**Assignment #2**

**Basic Outline**

Done!

**Challenge #1 Outline**

Done!

**Challenge #2 Outline**

The three auctions we will do are:

1. Dutch auction (already implemented)
2. First Price Sealed-Bid Auction (FPSB)
3. English Auction

For all of these, participants won’t have preferences and initiators won’t have types. Additionally, they would have a much higher budget to be able to participate in at least 3 auctions (or the item price will be much lower).

* For the Dutch Auction:

1. This auction will happen when the program gets to 100 cycles. All reflexes associated to this auction will have an additional condition added to them: Once cycle control variable’s value is 100.
2. Additional to what we already have, we’d take note of the final price the item was sold at.

* For the FPSB auction:

1. This auction will trigger once we get to 200 cycles of the program and all Dutch Auctions are over. All reflexes associated to this auction will be locked behind a cycle control variable’s value being 200 and the Dutch auction being over.
2. The initiator begins the auction. It will say that XXXX item is available.
3. All participants will be interested. They will offer a Y amount of money based on a random percentage of their available budget. For example:
4. Initiator: The FPSB auction begins now! The item this time is XXXX!
5. Participant: My current budget is XXXX. I want to buy! I will offer a Y percentage of my current budget. (All participants do this, but the bid is **never revealed** to other participants.)
6. Initiator: The results are in! The winner is ZZZZ!! This auction is now over!!
7. ZZZZ will be determined by the initiator looping through the “proposes” system list and choosing the highest one. It will then determine proposalXX.sender as the winner. An accept\_proposal will be sent to “sender” to tell him that he has won.
8. After receiving the accept proposal, “sender” adjusts his budget and gets ready for the next auction.
9. Once the auction has a winner, we’d take note of the final price the item was sold at.

* For the English Auction:

1. This auction will trigger once we get to 300 cycles of the program and all Dutch and FPSB Auctions are over. All reflexes associated to this auction will be locked behind a cycle control variable’s value being 300 and all other auctions being over.
2. InitiatorX will announce to all participants that item XXXX is available for a starting price of YYYY. This is the lowest acceptable price.
3. Participants will then bid with a number greater than YYYY but within their current budget. The percentage offered that complies with both conditions is randomized for each agent.
4. If at least two agents were able to propose (because they had the budget to do so), then InitiatorX sends a reject\_proposal to both agents and resets the auction. This time, the price of the item will be 10% higher than the previous price.
5. Steps 3 and 4 are repeated until a **single** proposal is received by InitiatorX. At this moment InitiatorX will determine that proposal’s sender as the winner of the auction and sell the item.
6. Once the auction has a winner, we’d take note of the final price the item was sold at.

This program would be run at least 10 times. We’d take note of the final selling price for all three auctions in all iterations. These would then be tabulated and plotted to apply the following criteria:

1. The auction which had the **lowest** **average selling price** is the one that is most beneficial to **participants** of the auction.
2. The auction which had the **highest** **average selling price** is the one that is most beneficial to **initiators** of the auction.

Expected results:

1. The auction most beneficial **on average** to the **participants** will be the Dutch auction, as the price is lowered every time until an agent can participate.
2. The auction most beneficial **on average** to the **initiators** will be the English auction, as the price is increased every time until only one agent can participate. This means the final price is out of the possible range for all other agents.

**Creative Outline**

Done!