ID2209
Distributed Artificial Intelligence and Intelligent Agents

Homework#2

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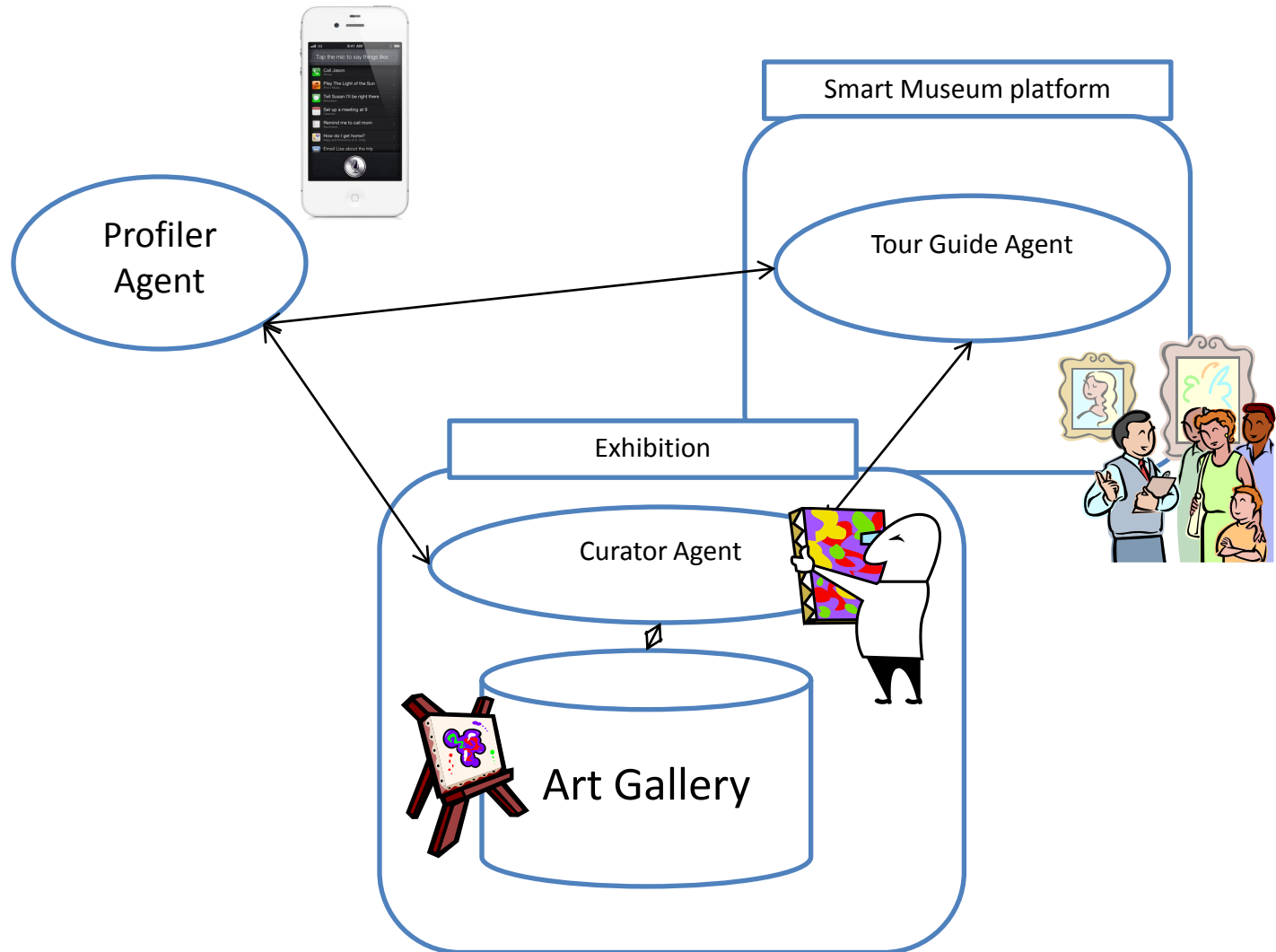
Homework#2

Topics covered in this session:

- ## Negotiations in MAS
  - Implementing FIPA Dutch auction in the context of a problem at hand

- ## Game mechanism design in MAS
  - Computing Utility/Pay-off and establishing Nash Equilibrium in a scenario proposed

-Complementary material

http://www.fipa.org/specs/fipa00032/index.html

SmartMuseum Agent Framework

Smart Museum platform

Profiler Agent

Tour Guide Agent

Exhibition

Curator Agent

Art Gallery

FIPA Dutch Auction Interaction Protocol

- The **auctioneer** attempts to find the market price for a good by starting bidding <u>at a price much higher than the expected market value</u>,

  - Then progressively reducing the price until one of the **buyers** accepts the price.

