



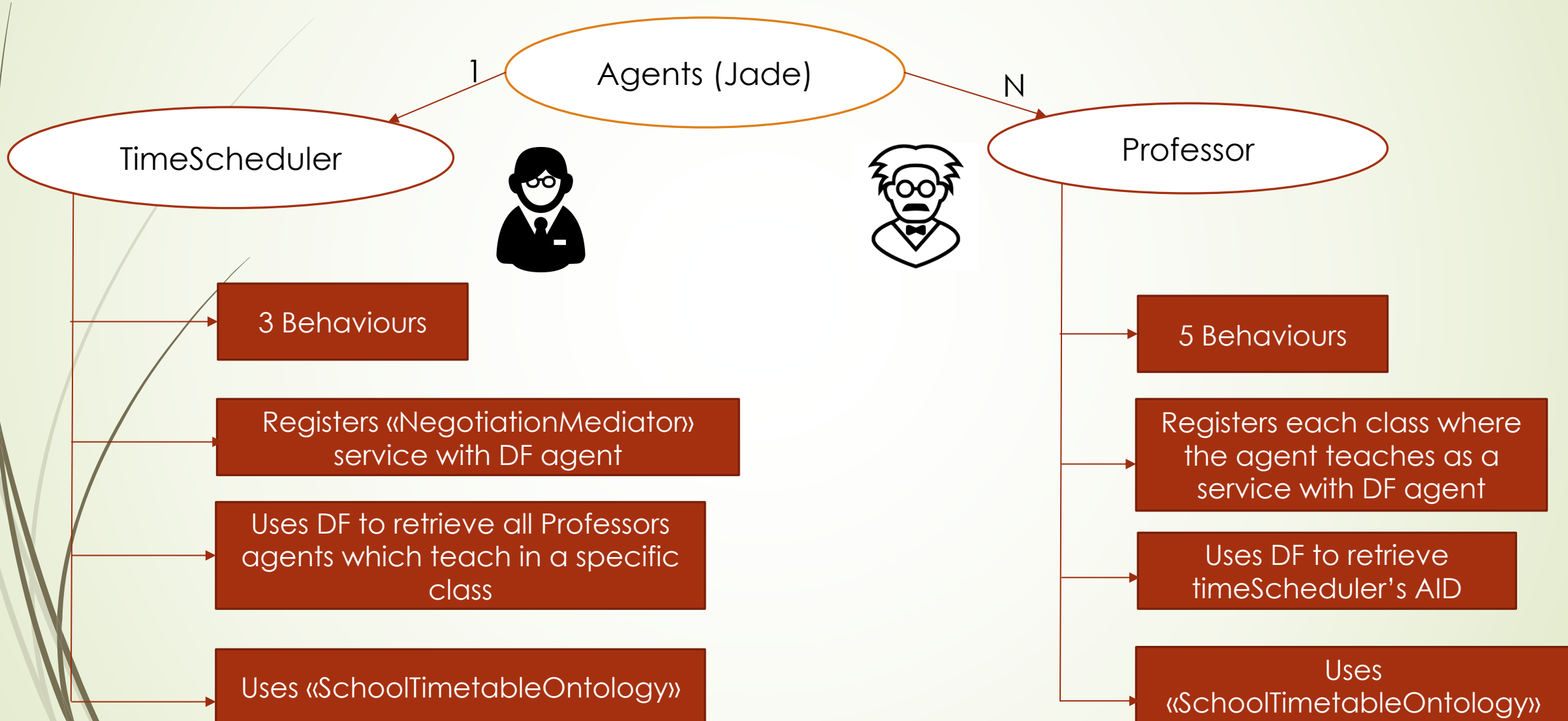
# SchoolTimetable

An hybrid CP and MAS case study

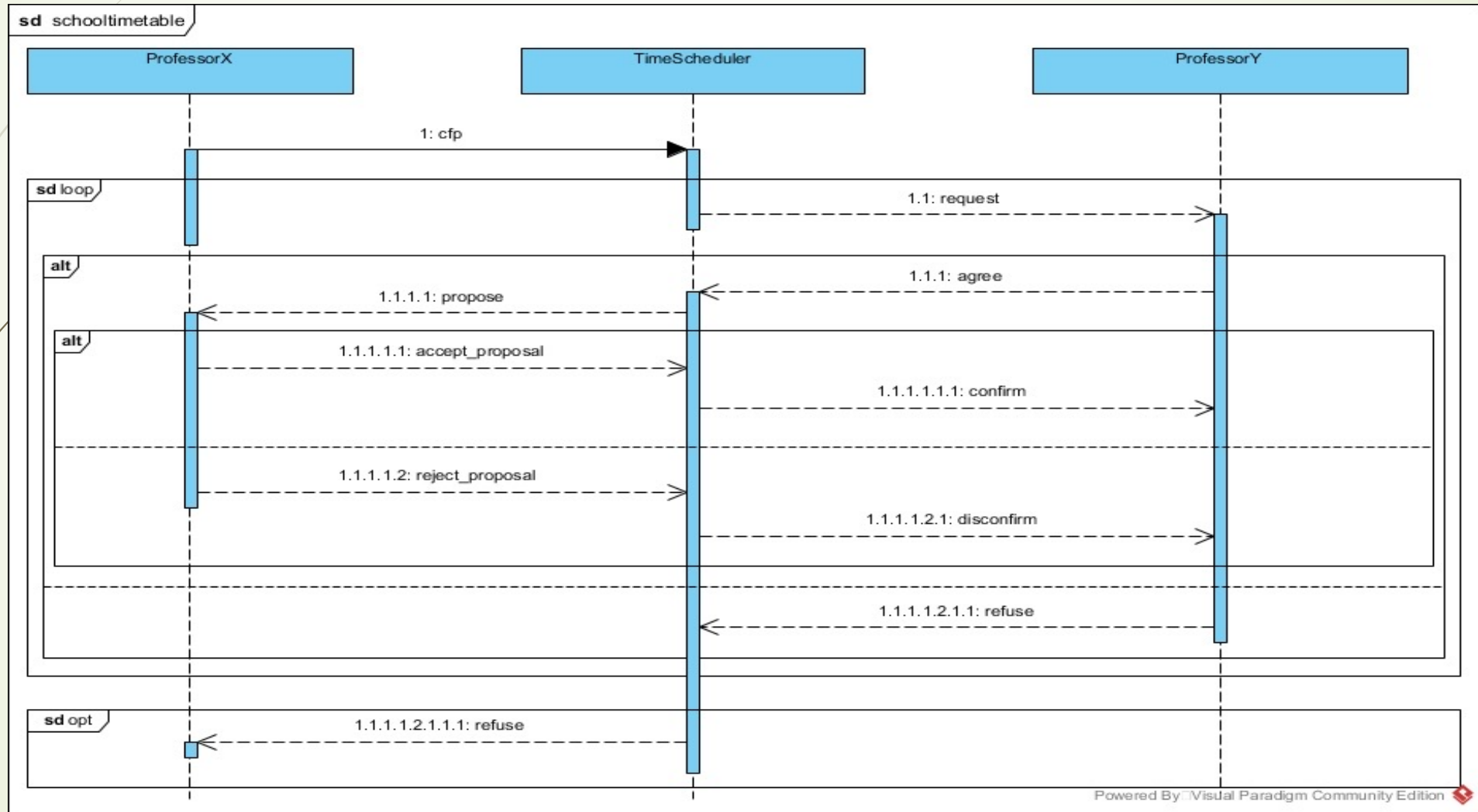
# Requirements

- There is a person, responsible for the creation of the timetable of each professor (timescheduler), who receives from school direction all information to perform the task
- After the creation of timetables, the time-scheduler must send to each professor the corresponding timetable
- Each professor must spend exactly in each class a number of hours described by the school regulation according to the number and type of class where the teaching happens
- Each professor must have a free day during the school week
- In the same class cannot be more than one professor per hour (this requirement has been imposed to simplify particular cases, e.g. laboratories, where two professor teach in the same class)
- Each professor can have own preferences related to the lessons in which he/she would rather not teach
- Each professor can begin a negotiation trying to satisfy own preferences, mediated by the time-scheduler

# Multi-Agent Systems



# Interaction to change a lesson



# Constraint Logic Programming

- A variable for each combination of professor, hour and day
- Each variable has a domain as an interval from 0 to the number of classes. 0 is used to state no class

Constraints:

- Each Professor must teach for a specified number of hours in each class
