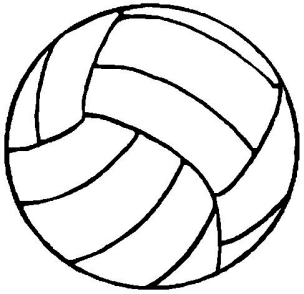
POLITECNICO DI MILANO

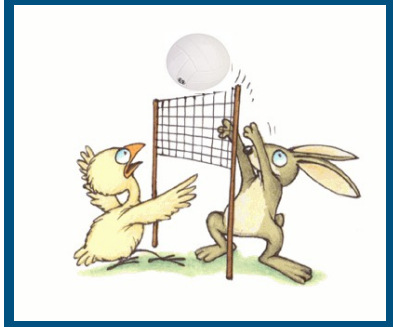


Intelligent Multiagent Systems 2009

Playing with a DCSP: Computing a Tournament Calendar with Asynchronous Backtracking

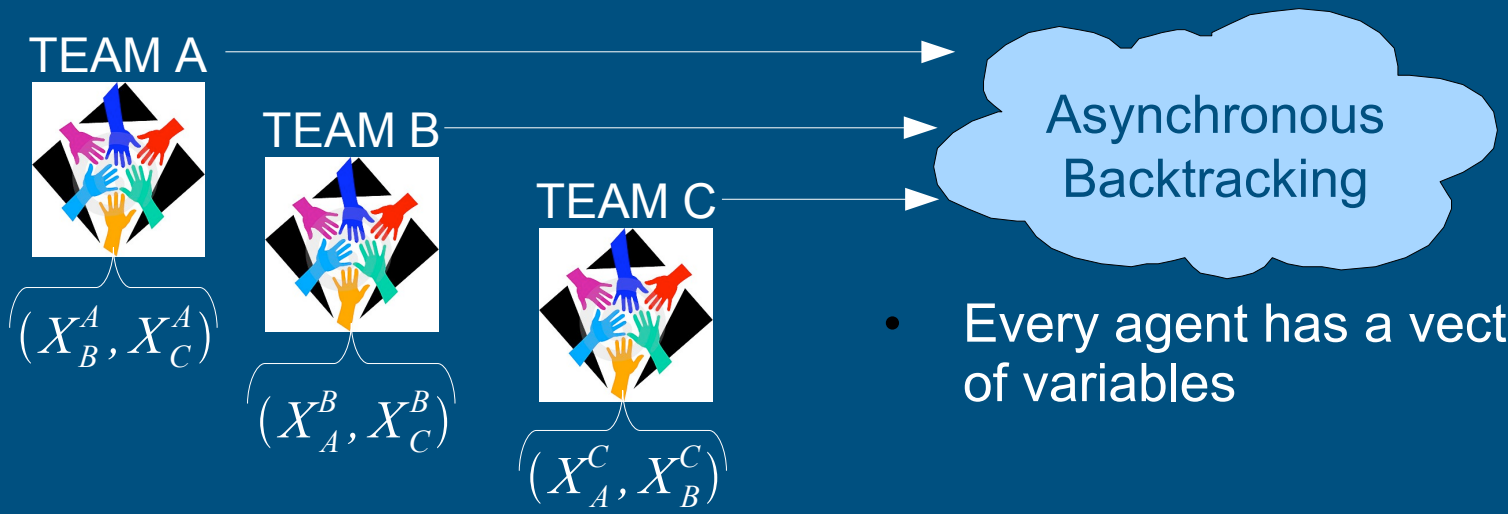
Nicola Basilico and David Laniado

Introduction



- The Problem: organizing a recreational volley tournament
  - *n* teams
  - *m* available days
  - each team has its own preferences over the days
- **Objective:** compute a consistent match schedule

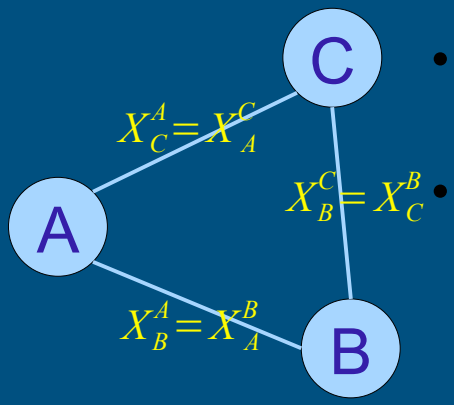
- First natural approach:
  - D = the set of *m* days over which the tournament can be distributed
  - Agent = team
  - For each agent *i*: $canplay_i : D \rightarrow \{0,1\}$