- The rate of reduction of the price is up to the auctioneer. They usually have a reserve price below which not to go.

- If the auction reduces the price to the reserve price with no buyers, then the auction terminates.
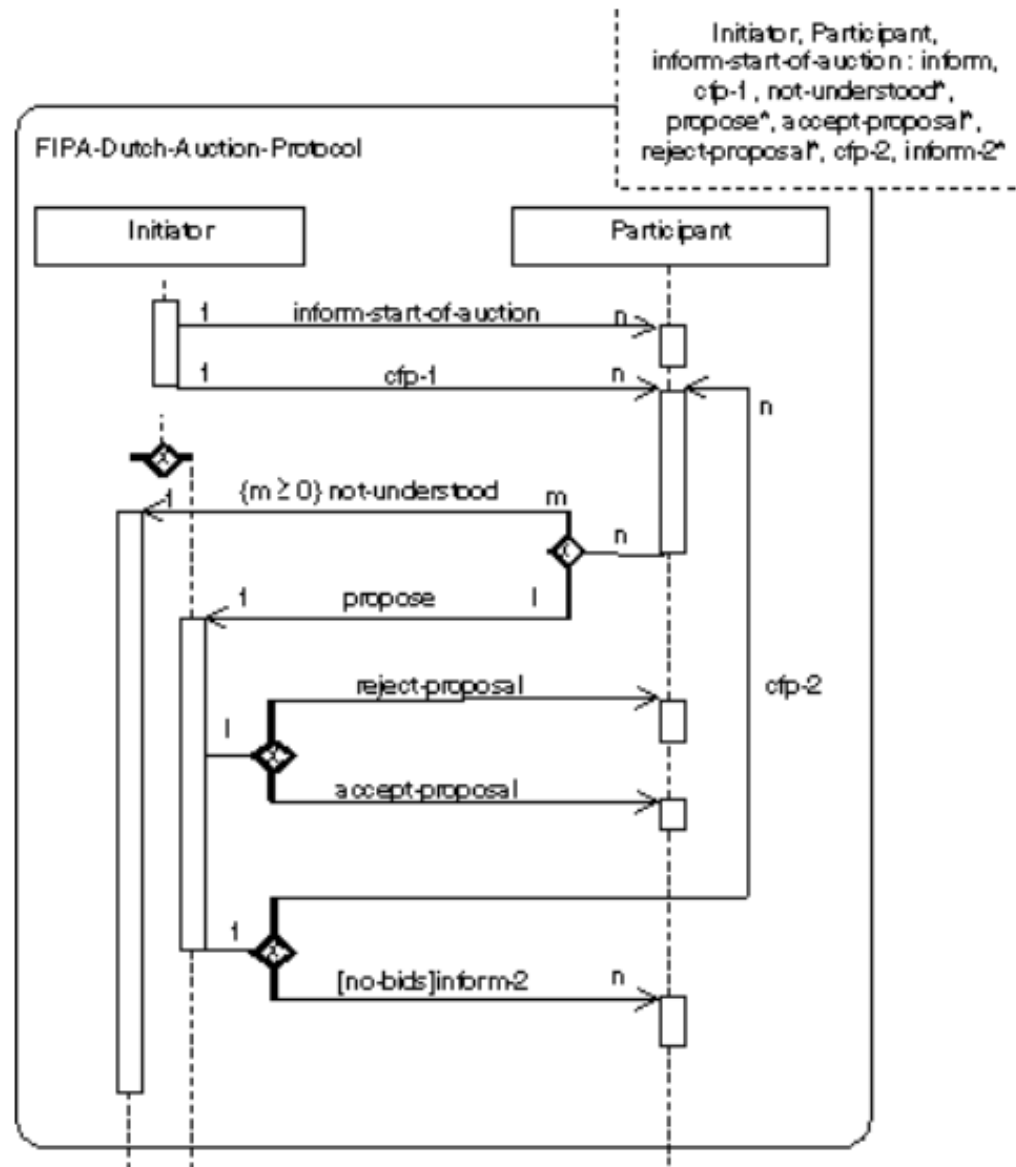
FIPA Dutch Auction Protocol

Figure 1: FIPA Dutch Auction Interaction Protocol

Task1&2: Dutch auction for Smartmuseum

1- Implement FIPA Dutch Net Interaction Protocol on Task 1 of HW 1.

