is more complicated in real life, but in Optibook we kept it simple.



# THE CHALLENGE: TRADING A DUAL LISTING

On Optibook you will find such a dual listing. Build a profitable strategy to trade this dual listing.

## PART 1: THE WARM-UP

Trade the dual listing by making use of the temporary price discrepancies as explained before

## PART 2: THE REAL CHALLENGE

Find a way to quote the dual listing in a profitable manner, i.e. provide liquidity!

IMPORTANT: Come to us for credentials!

Challenge description: <http://hack-cambridge.optibook.net:8080/>



# THE CHALLENGE: JUDGING CRITERIA & PRIZES

Not only looking at PnL, looking at strategies

Looking at strategies and evaluate how they will do over an infinite amount of time, so we will consider things like:

- How much risk are you taking?
- How novel is your strategy?
- Structure of your code

Prizes:

First prize: Nintendo Switch for every team member

Second prize: JBL Charge 4 for every team member

**OPTIBOOK**

