ID2209 Distributed Artificial Intelligence and Intelligent Agents

Assignment 2 - Negotiation and Communication (FIPA)

Assignment‘s theme

Festival

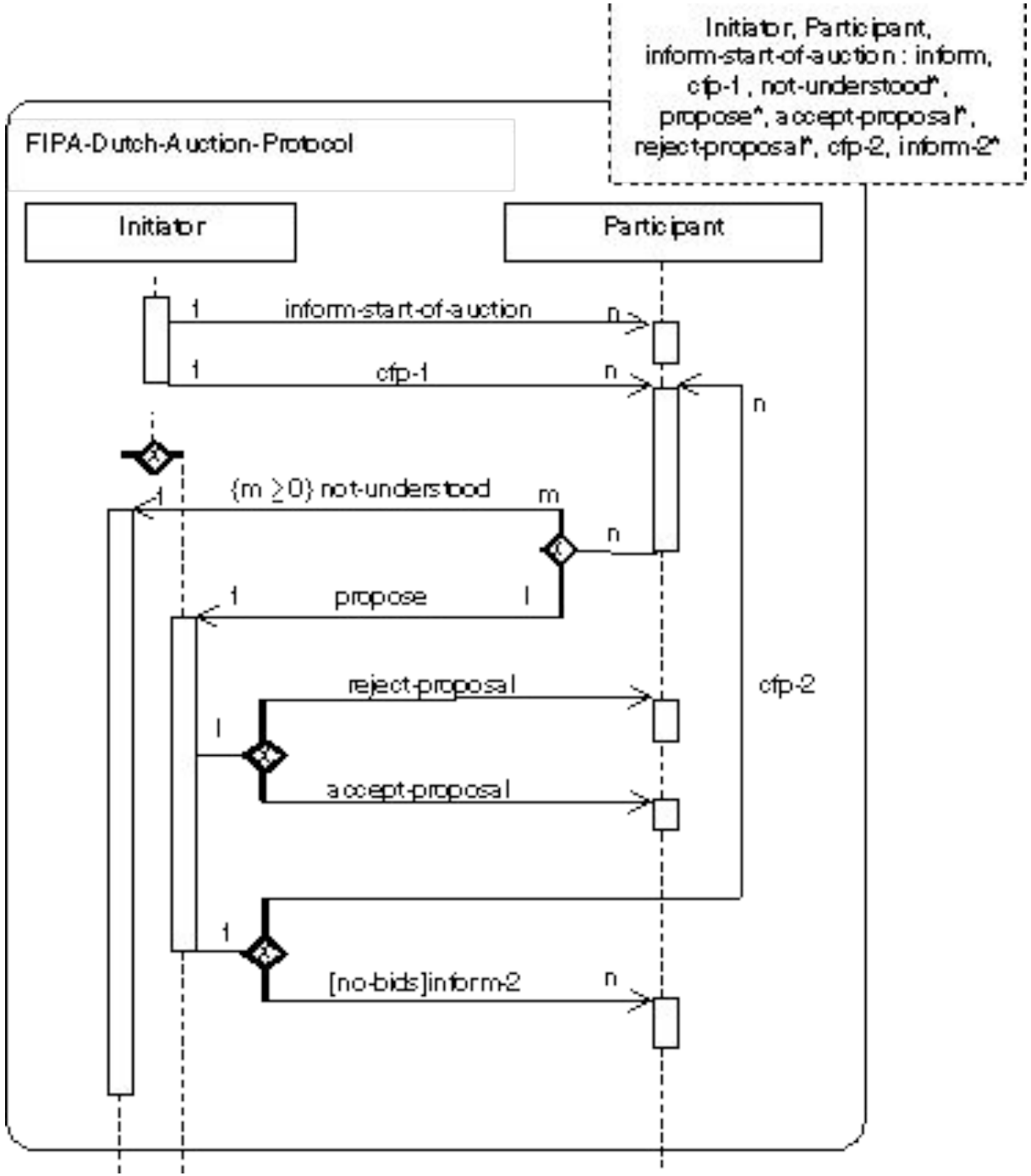
- Assignment 1 – GAMA and agents
  - Introduction to GAMA
  - Festival map, guests seeking information
- **Assignment 2 – Negotiation and Communication (FIPA)**
  - **Dutch auctions on merch**
  - **Communicating through FIPA protocol**
- Assignment 3 - Coordination
  - Positioning speakers at main stage (N Queen problem)
  - Visit all acts (Minimize travelling time + crowd at acts)

Add merch to the festival

- New type of agents – Auctioneers
- Auctioneers should pop up at least once per simulation
- Sell signed merch to auction winner
- Communicate via FIPA protocol (found in Lecture slides)

Dutch Auction

- Auctioneer starts his offer with much higher price than the expected market value.
- If no one wants to buy for the set price, he reduces the price at selected interval.
- The auctioneer decides how much he reduces the price in every round.
- If the price is reduced below the auctioneers minimum value, the auction is cancelled.

