DECISION-MAKING PLANNING & REASONING

LAB 5: planning

November 16, 2020

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AGENDA

- Answers from micro survey
- Planning tools
- Reasoning + planning

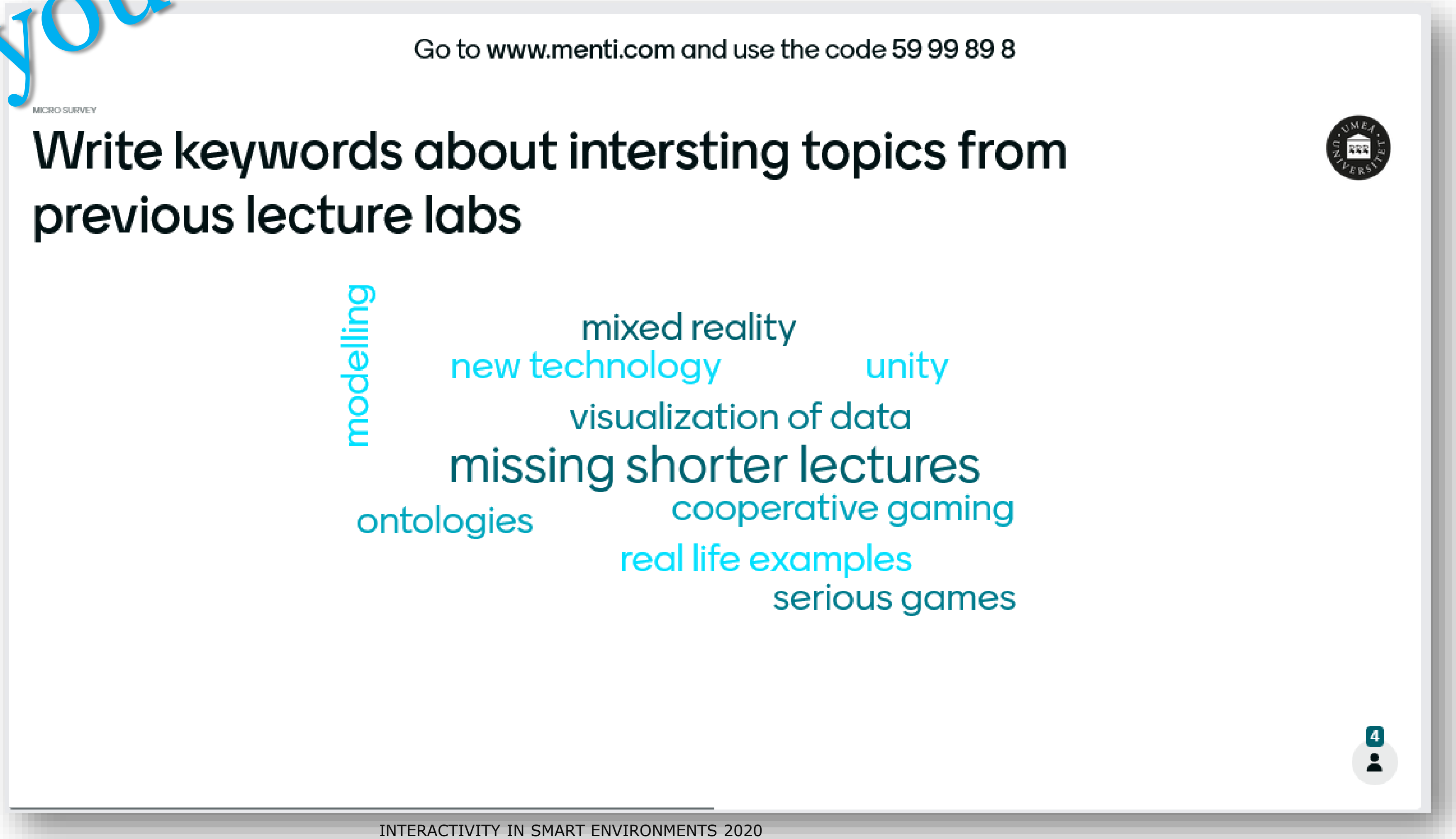
BEFORE START…

- 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

MICRO SURVEY

Write keywords about intersting topics from previous lecture labs

modelling

mixed reality

new technology

unity

visualization of data

missing shorter lectures

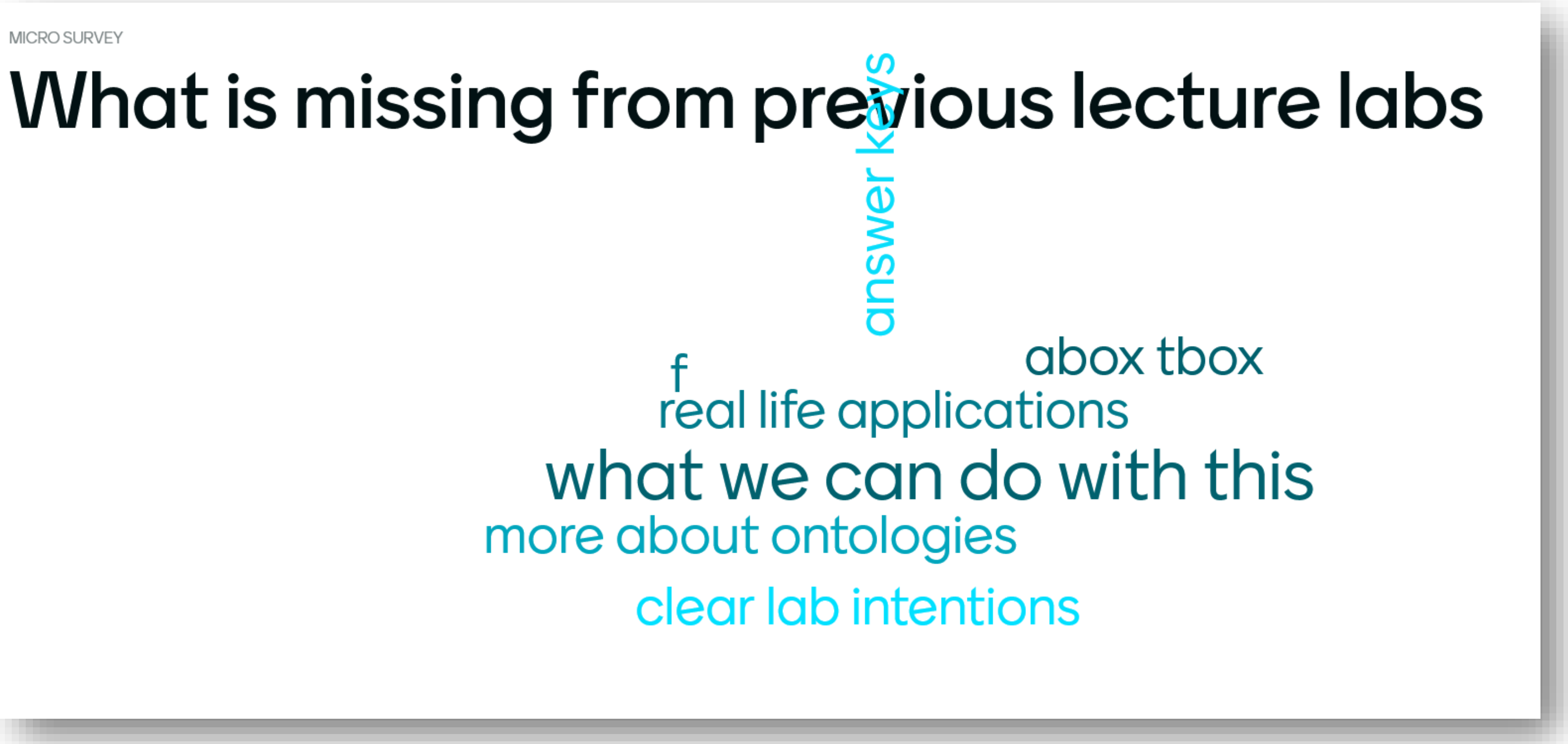
ontologies

cooperative gaming

real life examples

serious games

MICRO SURVEY: ANSWERS



MICRO SURVEY

What is missing from previous lecture labs

answer keys

abox tbox

f

real life applications

what we can do with this

more about ontologies

clear lab intentions

Thank you again!

QUICK RECAP ABOUT ONTOLOGIES

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UNFAIR ONTOLOGY VS DATABASE SCHEME

- Ontology:
  - Focus: meaning (shared understanding)
  - Defines a set of concepts and relationships
  - Represents content and structure
  - Core purpose: agents communication, interoperability, search, etc.
- Database scheme
  - Focus: Data
  - Defines structure of database
  - 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

Ontologies and databases. Ian Horrocks. Information Systems Group. Oxford University Computing Laboratory

