**Assignment 5**

**1a. Provide a comparative analysis of the following different order execution types: Market Order, Limit Order, Stop Limit Order, Stop Market Order.**

The entry and exit options for a trading system are limited by those of the exchange on which the order will be executed and the broker with whom it will be placed. As a result, there are two types of order that can be carried out, that is the market orders and limit orders

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| **Market Order** | **Limit Order** |
| A market order is an order to buy or sell an asset at the current bid or offer price. When you want to buy (bid) or sell (ask) shares and you are willing to accept the best available price, use a market order. Your order can be filled all at once or partially filled in separate transactions. | a limit order is an order to buy or sell at a specified price or better. Limit orders trade a certain volume at a certain price. Limit orders trade off price impact against certainty of execution |
| A market order sends your order straight to the exchange to be filled, but you may not get the price you want unless you use a limit order  When your market order is filled in separate transactions, you may end up paying a different price for each transaction. If there are other orders placed before your order, it may take a while before your order is processed. This order type guarantees the execution of the order. But it does not guarantee the execution price. If we are price sensitive, a market order may not be the logical choice. | In a limit order, you set a price limit on the number of shares that you want to buy or sell (referred to as bid or ask) and a time limit for the length of time you want the order to be active. If your price is not reached in the time limit you set, then the order is cancelled automatically. A limit order does not guarantee the fulfillment of the entire order quantity. But it guarantees the price that we want or even better. |
| A market-if-touched order is an order to buy (or sell) an asset below (or above) the market. This order is held in the system until the trigger price is touched, and is then submitted as a market order. | A limit-if-touched order is an order to buy (or sell) an asset below (or above) the market. This order is held in the system until the trigger price is touched, and is then submitted as a limit order. |
| A market-on-open order is executed at the opening of trading at the market price. When using market-on-open or market-on-close orders, the prices a trader pays will be close to those published in the historical data. | A limit-on-open order is a limit order executed at the market's open if the opening price is equal to or better than the limit price. All remaining orders in a one-cancels- all group of orders will be canceled when any one of the orders is executed. |
| A market-on-close order is an order submitted to execute as close to the closing price as possible. While, a market-on-open order is executed at the opening of trading at the market price. | A limit-on-close order is a limit order that executes at the closing price if the closing price is at or better than the submitted limit price, in accordance with the rules of the specific exchange. Otherwise the order will be canceled. |

One way to protect against downside risk in the markets is through the use of Stop Limit Orders, Stop Market Orders.

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| **Stop Market Order** | **Stop Limit Order** |
| A stop order becomes a market order to buy or sell assets once the specified stop price is attained or penetrated. A stop order can be placed on orders for all time durations except good till extended market hours (GTEM). You set your buy-stop order price above the current market price and your sell-stop order below the current market price. When your stop order price is reached, your order becomes a market order for processing. | A stop limit order becomes a limit order once the specified stop price is attained or penetrated. A stop limit order can be placed on orders for all time durations. With a stop limit order, you set two prices: a stop price and a limit price. Your stop price is the maximum price you will pay when buying and the minimum price you will accept when selling. Adding a limit price, however, protects your order from becoming a market order and instead it is processed as a limit order at the limits you set |
| In a trailing stop order, you set a trailing price that follows the current market price. Your stop price is the maximum price you’ll pay when buying and the minimum price you’ll accept when selling. The trailing price is either a percentage or a dollar amount above your maximum stop price amount for buying and below your minimum stop price for selling. It’s like setting a range. When the market price matches the trailing price condition, your order is processed as a market order. | In a trailing stop limit order, you set three prices: your stop price, a trailing price, and a limit price. Your stop price is the maximum price you’ll pay when buying and the minimum price you’ll accept when selling. The trailing price is either a percentage or a dollar amount above your maximum stop price amount for buying and below your minimum stop price for selling. Adding the limit price ensures that your order will be processed as a limit order instead of a market order. |
| The disadvantage is that the stop price could be activated by a short-term fluctuation in a stock's price. The key is picking a stop-loss percentage that allows a stock to fluctuate day to day while preventing as much downside risk as possible. | With stop-limit orders, buyers protect themselves from prices too high for their tastes. And sellers need not worry about prices that are disarmingly low. Specifying stop-limit rather than market orders is an effortless way to minimize the downside for the defensive investor. The benefit of the limit order is that you have more control over the price at which the sell will be executed. |