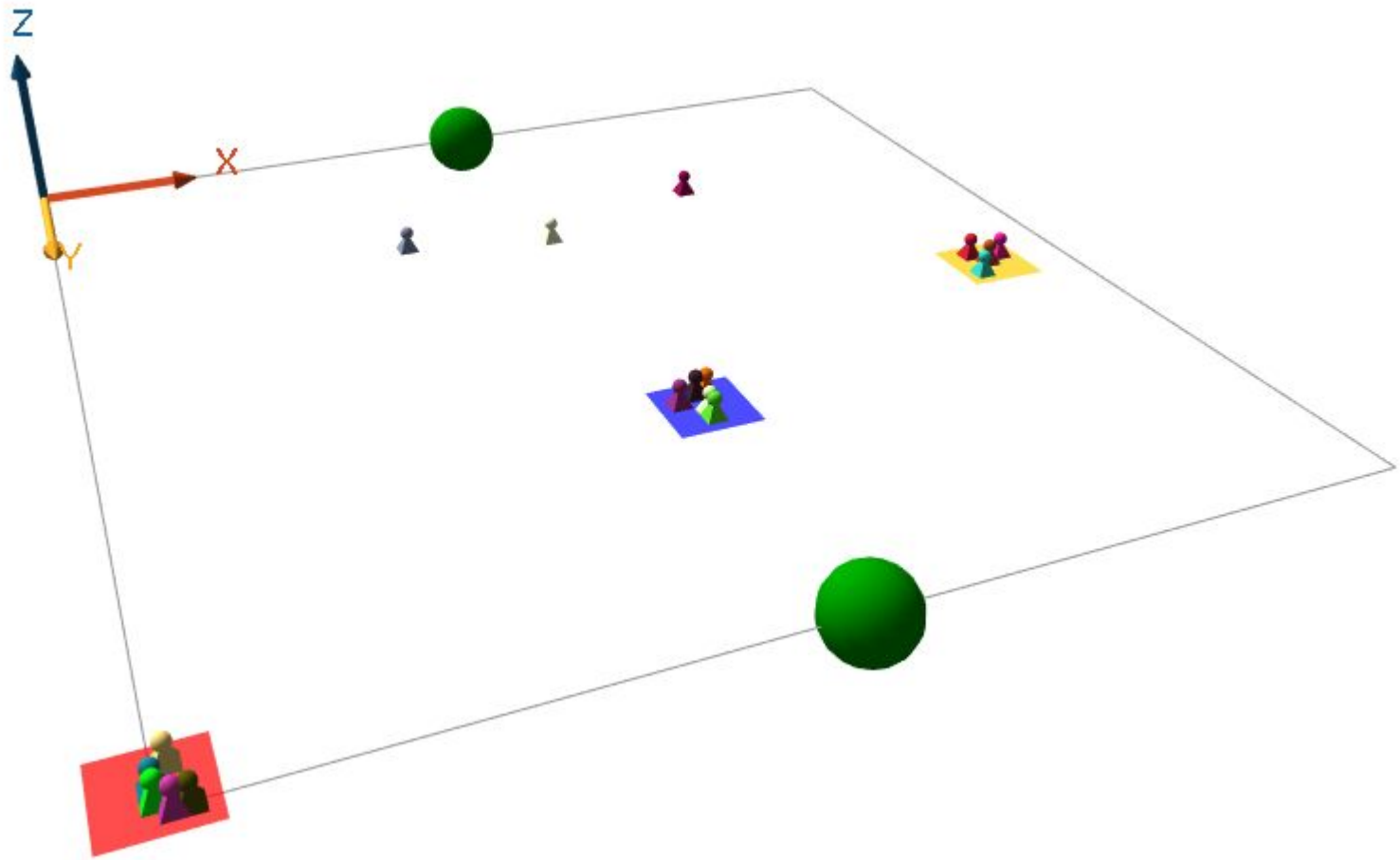

Initiator, Participant,
inform-start-of-auction : inform,
cfp-1 , not-understood*,
propose*, accept-proposal*,
reject-proposal*, cfp-2, inform-2*
FIPA-Dutch-Auction-Protocol
Initiator
Participant
1
inform-start-of-auction
n
1
cfp-1
n
n
{m ≥0} not-understood
m
1
n
1
propose
1
reject-proposal
cfp-2
1
accept-proposal
1
[no-bids]inform-2
n

Source

```
species Initiator skills: [fipa] {

    reflex send_request when: (time = 1) {
        Participant p <- Participant at 0;
        write 'send message';
        do start_conversation (to :: [p], protocol :: 'fipa-request', performative :: 'request', contents :: ['go sleeping'] );
    }

    reflex read_agree_message when: !(empty(agrees)) {
        loop a over: agrees {
            write 'agree message with content: ' + string(a.contents);
        }
    }

    reflex read_failure_message when: !(empty(failures)) {
        loop f over: failures {
            write 'failure message with content: ' + (string(f.contents));
        }
    }
}
 species Participant skills: [fipa] {

     reflex reply_messages when: (!empty(requests)) {
         message requestFromInitiator <- (requests at 0);
         do agree with: (message: requestFromInitiator, contents: ['I will']);

         write 'inform the initiator of the failure';
         do failure (message: requestFromInitiator, contents: ['The bed is broken']);
     }
 }
```