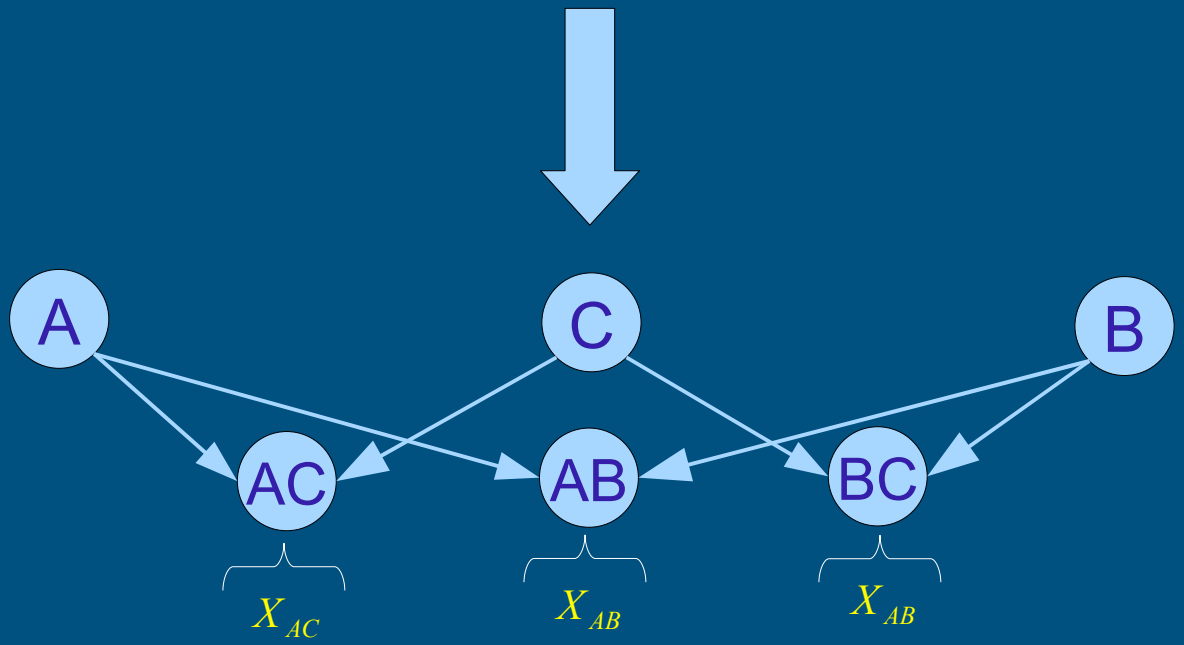
- Every agent has a vector of variables

Fomalization

- Constraints for agent *i*:
  - $X_j^i \neq X_k^i \quad X_j^i, X_k^i \in \{ d : canplay_i(d) = 1 \}$



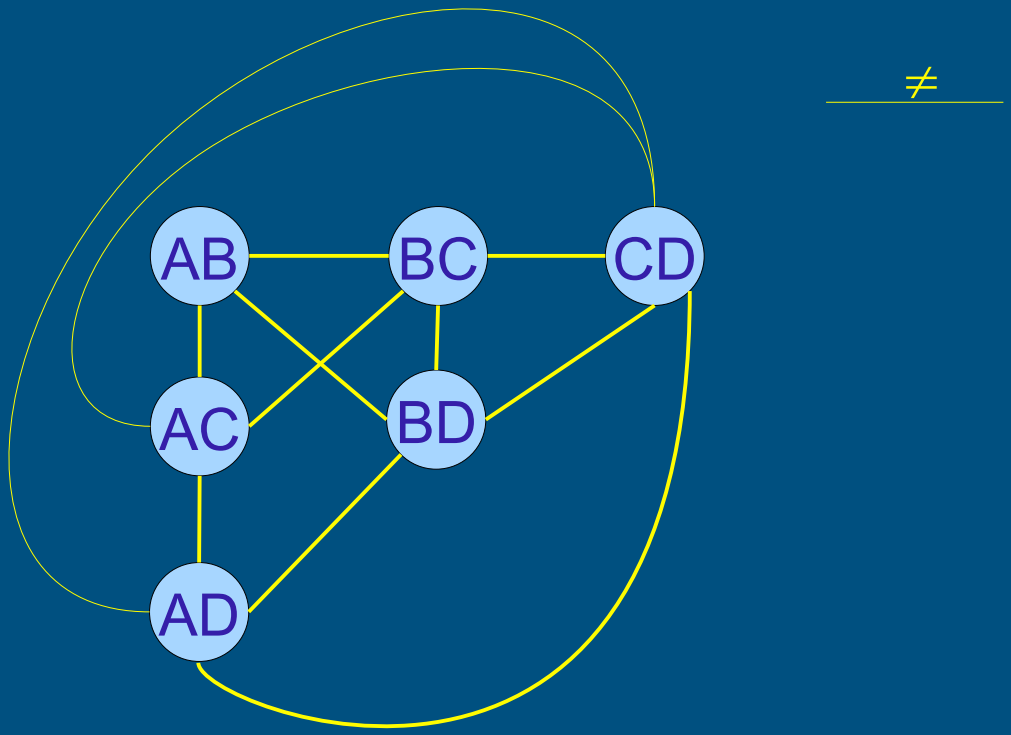
- DCSPs with multiple local variables can be in addressed in different ways
- We adopt the simplest one



