Bidding and Bidding Strategy

The purpose of this auction is to efficiently allocate a large number of items while respecting policy constraints that limit where those items can be placed. The auction incorporates a computerized process for summarizing the prices quickly and determining provisional winners. It will proceed as a process of competitive bidding with new orders creating new provisional prices and replacing provisional winners with new ones. Because of the number of bidders, strict rules are in place to speed the process to a conclusion while allowing bidders some flexibility to revise their orders in response to competition.

The role of orders in this auction is different from other auctions in which you might have participated. An order says what you are willing to buy IF the prices are at your order price or below. If the market price is below your order price, your order will be accepted, all of units that you ordered at that price will be delivered and you will pay the lower market price. The price you will pay would not be your order price, it will be the lower market price. If the market price is above your order price, your order will be rejected. If the market price equals your order price, your order could be fully accepted or may be only partially accepted. That is, you might receive fewer units than specified in your order.

In general, your bidding strategy involves expressing what you are willing to do at different possible market prices. Presumably, if the price is very high you would want to buy fewer units, or at least no more units than you would want to buy if the price is very low. You will be able to place several orders, each of which is an expression of what you are willing to do at the price. Your ruling (leading) order is the one which is at or immediately above the provisional market price and that order will be fully filled or partially filled. So, your pattern of orders expresses what you are willing to do at various market prices. It says, “If the market price is at or below this level then - yes- I want to buy”.

What should you bid?

This auction is designed to minimize the need for bargaining or strategic behavior that would otherwise slow the auction and create advantages for those who have the resources and time to behave strategically.

A reasonable strategy is to bid your exact maximum willingness to pay for various quantities. Or, another way to say it, a reasonable strategy is to exactly the quantity you would want to buy at various market prices. That might seem odd but this auction is structured to minimize bidding complexity from your point of view. You won’t usually pay the amount of your maximum bid, but your bid order is used to determine whether or not you win any units. The other bidders never see the details of your bid orders.

How do you determine your maximum? What does that mean?
To get started the question to ask yourself is: what is the absolute maximum price per unit you would pay? That is, if the market price per unit was even a dollar above your maximum amount then you would buy nothing. Another way to look at it is, what is the absolute maximum price you would pay for one unit? Now that you know the maximum, ask yourself how many units you would buy if you could buy all you wanted at that price. That price and quantity is your highest bid order.

Assume for example that if the market price is $1000 per unit you would be willing to buy up to 10 units and if the market price per unit is above $1000 you could buy none. Your first order (your highest bid) would be $1000 for 10 units.

Now consider market prices that are lower than your highest bid order. At what lower price would you want to buy more units? How many more would you want to buy? That price and the additional quantity is your second order.

Your highest bid order commits you to buy the quantity stated in your highest order at any market price equal to or below your highest bid price. So, if the market price is lower, you pay the lower price per unit for the quantity stated in your highest bid order. Your second highest bid commits you to the amount you want if the market price falls to your second highest bid price.

Continuing the example, suppose you would be willing to buy 25 units if the market price per unit is $900. Your second order would be $900 for 25 units. Your first order commits you to buying 10 units at any price below $1000, so at $900 you would get the 10 units for sure. Since your order at $900 is for 25 units, the auction would register you as a candidate for 15 more. If your second order is filled completely you would pay $900 per unit, for a total of 25 units. You could also win 25 units but pay a price lower than $900 per unit.

Next consider even lower prices. At what lower price would you want to buy still more units? That price will become your third order and the quantity associated with this bid order will be the amount you want beyond the amount stated in your $900 order.

Continuing the example, suppose at a market price of $850 you would be willing to buy up to a total of 45 units. Thus, your third order would be $850 for 45 units. If the price was $850 your order at $900 would guarantee that you would receive 25 units and the system would place you in competition for 20 more units with other orders at $850. If your order is completely filled, you will win a total of 45 units, just as you want.

Note that if the price is exactly $850, then it could be the case that your third order is not filled to its maximum. You will buy 25 units for sure (since your $900 order for 25 is above the market price) and you will buy no more than 45. However, if others submit orders at $850 exactly as you, then the existing supply will be rationed amongst the $850 orders, with priority given to orders submitted earliest.
How do I place my bid orders? There are many prices to consider.

As in the example above start with a high bid and choose the quantity. Submit and reload to display your order. You should choose your next lowest price and enter the amount that you want at that price. Continue this process until the separate orders are as you want them. At any time you can query the system by entering a hypothetical potential provisional price. The query will indicate which one of your orders will be provisionally accepted if that is the provisional market price, how many you will be buying and your total expenditure.

The bid entry system also serves as an order management system that allows you to see all of your bids whenever you enter a new bid or make changes. Rather than starting at high prices this tool allows you to start at low prices. All markets have minimum prices. At the minimum price you should enter the amount you would you want to buy.

Now, choose a higher price where you want to reduce the quantity you buy. Enter the quantity that you want at this higher price. Continue increasing the price and each time you reach a price at which you want to reduce the quantity, enter the quantity that you want at the price. Continue until the price is so high that you would buy nothing. When you enter these choices, they will be displayed as you entered them. Examine them and if they are correct submit them to the auction. This tool can be applied during the auction as well as before the auction opens.

