

Assignment 2

Negotiation and Communication (FIPA)

Group 17

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This assignment is a continuation of the festival simulation executed in the previous one. It focusses on a second skill to an Agent, called FIPA for agent-based communication protocol to participate in auctions. How we essentially do this is by adding a new type of agent called auctioneer who carry out the auctions at the festival to sell products such as memorabilia and other merchandise. The guests have to use the FIPA protocol to communicate with this agent and carry out the negotiation. The auction to be done is the Dutch auction where the auctioneer starts with the highest price and reduces it each round if there are no takers. The auction gets cancelled once the minimum decided price is reached and no buyers are found.

Agents

Guests

The guest agents implemented in assignment 1 are still used, however for simplicity we have removed the attributes hunger and thirst that they previously had, as a result now they wouldn't need the agents for the same which are information centre, food and drink stores. In this case they will wait for the auctioneers to begin the auction and use the fipa behaviour in order to ensure that the negotiation takes place using this protocol.

Auctioneers

Auctioneers sell signed merchandise and other similar products during the festival . They start the process by enlisting the products that are going to be auctioned and if the items are a part of the guests preferred items then using the FIPA protocol the negotiation takes place between the agents. The auction type is a dutch auction the process of which is covered in the introduction section. The auctioneers have the capability to reduce the price at set intervals and also decide if the auction should be cancelled by factoring in the minimum price and finding that there are no buyers for the same.

Implementation

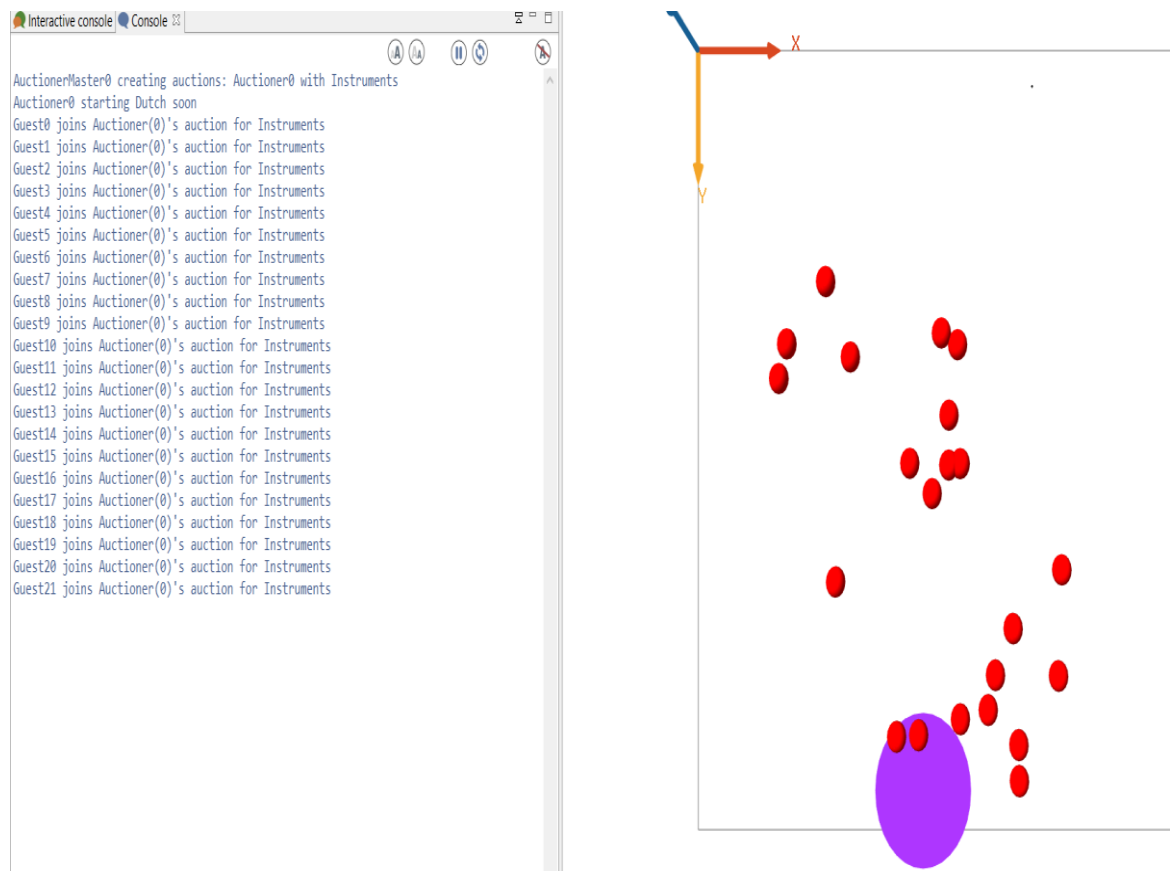
In addition to the guest agents movement behaviour that was added in the previous assignment we have now added the skill FIPA which ensures that they understand the fipa protocol whilst handling negotiation. The fipa skill offers some primitives and built-in variables which enable agent to communicate with each other using the FIPA interaction protocol. The reflexes used for the dutch auction are as follows:

