

# ***Rotman*** Online Trading Competition



# Table of Contents

Table of Contents.....	2
Important Information.....	3
Case Summaries.....	4
Sales & Trader Case.....	5
Options Trading Case.....	8

# Important Information

## Practice Servers

Practice servers will be made available starting on November 12th, 2015 at 11:59 pm EST and will operate 24 hours a day 7 days a week until the start of the competition.

Information on how to download and install the RIT v2.0 Client is available on the [RIT website](#).

We will post information on how to login to any server port. Remember that you can type in any username and password and it will automatically create an account if it does not exist. If you have forgotten your password or the username appears to be taken, simply choose a new username and password to create a new account.

## Scoring and Ranking Methodology

The Scoring and Ranking Methodology document will be released prior to the start of the competition on the ROTC website.

## Schedule and Timeline

The competition is held online, it will start at 5:30 pm on November 21<sup>st</sup> and end at 8:30pm and it will be run until the number of sub-heats described further in this document is completed. The Finance Lab team will not wait for anyone who is late. Competition Servers will be set up 10 minutes before the start. In the event of a server failure, the case session will be rerun and the scores from that session will not be kept.

# Case Summaries

## Sales and Trader Case

The Sales and Trader Case challenges participants to put their critical thinking and analytical abilities to the test in an environment that allows traders to have significant flexibility on the trading strategy they choose to implement. Traders will be faced with multiple tender offers requiring participants to make rapid judgments on the profitability and subsequent execution of these offers. Profits can be generated by taking advantage of pricing discrepancies, large tender offers, and market-making opportunities.

## Options Trading Case

The Options Trading Case will test competitors on their ability to implement volatility trading strategies through options. This will be achieved through positions in mispriced options whilst hedging delta exposure. Taking place over a one month period, competitors will receive accurate estimates on forecasted volatility for underlying assets. Competitors will need to analyze market information and update expectations in order to execute a profitable strategy.

# Sales & Trader Case

## Overview

The Sales and Trader Case challenges participants to put their critical thinking and analytical abilities to the test in an environment that allows traders to have significant flexibility on the trading strategy they choose to implement. Traders will be faced with multiple tender offers requiring participants to make rapid judgments on the profitability and subsequent execution of these offers. Profits can be generated by taking advantage of pricing discrepancies, large tender offers, and market-making opportunities.

## Description

The trading session will consist of five, 10-minute heats with each heat to be independently traded and representing one month of calendar time. Each heat will have a unique objective and could involve up to four securities with different volatility and liquidity characteristics.

Parameter	Value
<b>Number of trading heats</b>	5
<b>Trading time per heat</b>	600 seconds (10 minutes)
<b>Calendar time per heat</b>	1 month (20 trading days)

Tender offers will be generated by computerized traders and distributed at random intervals to random participants. Traders must subsequently evaluate the profitability of these tenders when accepting or bidding on them. Trading from excel using Rotman API will be disabled. Real time data (RTD) links will be enabled.

## Market Dynamics

There are five heats each with unique market dynamics and parameters ranging from changes in the spread of tender orders to the liquidity and volatility of various stocks. Below, you can find details regarding each heat which will allow participants to formulate trading strategies.

Heat 1					
Stock	Price	Commissions	Tender Spread	Volatility	Liquidity
GOLF	\$25	\$0.02	High	Low	Medium
POLO	\$13	\$0.01	Medium	Medium	Medium

Heat 2					
Stock	Price	Commissions	Tender Spread	Volatility	Liquidity
SUIT	\$30	\$0.02	High	Low	High
TIE	\$15	\$0.01	Medium	Medium	Medium

Heat 3						
Stock	Price	Commissions	Correlation to NYC	Tender Spread	Volatility	Liquidity
NYC	\$8	\$0.02	1.0	Medium	Medium	Medium
LONDON	\$15	\$0.02	0.5	Medium	Medium	Medium
PARIS	\$33	\$0.01	-0.5	High	High	Medium