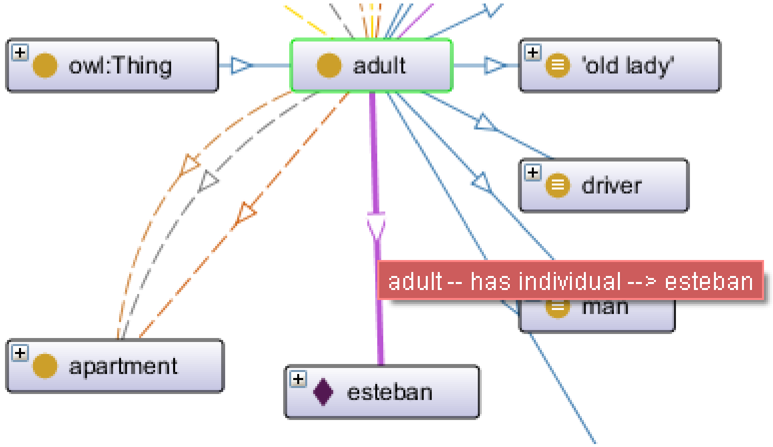
UNFAIR ONTOLOGY VS DATABASE SCHEME

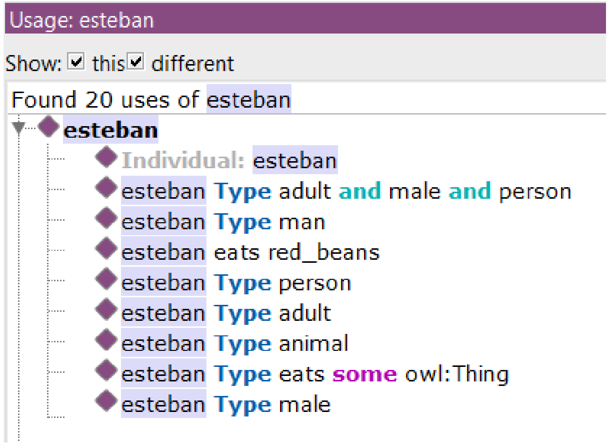
Recap

Database:	**Ontology:**
• Entities	• Classes
• Attributes, relations	• Properties
• Constraints	• Axioms
• No taxonomy	• Taxonomy is backbone
• Constraints for integrity, foreign key	• Constraints for meaning, consistency and integrity

A-BOX T-BOX

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



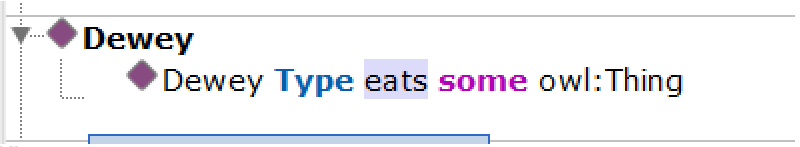

Usage: esteban

Show: ☑ this ☑ different

Found 20 uses of esteban

- esteban
    - Individual: esteban
    - esteban **Type** adult **and** male **and** person
    - esteban **Type** man
    - esteban eats red_beans
    - esteban **Type** person
    - esteban **Type** adult
    - esteban **Type** animal
    - esteban **Type** eats **some** owl:Thing
    - esteban **Type** male

- T-Box relates oriented to semantics relationships
    - To define specific relations among classes: “Dewey **eats**”


- **Dewey**
    - Dewey **Type** eats **some** owl:Thing

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PLANNING TOOLS

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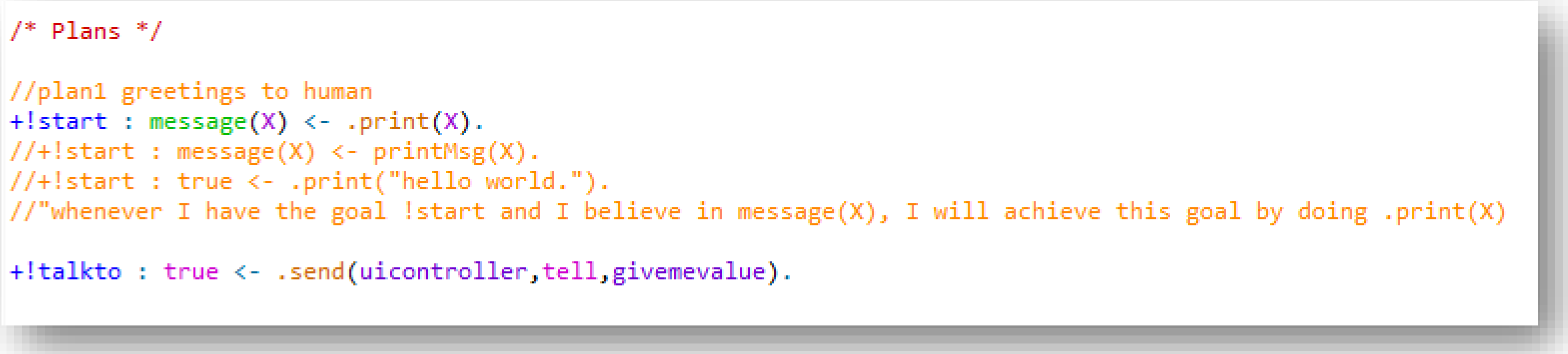
PLANNING PLATFORMS