2- Define your own bidding strategy and show how your new bidding strategy affects the execution of auctions. (e.g. in terms of speed, time and willingness to pay)

Choose between one of the following scenarios:

Artist Management Agent

Auction
Between artist manager
And curators...
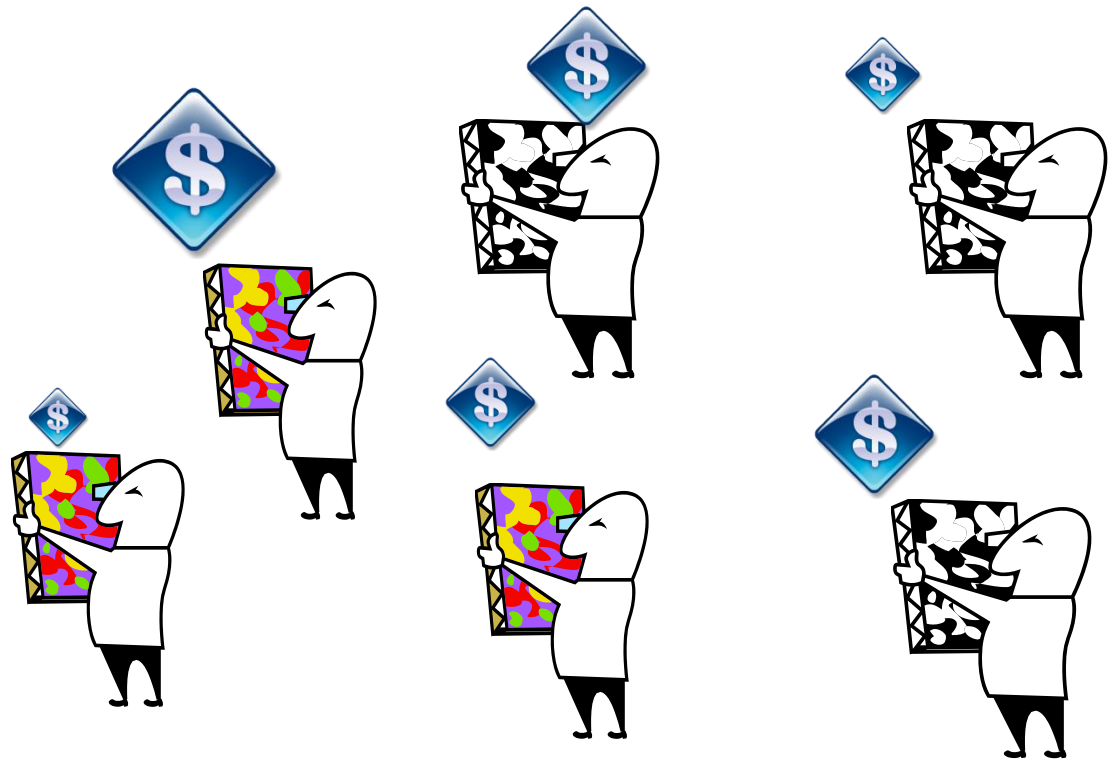
OR Auction
Between curators
And profilers...