- In the same day and hour cannot be more than one professor in each class
- Each Professor must have a free day

# Example

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| IA |    |    |    |    |    |
|----|----|----|----|----|----|
| 1H | 1D | 2D | 3D | 4D | 5D |
|    | P1 | P2 | P3 | P4 | P2 |
| 2H | P1 | P2 | P3 | P4 | P2 |
| 3H | P3 | P2 | P1 | P4 | P3 |
| 4H | P4 | P4 | P1 | P3 | P1 |
| 5H | P4 | P4 | P2 | P1 | P1 |

| 2A |    |    |    |    |    |
|----|----|----|----|----|----|
| 1H | 1D | 2D | 3D | 4D | 5D |
|    | P3 | P4 | P1 | P1 | P1 |
| 2H | P3 | P4 | P1 | P3 | P3 |
| 3H | P1 | P4 | P3 | P3 | P2 |
| 4H | P1 | P2 | P3 | P2 | P2 |
| 5H | P1 | P2 | P4 | P2 | P2 |

| IA |    |    |    |    |    |
|----|----|----|----|----|----|
| 1H | 1D | 2D | 3D | 4D | 5D |
|    | P1 | P2 | P3 | P4 | P3 |
| 2H | P1 | P2 | P2 | P4 | P1 |
| 3H | P3 | P2 | P2 | P4 | P3 |
| 4H | P4 | P4 | P1 | P3 | P1 |
| 5H | P4 | P4 | P2 | P1 | P1 |

| 2A |    |    |    |    |    |
|----|----|----|----|----|----|
| 1H | 1D | 2D | 3D | 4D | 5D |
|    | P3 | P4 | P1 | P1 | P1 |
| 2H | P3 | P4 | P1 | P3 | P3 |
| 3H | P1 | P4 | P3 | P3 | P2 |
| 4H | P1 | P2 | P3 | P2 | P2 |
| 5H | P1 | P2 | P4 | P2 | P2 |

P1: ProfessorRossi

P2: ProfessorBianchi

P3: ProfessorRosa

P4: ProfessorVerdi

Preferences

P1: (1,1)

P2: (2,5) (5,2)

P3: (2,3) (5,5)

P4: (1,1) (4,3)

Free day

P1: D2

P2: D1

P3: D2

P4: D5

Thanks for your attention