I: send message
P: inform the initiator of the failure
I: agree message with content: ['I will']
I: failure message with content: ['The bed is broken']

Demonstration



```
(Time 106.0): Auctioner0 sends a cfp message to all participants
selling for price 5337
(Time 107.0): buyer0 receives a cfp message from Auctioner0 with content ['Selling Clothes',5337]
Willing to buy for 2000
 @@@@@@@ buyer0 rejects 5337
(Time 107.0): buyer1 receives a cfp message from Auctioner0 with content ['Selling Clothes',5337]
Willing to buy for 3750
 @@@@@@@ buyer1 rejects 5337
(Time 107.0): buyer2 receives a cfp message from Auctioner0 with content ['Selling Clothes',5337]
Willing to buy for 3000
 @@@@@@@ buyer2 rejects 5337
(Time 111.0): Auctioner0 sends a cfp message to all participants
selling for price 4837
(Time 112.0): buyer0 receives a cfp message from Auctioner0 with content ['Selling Clothes',4837]
Willing to buy for 2000
 @@@@@@@ buyer0 rejects 4837
(Time 112.0): buyer1 receives a cfp message from Auctioner0 with content ['Selling Clothes',4837]
Willing to buy for 3750
 @@@@@@@ buyer1 rejects 4837
(Time 112.0): buyer2 receives a cfp message from Auctioner0 with content ['Selling Clothes',4837]
Willing to buy for 3000
 @@@@@@@ buyer2 rejects 4837
(Time 116.0): Auctioner0 sends a cfp message to all participants
selling for price 4337
(Time 117.0): buyer0 receives a cfp message from Auctioner0 with content ['Selling Clothes',4337]
Willing to buy for 2000
 @@@@@@@ buyer0 rejects 4337
(Time 117.0): buyer1 receives a cfp message from Auctioner0 with content ['Selling Clothes',4337]
Willing to buy for 3750
 @@@@@@@ buyer1 rejects 4337
(Time 117.0): buyer2 receives a cfp message from Auctioner0 with content ['Selling Clothes',4337]
Willing to buy for 3000
 @@@@@@@ buyer2 rejects 4337
(Time 121.0): Auctioner0 sends a cfp message to all participants
selling for price 3837
(Time 122.0): buyer0 receives a cfp message from Auctioner0 with content ['Selling Clothes',3837]
Willing to buy for 2000
 @@@@@@@ buyer0 rejects 3837
(Time 122.0): buyer1 receives a cfp message from Auctioner0 with content ['Selling Clothes',3837]
Willing to buy for 3750
 @@@@@@@ buyer1 rejects 3837
(Time 122.0): buyer2 receives a cfp message from Auctioner0 with content ['Selling Clothes',3837]
Willing to buy for 3000
 @@@@@@@ buyer2 rejects 3837
(Time 126.0): Auctioner0 sends a cfp message to all participants
selling for price 3337
(Time 127.0): buyer0 receives a cfp message from Auctioner0 with content ['Selling Clothes',3337]
Willing to buy for 2000
 @@@@@@@ buyer0 rejects 3337
(Time 127.0): buyer1 receives a cfp message from Auctioner0 with content ['Selling Clothes',3337]
Willing to buy for 3750
 ******* buyer1 buys for 3337
```

Goal

- More experience with Agents in GAMA
- Introduction to message passing and FIPA protocol in agents
- Experience working with Agent negotiation
- Simulating and participating in an auction

Deliverables

- New agent, Auctioneer that communicates ONLY to agents via FIPA
- Informs agents that auction is starting using INFORM protocol
- Initiates auction to participants using CFP protocol
  - Hint:
    do start_conversation with: [to :: list(possibleBuyers), protocol :: 'fipa-contract-net', performative :: 'cfp', contents :: [‘Sell for price: ‘ + aPrice]];
- Sells a product for some price using Dutch auction or terminates it if the price goes below a minimum value.
  - Hint: Demonstration through some sort of log is always helpful!

- Include a short report (1-2 pages max)
- The solution can be built on top of the former assignments or as stand alones.


ARE YOU UP FOR THE
CHALLENGE?

Multiple auctions in the festival

- Allow multiple auctions at the same time
- Agents will only join the auction if they are interested in the genre (Cloths, CD‘s etc…)

Different auction settings

- In addition to the Dutch auction, implement two or more types of auctions that agents can participate in.
  (English auction, Sealed bid auction, Vickrey auction etc)

- Compare the gained value of all 3 methods for both auctioneer and the buyers, and report on your findings which is more favorable.

Questions?