- reflex inAuction: To take care of the target auction, essentially the auction that a particular guest is interested in.
- reflex beIdle: Same as the previous assignment to take care of the guest's default behaviour during the festival.
- reflex listenMessages: to check if there is an auction being held and if the guest's preferred items are listed in that auction. It checks if messages for interaction in fipa are not empty/
- reflex reply_messages: This is for the auction participants to accept or reject the price proposed by the auctioneer.

In addition to this there are species defined for a AuctionerMaster who will handle the creation of the auctioneers with the reflex for the same and also the species Auctioner who is the one who carries out the action and has reflexes for announcing start of the auction, items on sale, checking for guests in the surroundings and also for receiving acceptance and rejection of proposals for the proposed price in each round.

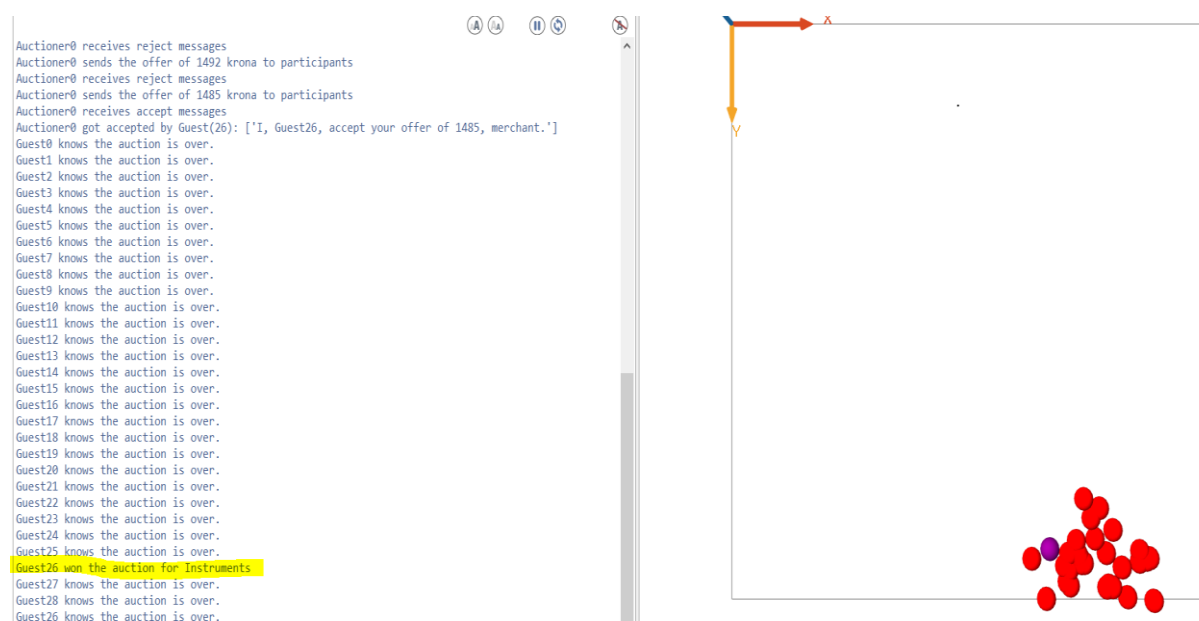
Results

The simulation results are as expected with the auction taking place on announcement and guests communicating using the fipa protocol with the auctioneers.