**1b. How will expanding and shrinking Bid-Ask spreads affect the efficiency of execution of each of the above Order Types.**

The bid-ask spread can affect the price at which a purchase or sale is made and an investor's overall portfolio return. The spread is the difference between the bid price and ask price prices for a particular security. The size of the spread and price of the stock are determined by supply and demand. The more individual investors or companies that want to buy, the more bids there will be, while more sellers would result in more offers or asks. The bid-ask spread is essentially a negotiation in progress. To be successful, traders must be willing to take a stand and walk away in the bid-ask process through limit orders. By executing a market order without concern for the bid-ask and without insisting on a limit, traders are essentially confirming another trader's bid, creating a return for that trader.

When the bid and the ask prices are close to each other, this is known as a small spread. A small spread will exist when a market is being actively traded and when it has high volume (a significant number of contracts being traded). When the bid and ask prices are far apart, the spread is said to be a large spread. A large spread will exist when a market is not being actively traded and it has low volume—the number of contracts being traded is fewer. Thus, when bid‐ask spreads is expanding it is moving from a small spread to a large spread, which means from high volume and liquidity to a low volume and illiquid market. Most traders prefer small spreads because they allow their orders to be filled at the prices they want. While, many traders will temporarily stop trading if their market develops a large spread. As such, an expanding bid-ask spread causes orders, especially market orders to be filled at unwanted prices. This then requires adverse adjustments to the trading system to compensate, such as increasing a stop loss order. Moreover, an expanding bid-ask spread increases the probability of price-improving limit orders and reduces the probability of market orders

Markets typically impose price and time priority rules on limit order execution. Price priority means that limit orders offering better terms of trade — limit sells at lower prices and limit buys at higher prices — execute ahead of limit orders at worse prices. Time priority means that, at each price p, older limit orders are executed before more recent limit orders. The queuing discipline is thus “first in, first out” which rewards first-movers providing liquidity at a given price. Taken together, the price and time priority of a limit order translates directly into a probability distribution over execution timing. Trading systems that trade the spread are collectively known as "scalping" trading systems. The traders are known as scalpers because they only want a few ticks of profit with each trade. An example of trading the spread would be to place simultaneous limit orders and not market orders to buy at the bid price and sell at the asking price, then wait for both orders to be filled. The tightness of the bid-ask spread reflects the degree of competition among limit order–placing traders. The more traders are competing to post and execute limit orders, the closer will the traders post their limit orders to the market price, the tighter will be the resulting bid-ask spread. This metric is an easy liquidity test suitable for most markets, and particularly in markets with wide spreads, such as most U.S. equity options.

There are primarily two kinds of stock exchanges. One is a typical order-driven matched bargain market, and the other kind is a quote-driven over-the-counter market where there is a market-maker. In such cases, the spread between the bid & ask goes to the market maker as compensation for making a market in a stock. For a liquid stock that is easy for the market maker to turn around and buy/sell to somebody else, the spread is small (narrow). For illiquid stocks that are harder to deal in, the spread is larger (wide) to compensate the market-maker having to potentially carry the stock in inventory for some period of time, during which there is a risk to him if it moves in the wrong direction. A contracting bid-ask spread reflects the underlying confidence that market makers have in the equity in question. For example, less volatile equities traded with large volumes will have very small price spreads. While, highly volatile equities traded in lower volumes, however, are less inspiring of confidence and riskier for the market makers. Although the spread will not help you pick the right stock or choose the best entry or exit price, it can help you determine short-term trends. For example, you can see whether the spread is leaning toward buyers or sellers. For instance, if you notice that people are buying on the ask price, then momentum might be developing. And, if buyers are willing to pay what the sellers are asking, the stock is trending up. Conversely, if stocks are selling at the bid price, this could be the beginning of a downward trend. If price movements are a random walk, having a shorter stop-loss due to the contracting bid-ask spread means that there is a good chance the stop market order would be triggered before the profitable exit order. You might be making twice as much for profitable orders, but you are triggering the stop-loss twice as often, nullifying the effect, while driving up transaction costs(slippage). If you were setting your profit target shorter than the stop-loss (stop limit order), at least more trades would be profits instead of most being losses.