Curator
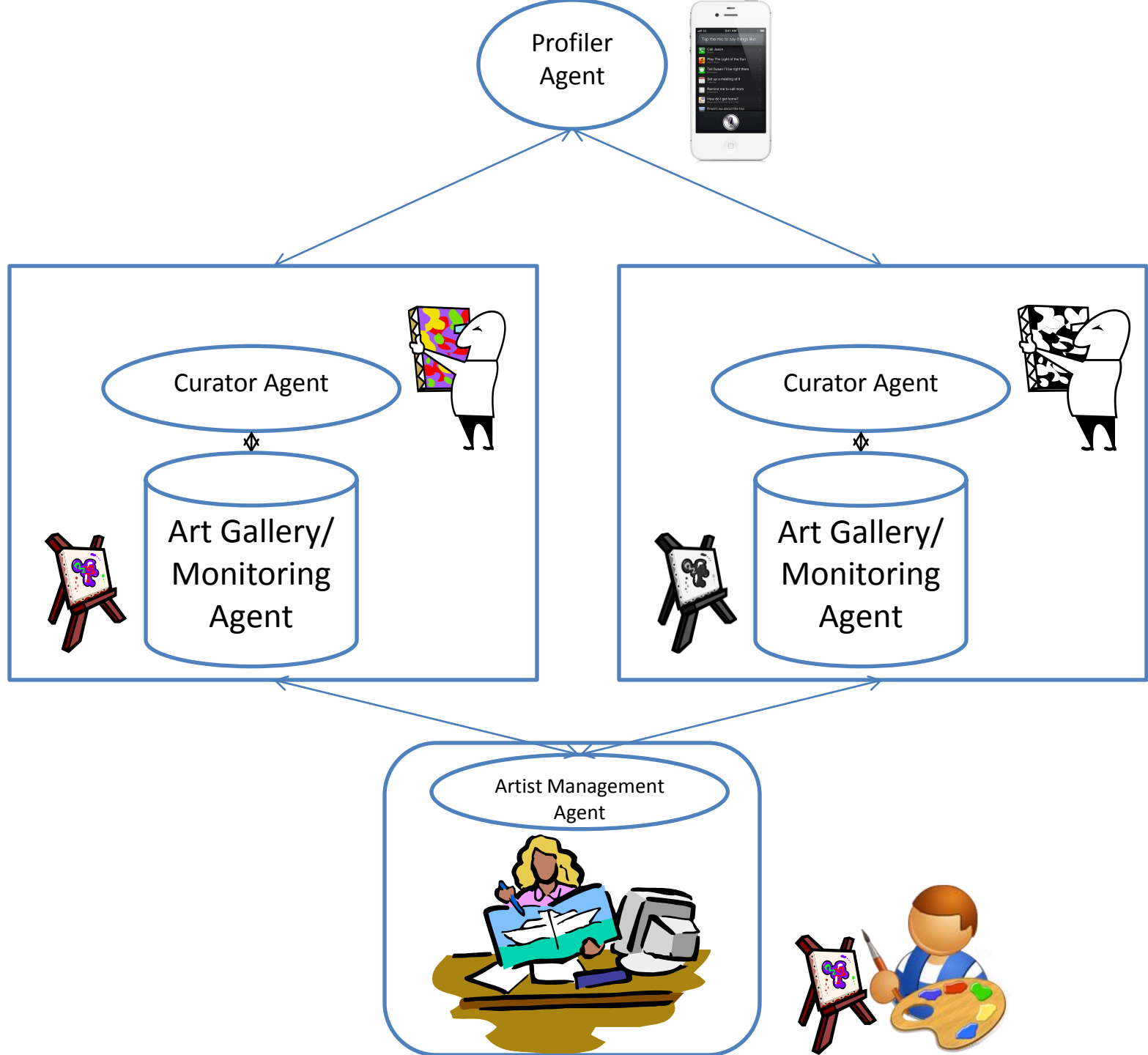Agent

Use FIPA interaction protocol of JADE

Field Summary

static java.lang.String	**FIPA_BROKERING** The FIPA-Brokering interaction protocol.
static java.lang.String	**FIPA_CONTRACT_NET** The FIPA-Contract-Net interaction protocol.
static java.lang.String	**FIPA_DUTCH_AUCTION** The FIPA-Auction-Dutch interaction protocol.
static java.lang.String	**FIPA_ENGLISH_AUCTION** The FIPA-Auction-English interaction protocol.
static java.lang.String	**FIPA_ITERATED_CONTRACT_NET** The FIPA-Iterated-Contract-Net interaction protocol.
static java.lang.String	**FIPA_PROPOSE** The FIPA-Propose interaction protocol.
static java.lang.String	**FIPA_QUERY** The FIPA-Query interaction protocol.
static java.lang.String	**FIPA_RECRUITING** The FIPA-Recruiting interaction protocol.
static java.lang.String	**FIPA_REQUEST** The FIPA-Request interaction protocol.
static java.lang.String	**FIPA_REQUEST_WHEN** The FIPA-Request-When interaction protocol.
static java.lang.String	**FIPA_SUBSCRIBE** The FIPA-Subscribe interaction protocol.
static java.lang.String	**ITERATED_FIPA_REQUEST** The Iterated-Fipa-Request interaction protocol.

http://jade.tilab.com/doc/api/jade/domain/FIPANames.InteractionProtocol.html

Task3

- In previous homework, we considered **Profiler Agent** and **Curator Agent**.

- Now let's consider an **Artist Management Agent** that is responsible for auctioning, managing and selling a product (art works) on an artist's behalf.

Profiler Agent

Curator Agent

Art Gallery/ Monitoring Agent

Curator Agent

Art Gallery/ Monitoring Agent

Artist Management Agent

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Task3 assumptions 1/5

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

- **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).

Task3 assumptions 2/5

- **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 it 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.

- 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 quoting the price depending on the profiled interests).

  - Mind it that <u>all curator agents</u> get the same price quote for a certain product from artist management agent.

- Quality of the product is unknown to **profiling Agent** and **curator Agent.**

  – But of course 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 viewing 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.

- **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.

Task3

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

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

Task3

– This task 3 is a theoretical Question.

– No Implementation is needed.

Deliverables

1-Documented source code (with instructions for execution) of Implementation of Task#1 and Task#2

2- Documented report for Task #3

Deadline: **November 12**

emailed by deadline to

- – nimad@kth.se and shahab.mokari@gmail.com

- – with Subject "DAIIA12 HW2".
- – Don't forget to write full names of group members in the email.
- – A small demo (10 min) of running agents.
- – Email us the documented source code and Report by Deadline specified.