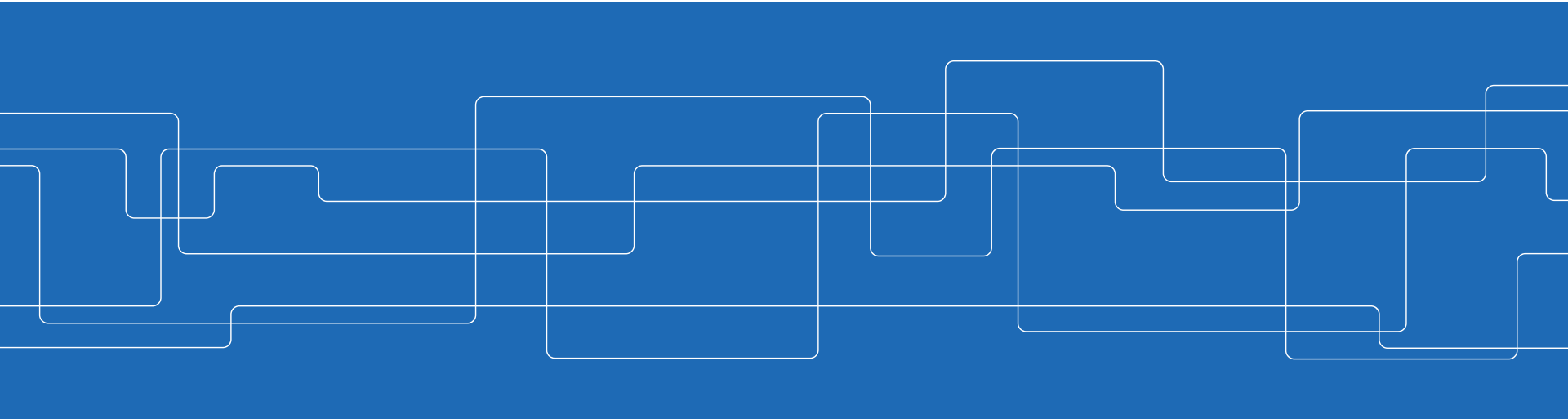
ID2209 Distributed Artifical Intelligence and Intelligent Agents

Project Description



Project of your own choice

- It's possible to propose your own project
- **Requirements**
  - Subject must be within the boundaries of course.
  - Work load should be equal to project (three weeks of work, or one full week of work)
  - You must reuse the concepts you have learned in labs
    - (agent behaviours, messaging, negotiations, mobility, etc.)
  - Preferrably using JADE environment
    - Other environment possible
- Deadline for proposal:
  - One week from introduction of project

Project Introduction

- Topics covered in this session:
  - Agent Oriented Software Engineering (AOSE)
    - Using GAIA AOSE model
  - Reusing concepts learned throughout homeworks so far