Above is the log of the auctions starting and the simulation for the same is also given. The amounts are also mentioned eventually and it can be seen how it decrements at each stage.

The below snapshot consists of the simulation when the auction is over and a winner has been decided. Guest 26 wins the auction and the other guests are notified that the auction is over. The winner's colour transitions to purple.



Challenge 1

The first challenge is to have multiple dutch auctions take part simultaneously. Each of these auctions would be for selling a different type of merchandise. Below is the snapshot of the simulation and log for this scenario. To enable the multiple auctions we add more items to the items available list.



Challenge 2

This challenge involves conducting multiple auctions at the same time, the auctions being of different types. The auctions we have chosen are the dutch, english and sealed auctions. English auction is one where the price is increased in each round whereas the sealed auctions are those which just have a round of bidding before the result is declared. This is implemented as follows—additional configs for the 3 auctions in the start, adding a list of the auction types present. Additional reflexes and attributes are designed for the species auctioneer to enable them to implement the various auctions. Below is a snapshot of the simulation of these auctions taking place at once.

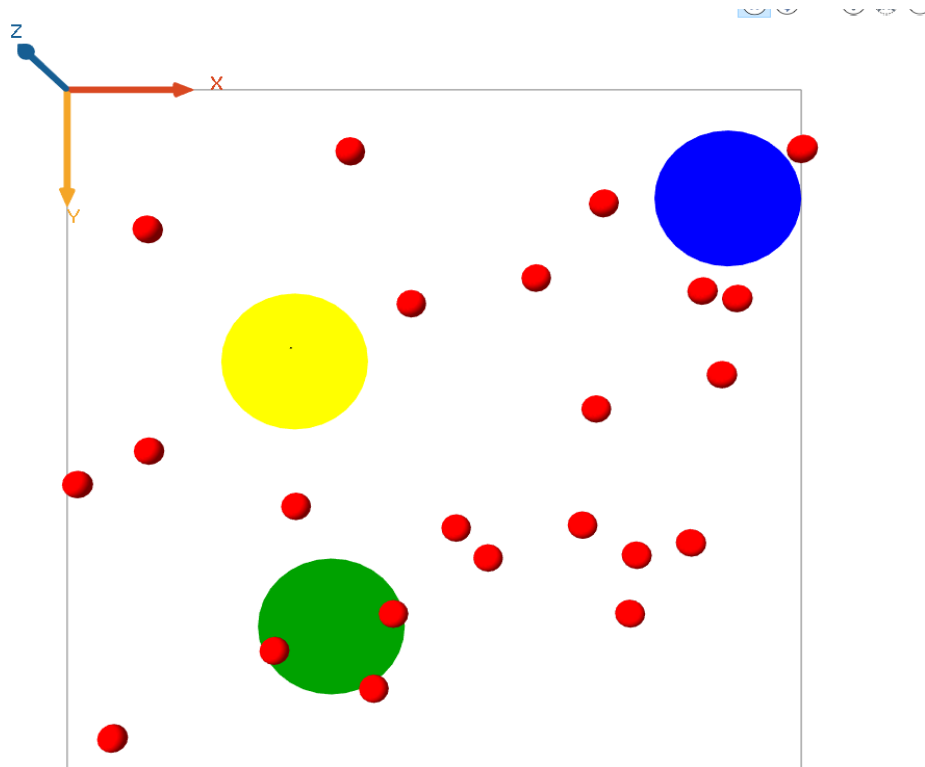


Figure 1: Multiple Auctions taking place at once-English, dutch, sealed.

Conclusions

The assignment helped us to build upon the concepts we developed in the previous set of deliverables. It introduced us to applying communication protocols for negotiations between agents with the protocol in use being FIPA for this assignment. This enables us to see real time as to where each agent's interests lie really and why negotiation is needed in order to obtain a result in such situations.