Abstract

This thesis introduces a method for solving the lectures scheduling problem using multi-agent systems and the Gaia Methodology. The proposed method divides the problem into a number of simpler sub-problems, and assigns each sub-problem to an agent. There are three main types of agents in the system:

- A Lecturer Agent that keeps a list of the courses that the lecturer can teach, along with the lecturer's scheduling preferences. This agent receives requests to teach courses from Class Agents and responds to them.
- A Class Agent that has a list of the courses to be taught to the class in a specific semester and tries to find a lecturer and allocate a room for each course.
- A Rooms Agent that keeps a list of the available rooms, their locations, and their capacities and responds to room requests by Class Agents.

Two additional agents are defined in the system but are not implemented: a Department Coordinator Agent and a College Coordinator Agent. The Department Coordinator Agent tries to solve room unavailability problems by facilitating exchange of rooms between departments. The College Coordinator Agent tries to solve room unavailability problems by facilitating exchange of rooms between colleges. The implementation of these two agents is outside the scope of this work.

The system has a Lecturer Agent for each lecturer, a Class Agent for each class, and one Rooms Agent. Each agent is self-interested and has his own goal. The goal of the agent is to solve the sub-problem assigned to it. The agent tries to achieve his goal with the minimum compromises. The agents in the system interact together and try to solve the lectures scheduling problem cooperatively. The problem is solved by generating class, lecturer, and room timetables.

The analysis and design of the system are done using the Gaia Methodology.

Results obtained indicate that a number of interacting self-interested agents can solve the lectures scheduling problem provided that enough resources are available and the constraints imposed by lecturers are reasonable.