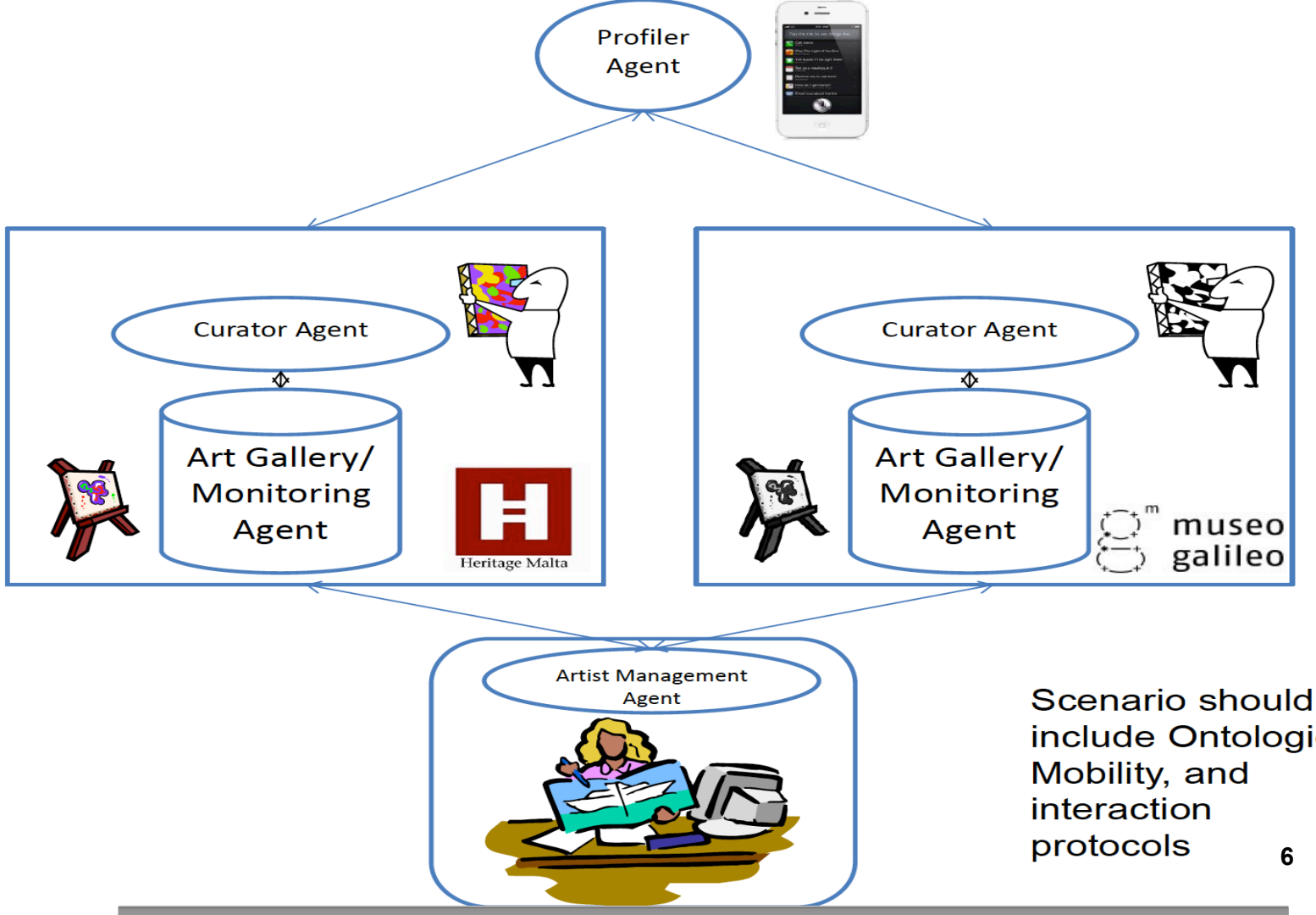
Materials needed

- **You can download them from Canvas – Modules/Project:**

1. Odell et al, "*Representing Agent Interaction Protocols in UML*"
2. Bauer, "*UML Class Diagrams Revisited in the Context of Agent-based Systems*"
3. Yan et al, "*ROMAS: a role-based modeling method for multi- agent system* "
4. Reference materials:
    - Course Book + Slides of "Agent Oriented Software Engineering"

Goal

- Objective of the project is to model the following Smart Museum scenario using GAIA AOSE.



Scenario should include Ontologies, Mobility, and interaction protocols

Task 1

- Task 1. Model your system via GAIA AOSE Methodology

  Check the following two references uploaded in Canvas:

  1. **GAIA**

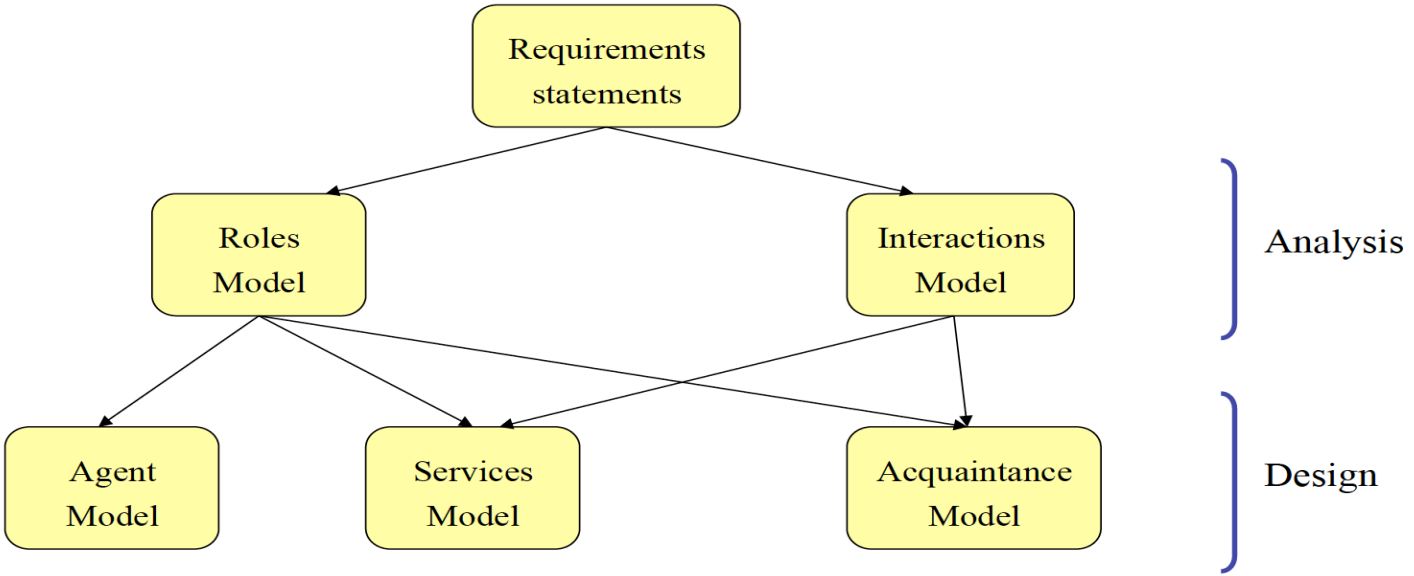
  And for the “Mobility Model” refer to:

  2. **Mobile GAIA**

Task 1

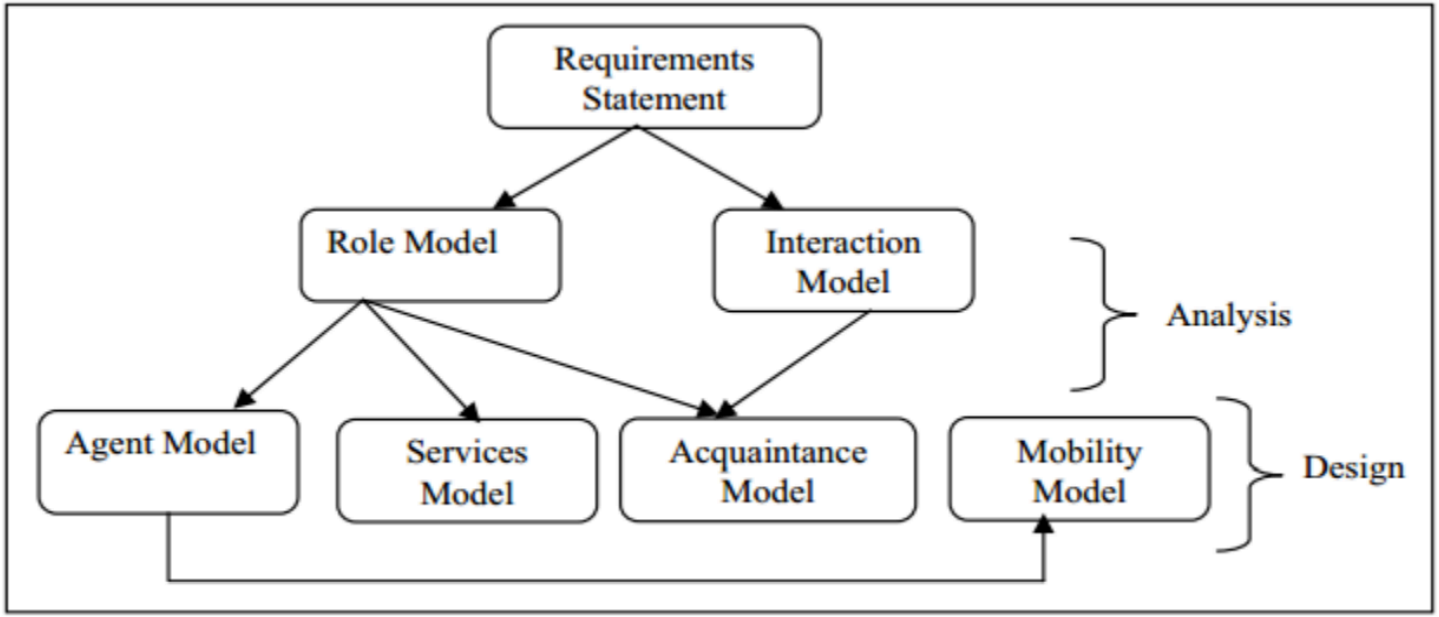
Gaia Methodology

Relationships between Gaia Models



Mobile GAIA

The mobility scenarios are supported in the extended model m-GAIA (mobile GAIA), which includes the mobility model, that identifies the movement and travel path of each mobile agent.