- Agent *ij* = Match between teams *i* and *j*
- Now each agent has only one variable

Formalization

- Constraints for agent *ij*:
  - $X_{ij} \in \{\{d : canplay_i(d) = 1\} \cap \{d : canplay_j(d) = 1\}\}$

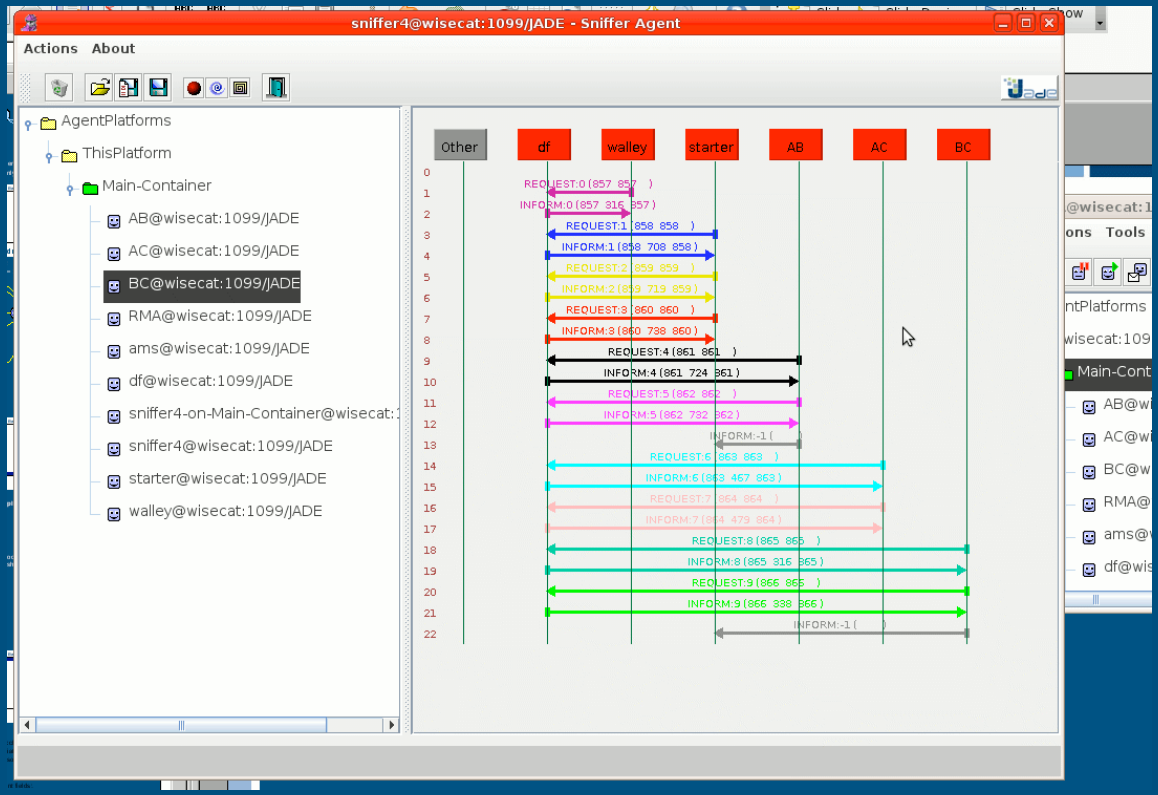


- Return matches (if any) can be easily handled
- Matches involving different teams can be played in the same day (e.g. AD and BC)