Heat 4						
Stock	Price	Commissions	Tender Spread	Volatility	Liquidity	
THUNDER	\$8	\$0.02	High	High	Medium	
BULL	\$15	\$0.02	Medium	High	High	
ROCK	\$33	\$0.03	Medium	Medium	High	

Heat 5						
Stock	Price	Commissions	Tender Spread	Volatility	Liquidity	
MOE	\$20	\$0.03	Medium	Medium	Medium	
LARRY	\$15	\$0.02	Medium	High	Low	
CURLY(ETF)	\$35	\$0.05	High	High	Medium	

Note: Heat 5 includes a third security which is an ETF. The ETF CURLY is comprised equally of securities MOE and LARRY. This means that at any given point in time the price of CURLY should be the combined price of LARRY and MOE. The implication of this ETF also means that CURLY will close out at the price equal to the price of MOE and LARRY if held until the end of the case instead of the last traded price.

During each heat, traders will occasionally receive one of three different types of tender offers: private tenders, competitive auctions and winner takes all. Tender offers are generated by the server and randomly distributed to traders at different times. **Each participant will get the same number of tender offers with variations in price and quantity.**

Private tenders are routed to individual traders and are offers to purchase or sell a fixed volume of stock at a fixed price. The tender price is influenced by the same pre-generated path that the liquidity traders follow in an attempt to drive the market price towards that path. Private tenders will give a spread based on the mid-market price when the order was generated (if the mid-market price is \$10, and the spread was 1-2%, the tender offer will offer to buy shares for an amount between \$10.10 and \$10.20).

Competitive auction offers will be sent to every participant at the same time. Traders will be required to determine a competitive, yet profitable price to submit for a given volume of stock from the auction. Any trader that submits an order that is better than the base-line reserve price (hidden from traders) will automatically have their order filled, regardless of other traders' bids. If accepted, the fills will occur at the price that the trader submits.

Winner takes all tenders request traders to submit bids to buy or sell a fixed volume of stock. After all prices have been received, the tender is awarded to the single highest bidder or lowest offer.

The winning price however must meet a base-line reserve price. If no offer meets the reserve price, then the trade may not be awarded to anyone (i.e. if all traders bid \$2.00 for a \$10 stock, nobody will win).

## Trading Limits and Transaction Costs

Each trader will be subject to gross and net trading limits: the net and gross trading limits for all of the versions are NET 250,000 shares, or GROSS 250,000 shares. The gross trading limit reflects the sum of the absolute values of the long and short positions across all securities; while the net trading limit reflects the sum of long and short positions such that short positions negate any long positions. Trading limits will be strictly enforced and traders will not be able to exceed them.

The maximum trade size will be 25,000 shares, restricting the volume of shares transacted per trade to 25,000.

There is a maximum stop loss of \$1.5 Million per person for each trading heat. If a user loses more than \$1.5 Million, he/she will be forced to stop trading for the remainder of the heat.

## Position Close-Out

Any non-zero position will be closed out at the end of trading based on the last traded price. This includes any long or short position open in any security. Computerized market makers will increase the liquidity in the market towards the end of trading to ensure the closing price cannot be manipulated.

## Key Objectives

### Objective 1:

Generate profits by market making in order to capture the bid-ask spread. Develop trading strategies based on the case descriptions to be distributed prior to the trading period in order to customize profitable trading strategies to each heat.

### Objective 2:

Evaluate the profitability of tender offers and accept those that will generate profits while rejecting those that will create losses. Submit competitive, yet profitable, bids and offers on above reserve and winner takes all tenders in order to maximize potential profits.

### Objective 3:

Limit market risk by managing open positions and optimally utilizing the gross and net trading limits to maximize profits. Maintaining large short or long positions may result in the market trading away from your transaction price, resulting in losses. Use a combination of limit and market orders to mitigate any liquidity and price risks from holding open positions.