Structure of m-GAIA's Models

Task 1

Expected Output:

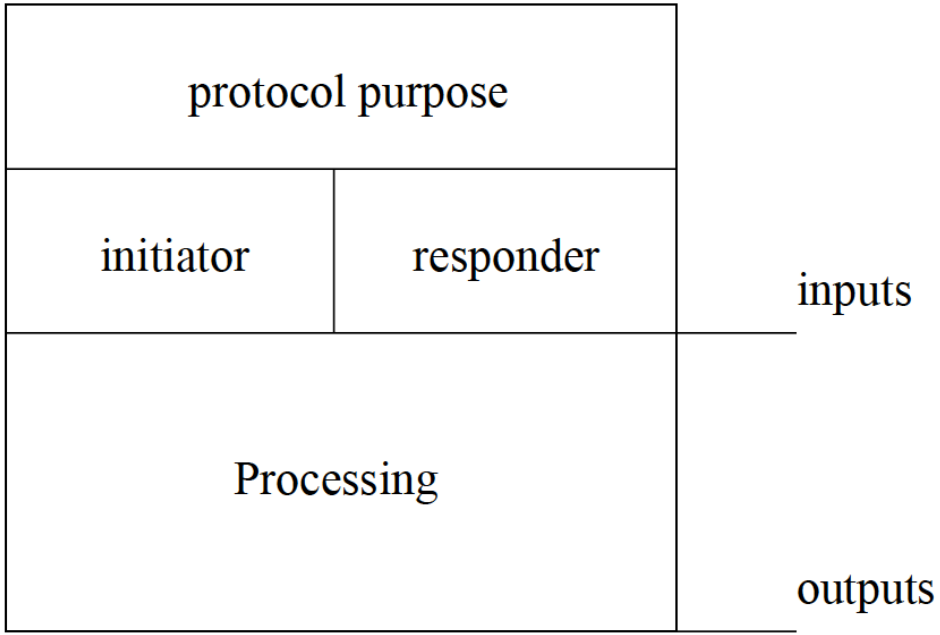
1. **Requirements Statement** (Use your knowledge from previous homeworks – the previous scenarios supported interaction and mobility between agents)
2. **Roles Model**

Role Schema:	*name of role*
Description	*short English description of the role*
Protocols and Activities	*protocols and activities in which the role plays a part*
Permissions	*"rights" associated with the role*
Responsibilities	
Liveness	*liveness responsibilities*
Safety	*safety responsibilities*

Task 1

3. **Interaction Model**

Example of protocol definition:



Task 1

4. **Agent Model**

Identification of each agent type

5. **Service Model**

For each protocol:

Service	Input	Output	Preconditions	Postconditions

6. **Acquaintance Model**

Show the communication links between the agents

Task 1

7. Mobility Model

Please check “mobile GAIA” reference in Canvas:

a. Identification of place types (example: Museo Galileo Museum).

b. Identification of relationships between agent types and place types

c. Definition of the cardinality between agent types and place types

d. Identification of the travel path of each mobile agent

Task 2

- Task 2. Model interactions among agents in AgentUML

Check this reference from Canvas:

Representing Agent Interaction Protocols in UML

Task 2

Expected Output:

Application of the following:

- **Level 1: Representing the overall protocol**

Output: Detailed package and template diagrams + brief description

- **Level 2: Representing interactions among agents**

Output: Sequence diagrams + brief description

- **Level 3: Representing internal agent processing**

Output: State chart diagrams + brief description

Task 3

- Task 3. Use UML Class diagrams to design behavior of your agents.

  Check this reference from Canvas:

  UML Class Diagrams Revisited in the Context of Agent- Based Systems

  Expected Output:

  UML class diagrams according to the descriptions found in the reference

Task 4

- Task 4. Model your system using Role based modeling approach

Check this reference from Canvas:

ROMAS: a role-based modeling method for multi-agent system

Task 4

- Task 4.1 Perform **role-based modeling** using RoMAS for the initial task**.**
- Task 4.2 Comment on differences in resulting designs of 4.1 and GAIA (from Task 1).
  - (i.e. Analysis phase of GAIA against performing role-based modeling as first step to GAIA analysis)

Task 5 JADE and (Other Agent Platforms)

- There are number of implementations of agent platforms which conform to the FIPA Specifications. Perform a comparison of at least 02 other Agent Platforms with JADE.
- Your comparison should comprise of
  - i). Architecture of Platform
  - ii). Services provided by Platform
  - iii). Comparison of implementation of a simple scenario same as Question 2 (i.e. Service Implementation, Service Registration, and Service Discovery)
  - iv). List some notable projects which used that platform.
  - v). your personnel opinion/judgment about the platform as compared to JADE. You can take part iii) as your starting point, and explain the architecture and services the platform provides from a practical point of view.

Task 5 JADE and (Other Agent Platforms)

- Agent Development Kit, FIPA-OS, JACK Intelligent Agents, ZEUS, SAGE … just to name a few other FIPA Complaint implementations. (Feel free to use some other FIPA Complaint Implementation)

Deliverables

- Deadline: 20 December
  Demo date: 8 January

- Upload Documented Reports in Canvas