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

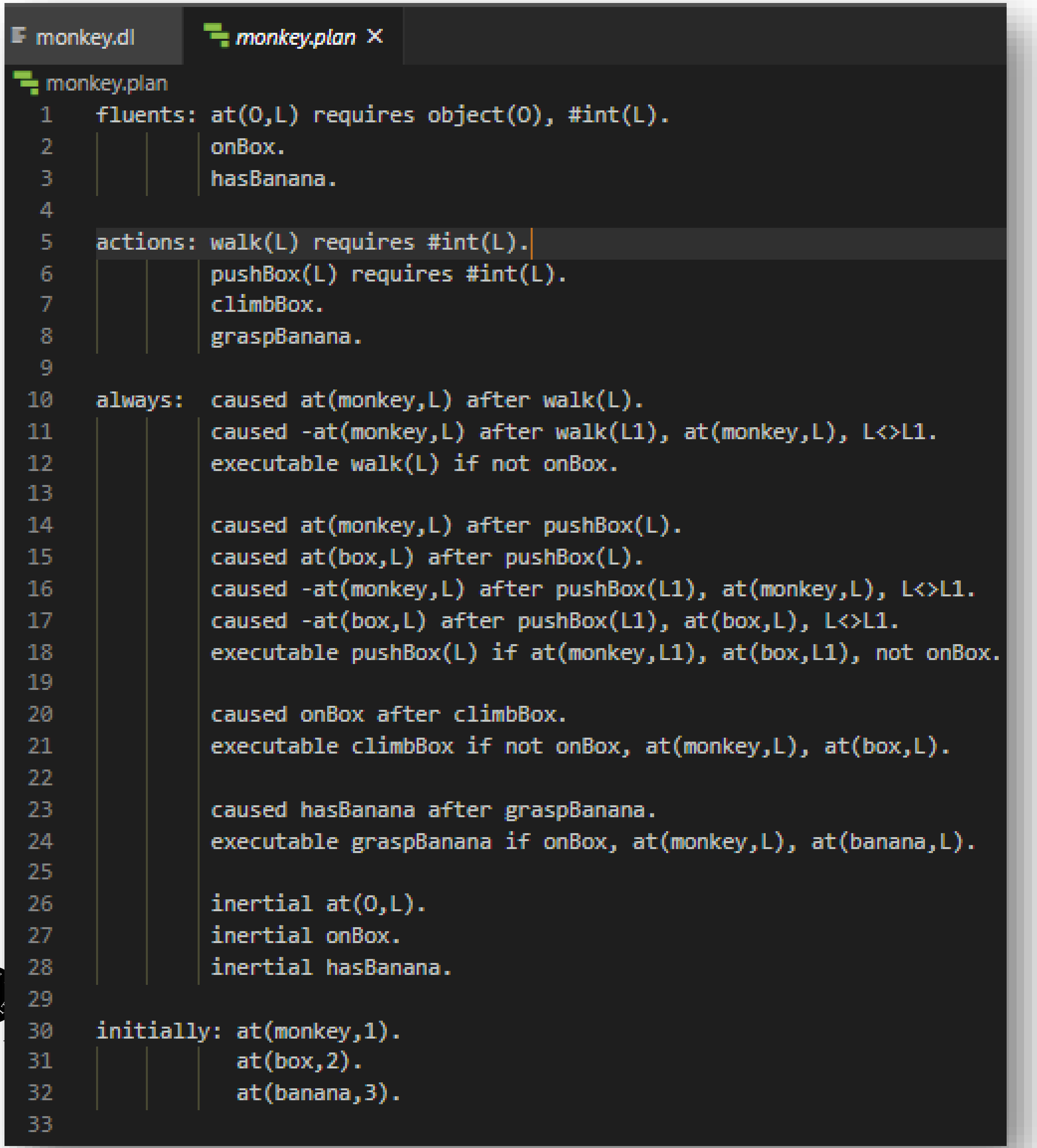


```
/* Plans */

//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 <- .send(uicontroller,tell,givemevalue).
```

