DECISION-MAKING
PLANNING
& REASONING

LAB 5: planning
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AGENDA

• Answers from micro survey
• Planning tools
• Reasoning + planning
BEFORE START...

- Any question about topics of the previous lecture/lab?

Go to www.menti.com and use the code 60 11 33 4
MICRO SURVEY: ANSWERS

Thank you!

Go to www.menti.com and use the code 59 99 89 8

Write keywords about interesting topics from previous lecture labs

- mixed reality
- new technology
- unity
- visualization of data
- missing shorter lectures
- cooperative gaming
- ontologies
- real life examples
- serious games
MICRO SURVEY: ANSWERS

What is missing from previous lecture labs:
- answer keys
- real life applications
- what we can do with this
- more about ontologies
- clear lab intentions

Thank you again!
QUICK RECAP ABOUT ONTOLOGIES
UNFAIR ONTOLOGY VS DATABASE SCHEME

• Ontology:
  o Focus: meaning (shared understanding)
  o Defines a set of concepts and relationships
  o Represents content and structure
  o Core purpose: agents communication, interoperability, search, etc.

• Database scheme
  o Focus: Data
  o Defines structure of database
  o Core purpose: structure instances for efficient storage and querying
# UNFAIR ONTOLOGY VS DATABASE SCHEME

## Recap

**Database:**
- Closed world assumption *(CWA)*
  - Missing information treated as false
- Unique name assumption *(UNA)*
  - Each individual has a single, unique name
- Schema behaves as **constraints** on structure of data
  - Define legal database states

**Ontology:**
- Open world assumption *(OWA)*
  - Missing information treated as unknown
- **No UNA**
  - Individuals may have more than one name
- Ontology axioms behave like **implications** *(inference rules)*
  - Entail implicit information

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On the image:

- On the left: **Database**: Closed world assumption (CWA) and Unique name assumption (UNA). Each individual has a single, unique name. Schema behaves as constraints on the structure of data, defining legal database states.
- On the right: **Ontology**: Open world assumption (OWA), without Unique name assumption (UNA). Individuals may have multiple names. Ontology axioms behave like implications (inference rules), entailing implicit information.
### UNFAIR ONTOLOGY VS DATABASE SCHEME

**Recap**

<table>
<thead>
<tr>
<th>Database:</th>
<th>Ontology:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Entities</td>
<td>• Classes</td>
</tr>
<tr>
<td>• Attributes, relations</td>
<td>• Properties</td>
</tr>
<tr>
<td>• Constraints</td>
<td>• Axioms</td>
</tr>
<tr>
<td>• No taxonomy</td>
<td>• Taxonomy is backbone</td>
</tr>
<tr>
<td>• Constraints for integrity,</td>
<td>• Constraints for meaning,</td>
</tr>
<tr>
<td>foreign key</td>
<td>consistency and integrity</td>
</tr>
</tbody>
</table>
A-BOX T-BOX

• A-box related to instances:
  o To define “taxonomical” relationships in an ontology “Esteban is an Adult” in PeopleOntology

• T-Box relates oriented to semantics relationships
  o To define specific relations among classes: “Dewey eats”
PLANNING TOOLS
PLANNING PLATFORMS

1. JaCaMo
   URL: http://jacamo.sourceforge.net
   Language: AgentSpeak + Java

/* Plans */

//plan1 greetings to human
+!start : message(X) <- .print(X).
//+!start : message(X) <- printMsg(X).
//+!start : true <- .print("hello world.").
//"whenever I have the goal !start and I believe in message(X), I will achieve this goal by doing .print(X)
+!talkto : true <- .snd(uicontroller,tell,givevalue).
1. DLV system
   URL: http://www.dlvsystem.com/
   Language: Disjunctive logic programs + Java

Demo: DLV system monkey banana
PLANNING PLATFORMS

1. Monkey banana planning with DLV system + Java wrapper
   URL: https://github.com/esteban-g/dlvmonkeyexample
REASONING + PLANNING

Modular-based platform/agent

For example using SWRL (Java/Py)

For example with DLV + Java

Environment

Agent

Sensing

Reasoning

Planning

Acting

KG

Percepts

Actions

https://hubs.mozilla.com/
PROJECT MANAGEMENT
PROJECT MANAGEMENT

- Modular
- Use iterations for prototypes (Agile-like software development methodologies)
- Web-oriented:
  - To work collaboratively
  - To present demonstration
- Establish good communication and fair task-assignments with your team
THANK YOU