# Options Trading Case

## Overview

The Options Trading case will test competitors on their ability to implement volatility trading strategies through options. This will be achieved through positions in mispriced options whilst hedging delta exposure. Taking place over a one month period, competitors will receive accurate estimates on forecasted volatility for underlying assets. Competitors will need to analyze market information and update expectations in order to execute a profitable strategy.

## Description

The trading session will consist of five, 10-minute heats with each heat to be independently traded and representing one month of calendar time. Each heat will have different volatility characteristics which Traders must subsequently evaluate to identify mispricing. Trading from excel using Rotman API will be disabled. Real time data (RTD) links will be enabled.

Parameter	Value
Number of trading heats	5
Trading time per heat	600 seconds (10 minutes)
Calendar time per heat	1 month (20 trading days)

## Market Dynamics

As a trader you will focus on trading options for one security, RTM, which is a non-dividend paying Exchange Traded Fund (ETF) that tracks a major stock index. The price of the ETF is generated using the following (martingale) process:

$$P_{RTM,t} = P_{RTM,t-1} * (1 + r_t); \text{where } r_t \sim N(0, \sigma_t)$$

That is the ETF price is based on the previous price adjusted by a return that is drawn from a normal distribution with a mean of zero and standard deviation (volatility) of sigma. Sigma's starting value is 16% (on an annualized basis). The following table illustrates the 1-month call/put options with 5 different strike prices.

Call Ticker	Strike Price	Put Ticker
RTM48C	48	RTM48P
RTM49C	49	RTM49P
RTM50C	50	RTM50P
RTM51C	51	RTM51P
RTM52C	52	RTM52P





RTM is a large ETF with its options priced by a large market-maker who will always quote a bid/ask spread of 2 cents. The bids and asks are for an infinite quantity meaning there are no liquidity constraints in the case.

The market maker quotes options using the Black-Scholes pricing model whilst assuming a risk-free interest rate of 0%. Furthermore, the volatility forecasts made by the market maker are uninformed and will **not** accurately reflect the future volatility of the underlying asset. Due to the highly volatile nature of option prices the market maker will demand a volatility risk premium. The market maker has determined a constant 4% volatility risk premium on an annualized basis. That is, the implied volatility quoted by the market maker for the option is 4% higher than the expected volatility of the underlying stock.

Your analysts have developed a very effective model to forecast the realized volatility of the underlying asset and will send the trader weekly updates. The trader must use this information to identify mispricing opportunities in the options markets and profit from that mispricing. When a mispricing opportunity occurs, you should take a position in the mispriced options while at the same time trading the underlying security to hedge your delta exposure in order to build a delta neutral portfolio.

At the beginning of each week, the volatility value will shift and a new value will be provided by analysts to each trader. In addition, at the middle of each week an estimate of next week's volatility value will be announced. Sample news provided by analysts are shown below.

Time	Week	Release
1	Week 1	The analysts have informed you that the volatility of RTM for this week will be 16%
75	Week 1	The analysts have informed you that the volatility of RTM for next week will be between 20-23%
150	Week 2	The analysts have informed you that the volatility of RTM for this week will be 22%
....		
450	Week 4	The analysts have informed you that the volatility of RTM for this week will be 26%

## Trading Limits and Transaction Costs

Each trader will be subject to gross and net trading limits specific to the security type as specified below. The gross trading limit reflects the sum of the absolute values of the long and short positions across all securities of the same type; while the net trading limit reflects the sum of long and short positions such that short positions negate any long positions. Trading limits will be enforced and students will not be able to exceed them.

Security Type	Gross Limit	Net Limit
RTM ETF	50,000 Shares	50,000 Shares
RTM Options	2,500 Contracts	1,000 Contracts

The maximum volume per trade will be 10,000 shares for the RTM ETF and 100 contracts for RTM options. There are no transaction fees.

### **Position Close-Out**

Any outstanding position in the RTM ETF will be closed at the end of trading based on the last-traded price. There are no liquidity constraints for either the options or the ETF. All options will be cash-settled based on their exercise value.