If the auction has not been started, you can adjust orders as you wish. However, you should be very careful at this point. Once the auction is open, only the order price can be adjusted but it can only be adjusted upward. Non provisional winning orders can be cancelled or adjusted as you want. New orders can be entered. However, provisional winning orders are limited to upward adjustments of the bid price and the upward adjustments must meet the increment requirements. Quantity adjustments of provisionally winning bids are also only allowed upward. Thus, if you have bid too much and if those bids are provisional winners, you will be stuck with units that you really do not want.

Notice that there is an advantage to submitting many bids with small price differences. The increment requirements force you to make large order prices increases once the market price is in the range of one of your orders. Many bids at many price levels allows you to adjust your quantity bought to small changes in price as opposed to a possible big quantity adjustment reflecting a big price increased forced by the increment requirements.

Why is that a sensible way to bid?

The reason rests with the way that market prices are calculated. The auction software determines prices from the orders that are submitted by participants. Your order price determines if your order is accepted or not at a given market price but it does not determine what you pay (except in special cases). That is, if you placed orders that are
above the market price your ruling (leading) order will be accepted but you pay the lower market price. If your orders are all below the market price, your orders will be rejected. If your ruling (leading) order is exactly at the market price, and if it is the only order at that price, then the price is determined by your order.

To elaborate on why you might want to bid in a way to express your maximum willingness to pay, consider the following example. Suppose you only want one unit, and suppose that you value this one unit at $1000. In other words, your maximum willingness to pay is $1000. If you enter an order price of $1000 for this one unit, you are saying that you are willing to purchase the unit for any amount less than or equal to $1000, which is perfectly in line with how much you value the unit.

There is no reason to enter an order price above $1000. For example if you enter an order price of $1100 it may occur that the final market price is $1050, which means you would pay $1050 for a unit which you value at only $1000. And remember, you cannot cancel provisionally winning orders.

Entering an order price less than $1000 is also a bad idea. For example, if you enter an order price of $900 the final market price could be $950, which means you would not be able to purchase your unit even though you value it at more than the market price. Of course, as long as the auction is not over and your personal clocks have not been exhausted, you can make new orders at higher prices.

While this example only considered a single unit, the same reasoning applies if you want to purchase many units.

You might consider responding with higher orders if you do not get the quantity you want at a market price. You might start bidding low and respond aggressively with higher orders if the market price is above your order. This can be done but you must be very careful not to make mistakes and you must be very careful to watch your personal clocks. If your clock accidentally runs down and your order prices are less than you are willing to pay you will be unable to respond as you planned to higher prices.

**Should I protect my Personal Clock by bid adjustments or new orders?**

Four clocks operate to speed the auction. The new bid clock resets when any new order is submitted and the new winner clock resets if there is a change in the pattern of provisional winners. The auction ends if either clock hits zero. Two additional clocks monitor your personal bidding.

Your personal clock has a total response budget of X minutes. Every time you are outbid and your provisional allocation falls during the auction, your personal clock will start counting down, using up some of your total budget and will continue down until you make sufficiently aggressive new order. Your offer is aggressive enough if it wins back some of your lost quantity. If your personal clock reaches zero you will not be able to
make new orders. Orders you have in the system remain valid but you will not be able to make changes. This is another reason why we recommend that you simply bid your maximum willingness to pay at the start. When you are outbid and your provisional winning amount falls you have a grace period of Y seconds before your response budget is used. Your second clock shows the time remaining in your grace period before you start losing any of your allocated response budget.

The response budget interacts with your bidding strategy. If you have fully expressed your willingness to buy, you will not want to adjust your order price when your order is rejected or partially rejected. You have bid your maximum so there is no need to respond. Thus, you can stop your clock and be unable to bid higher quantities later. If you have all bids you want in the system this option costs you nothing. Or, you can let your personal clock run down and you will not be able to make additional orders. However, the orders you have in the system are good and will be provisional winners if the prices are in the appropriate range.

If you have not fully expressed your willingness to buy, however, then when you are outbid, you should respond with an order that more closely mirrors what you are willing to pay. This could be by increasing the bid price on your provisional winning orders or by entering a new order. In either case the new price must be above the increment requirement.

Exactly how are prices determined?

Three issues need to be considered.

1. **Who are the winners in each market?** In each market, orders from all bidders are arranged from highest to lowest. Once the amount for sale in that market is determined the system moves down the orders, starting from the highest and provisionally accepting the orders until the quantity is exhausted.

2. **What is the price in each market?** The provisional price in the market is determined by the last provisionally accepted order. That is, if the last provisionally accepted order is 325 then the provisional price in that market is 325. Orders at prices above that price are provisionally accepted. All orders at prices below that price are provisionally rejected. Orders exactly at that price are provisionally accepted up to units available. Notice that in general the price will be set by the bid order tendered by someone else. The price could be set by your bid order but in general it will not be.

3. **What is the quantity sold in each market?** The quantity for sale in a market is determined by orders in other markets and quotas imposed by regulations. If the quota has not been reached and if the provisional price in the market is above the provisional price in another market, then units flow from bidders in the lower price market to the higher bidders in this market. If the provisional price in another market is higher, and if that market has not reached its quota, then units are moved from the market in question to the higher priced market. This reallocation of quantity to different markets occurs immediately by the computer program following the submission of every new order.