Homework #2

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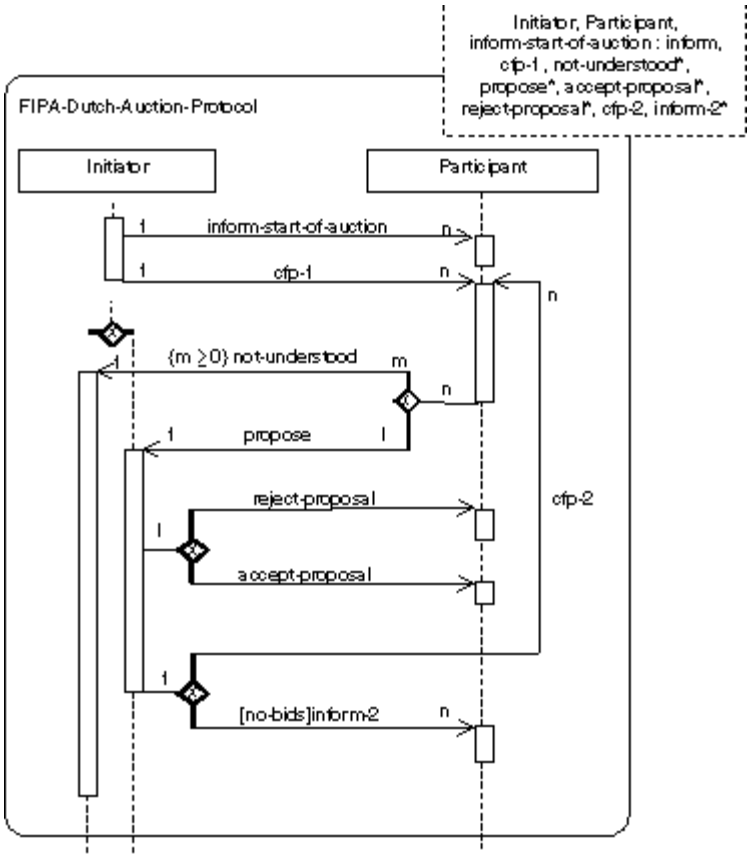
Task #1: Dutch auction for Smartmuseum

1. Implement FIPA Dutch Auction Interaction Protocol.
2. Use the Implemented Dutch Auction interaction protocol with your own bidding strategies for the suggested scenarios (shown on the next slides) and show how change of your bidding strategy affects the execution of auctions (e.g. in terms of result and time). Choose between one of the following scenarios (use at least 4 agents participating in the protocol): between Artist Managers and Curators, or between Curators and Profilers



Task 2

Assumptions:

Assumption 1

We assume that there is no direct interaction between Profiler agent and Artist Management Agent.

Assumption 2

- Artist Management Agents correspond to art -producers (painters). So, it is responsible for auctioning, managing and selling an artist's products.
- Artist Management can decide to sell either a high-quality product (the original art work), or a low-quality product (such as a poster or copy of an artwork).
- Artist Management quotes the same price for the high-quality and low-quality product to curator Agent.
    - i.e. Artist Management sells the product at the same price regardless of its quality.
- Of course, if Artist manager sells a low-quality product then it will incur a low cost of producing as compared to producing a high-quality product – thus if it decides to maximize its profit margin then it will go for a low-quality product.

Assumption 3

- After getting the price from Artist Management Agent, Curator Agents quotes the price to Profiling Agents based on some strategy
    - a simple case would be quoting a price depending upon the demand and an advanced case is quo1ng the price depending on the profiled interests
- All curator agents get the same price quote for a certain product from artist management agent.

Assumption 4

- Quality of the product is unknown to profiling Agent and curator Agent.
    - But of course, Artist Management agent knows about the quality of product it is selling.
- Profiling Agent only knows about the quality when it has bought a product.
    - Of course, profiling Agent wants to view a high-quality product, and this has a higher payoff for profiling Agent.
- Viewing a low-quality product has a less pay off. And not-viewing a product is also associated with a pay-off.

Assumption 5

- Artist management Agent on the other hand wants to maximize its profit. So, selling a low-quality product gives it a higher payoff (as less cost is incurred in produce a low-quality product).
    - Selling the high-quality product has a lesser pay off (It costs more to produce the high-quality product, but it will sell for the same price).
- If the Profiling Agent does not view, then the seller has produced a product and received no revenue. A high-quality product will cost more to produce, so not selling a high-quality product has a negative pay-off.
    - Not selling a low-quality product also incurs a very low or negative pay-off.

Tasks

1. Establish pay-offs/utilities for different strategies for Profiling Agent, Curator Agent and Artist Management Agent.

Suppose that the Artist Manager pays a low-quality item 50$, and a high-quality item 500$. In both cases he/she sells the item for 700$. So, the profits for the Artist Manager are:

HQ item	LQ item
200$	650$

Suppose that the Curator proposes a price to the Profiler depending on the interests of the user. If the Profiler decides to buy the item, then he/she will pay the Curator, who buys the item from the Artist Manager. If the Profiler decides not to buy the item, then the Curator will not buy it from the Artist Manager. The prices that the Curator proposes to the Profiler are the following:

The item is interesting for the user	The item is not interesting for the user
200$	100$

Finally, the Profiler can decide either to buy the item, or not. The profit is given by the actual value of the item (how much the Artist Manager payed for it) and the cost imposed by the Curator.

To see if the strategy of the Curator agent is important in determining the payoff-matrix, let's consider the two cases:

- The item is interesting for the user

Profiler \ Artist Manager	HQ item	LQ item
Buy	(300, 200)	(-150, 400)
Not buy	(0, -500)	(0, -50)

- The item is not interesting for the user

Profiler \ Artist Manager	HQ item	LQ item
Buy	(400, 200)	(-50, 400)
Not buy	(0, -500)	(0, -50)

We can observe that the two payoff-matrices are equivalent.

2. Based on the pay-offs try to find Nash equilibrium.

In yellow we have the preferred strategies of the Profiler *given* the strategy of the Artist Manager.

In green we have the preferred strategies of the Artist Manager *given* the strategy of the Profiler.

The Nash equilibrium is represented by the strategies {Not buy, LQ item}, i.e., the Profiler will not buy the item and the Artist Manager will try to sell a low-quality item.