Introduction to the principles of the Market Making Game

Below is an introduction to the terminology and the basic principles of Market Making. Some of these concepts will be discussed during your interview. Please go over the terminology and the concept of Market Making. An example of a Market Making game is included to give you a feel for what you can expect during the interview.

Some terminology is shown in **bold**. Make sure that you familiarize yourself with these.

Bid – Price at which someone is willing to buy
Ask or **Offer** – Price at which someone is willing to sell
(Bid-Ask) **Spread** – Difference between bid and offer, where spread equals offer minus bid
Lot-(size) – Quantity of the bid and ask which defines the size of a trade.

Anyone who is willing to show a bid or an offer for a product can be considered a **Market Maker (MM)**. All other participants are **Market *Takers* (MT)**, and they will be trading on the prices provided by the **MM**. Generally MMs provide **Quotes** which consist of one bid and one offer. Typically, the quotes can't be wider than a predefined spread. Since the quotes have limited size (determined by the market maker), only the fastest (or loudest) trader is able to trade on the prices. For verbal trading, the following terminology is used:

"**Sell!**", or "**Yours!**" is used to indicate that you want to sell the market maker's bid (**hitting** the bid)
"**Buy!**" or "**Mine!**" is used to indicate that you want to buy the market maker's offer (**lifting** the offer)
Important here is that the market maker is doing the **opposite** trade.
If a MT buys 1 lot (lifts the offer) of a MM, the MT will be **long** 1 lot, and the MM will be **short** 1 lot. Vice versa, when a MT sells he'll have a short position, while the MM ends up with a long position

Typically traders (both market makers and takers) have a **position limit**, meaning that they can't have a position of more than a certain amount of lots **long** or **short.** Note here, that it's easier for a MT to stay within his positions limits than a MM, since the MT actively trades in and out of positions depending on his opinion. For a MM it's very important to manage their positions so that they stay within their positions limits. They can do this by adjusting the prices and the amount of lots they quote.

It's not only possible to provide quotes on financial products, a MM can provide quotes on anything which is quantifiable. Here is an example to illustrate the above:

The MM has to make a market (provide bid and ask) with a spread of 10% on the number of inhabitants in the Netherlands. His theoretical (expected value) is 31.5M people and his market is the following:
"30 Million **bid at** 33 Million **offered**", meaning he is willing to buy 30M and is willing to sell 33M

Trader A expects the population of the Netherlands to be about 25M and sells the bid of the MM, by shouting: "Yours!" This will result in a trade on the bid in which the MM buys at 30M and now has a position of 1 lot long, and Trader A sells at 30M with a position of 1 lot short. Now the MM is expected to make a new market on which the others can trade again. Although he initially had a theoretical value of 31.5M, he now received new information; Trader A apparently thinks it's less than 30M and has shown willingness to execute against the initial market.

Question to think about:

- Should the Market Maker adjust his prices given the trades? If so, why & how?
- Should the MM take his position into account when making a market? If so, why & how?
- What risks are there for the MM, and for the other traders?

- What is the optimal spread for the Market Maker?

The **Settlement Level** is the fair value determined at a certain, agreed time. We can use this settlement level to calculate the **P/L** (Profit or Loss) on a trade. In the above example we would have agreed to look up the population of the Netherlands on Wikipedia.org and find that it is 17M. We'd settle the trades at 1 pnt per Million. How to settle (whether we do 1pnt per Million or $100 per Million etc) will be determined before the MM gives out the first quote.

For the example above it means that Trader A made a profit of 13 points and the MM made a loss of 13 points.

It's also possible to do multiple trades and you may be asked about your overall position. In the example above, the MM has bought at 30M. Before the final answer is revealed, the MM is asked for another market. Let's go through a few more scenarios to ensure that you understand these concepts in advance of your interview:

1)

- After the trade at 30 M, the MM gives a price of 25 M bid at 27 M offered. Trader A sells again. We then reveal the answer to be 17 M.

  In this scenario, the MM loses 21 points; 13 points on the buy at 30 and 8 points on the buy at 25. Prior to revealing the answer, we say that the MM is long 2 lots – a buy at 30 and another buy at 25. The higher the revealed answer is, the better it is for this MM.

2)

- After the trade at 30 M, the MM gives a price of 21 M bid at 23 M offered. Trader A buys this offer. We then reveal the answer to be 17 M.

  In this scenario, the MM loses 7 points; 13 points on the buy at 30, but makes back 6 points on the sell at 23. Prior to revealing the answer, we say that the MM is flat, or that he has no position – a buy at 30 and a sell at 23. Note that there is no possible value for the revealed answer that will alter the fact that this MM loses 7 points.