The implementation

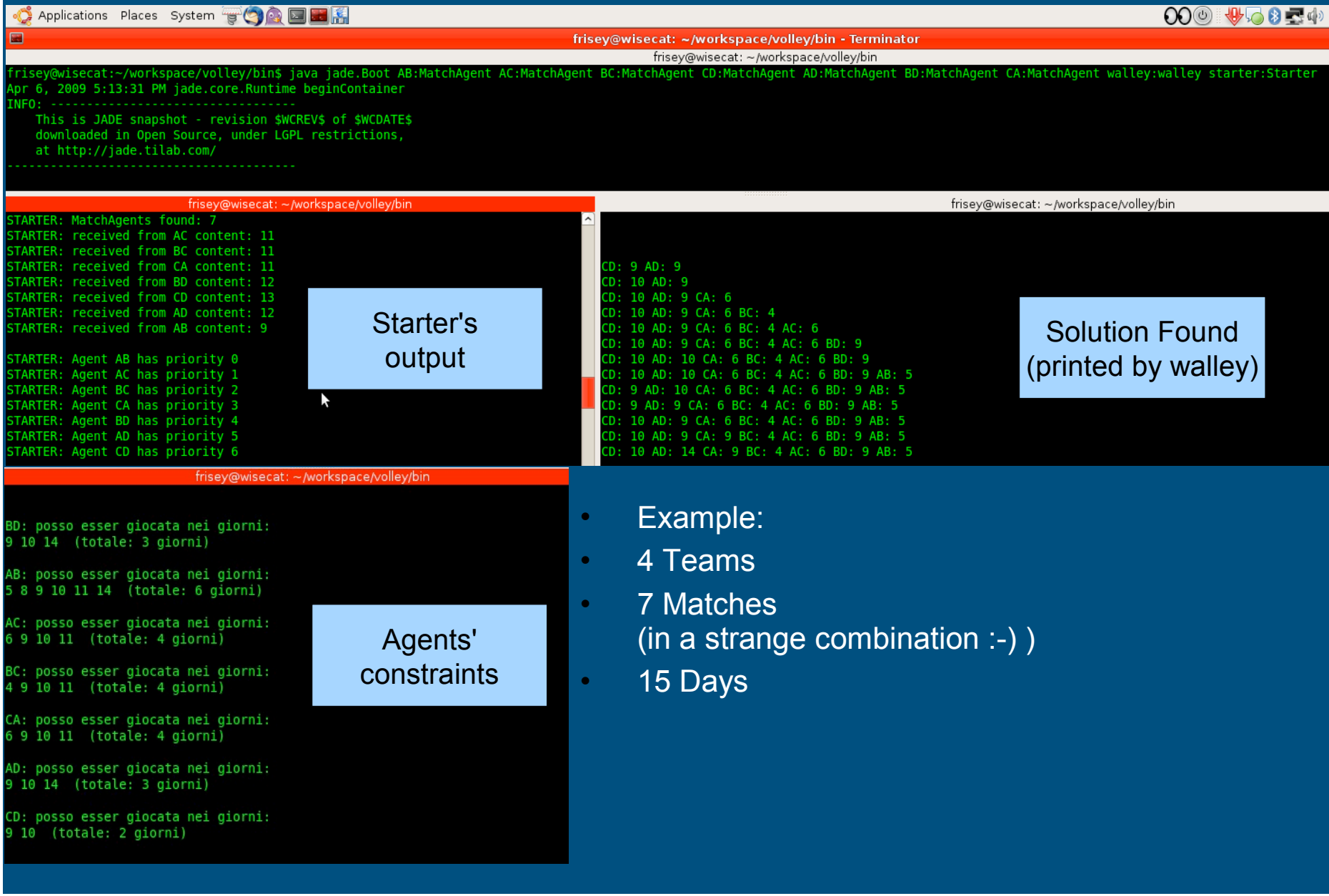
Agents on the JADE platform:

- **Starter**:
  it's the coordinator, it assigns priorities to agents following the *"first the busiest"* principle
- **MatchAgent**:
  the single match
- **Walley**:
  it "sniffs" all the ***ok?*** messages and prints out the current global solution (i.e., the variable value for each agent)
- **DF** and **AMS**



- Agents exchange the following messages:
  - ***ok?*** to communicate a new assignment to neighbors
  - ***nogood*** to communicate a new constraint to a higher priority agent
  - ***requestNeighbor*** to add a new neighbor
  - ***terminate*** to communicate that there is no solution

Some screenshots



- Example:
- 4 Teams
- 7 Matches
  (in a strange combination :-))
- 15 Days