PLANNING PLATFORMS

1. DLV system
   URL: http://www.dlvsystem.com/
   Language: Disjunctive logic programs + Java

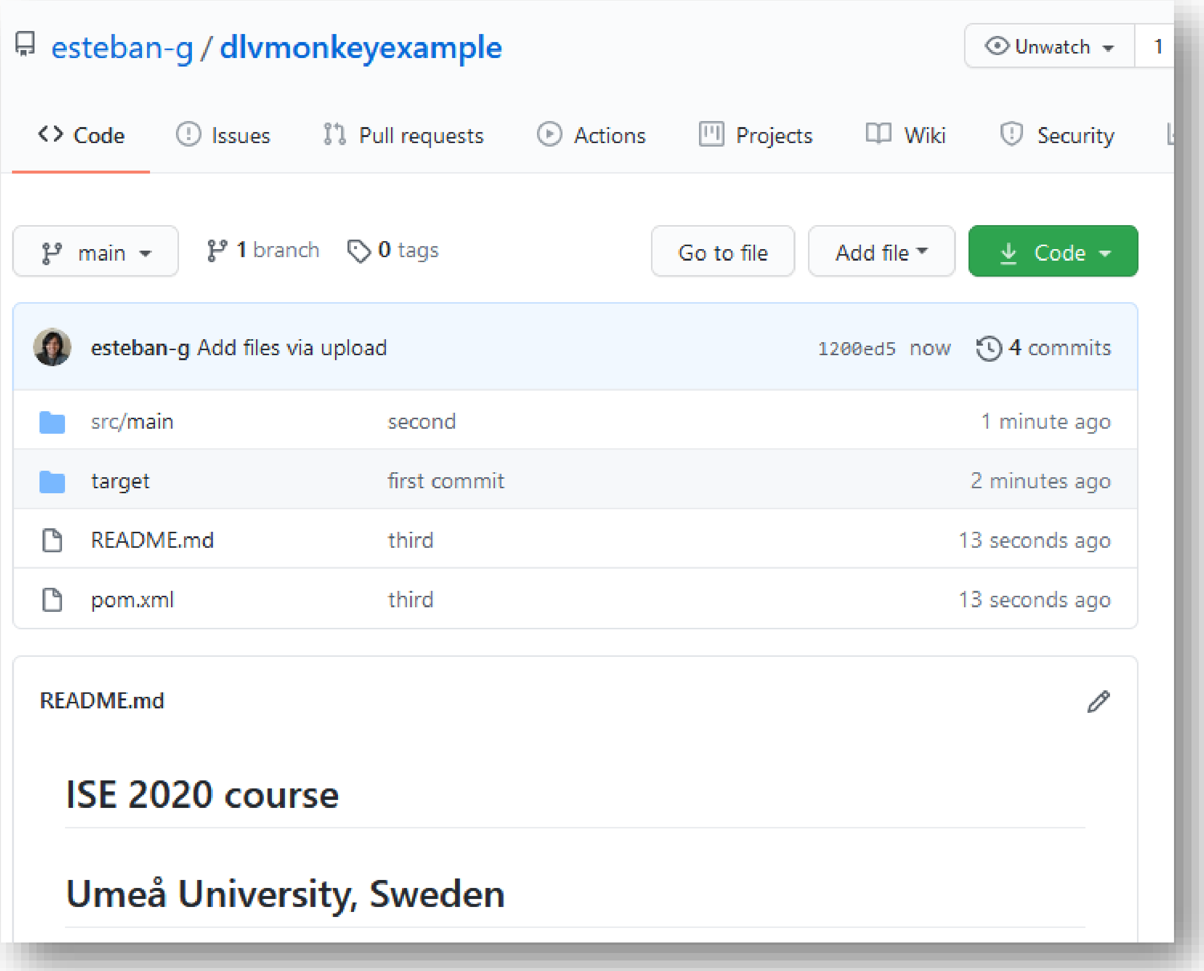
Demo: DLV system monkey banana



```
fluents: at(O,L) requires object(O), #int(L).
         onBox.
         hasBanana.

actions: walk(L) requires #int(L).
         pushBox(L) requires #int(L).
         climbBox.
         graspBanana.

always:  caused at(monkey,L) after walk(L).
         caused -at(monkey,L) after walk(L1), at(monkey,L), L<>L1.
         executable walk(L) if not onBox.

         caused at(monkey,L) after pushBox(L).
         caused at(box,L) after pushBox(L).
         caused -at(monkey,L) after pushBox(L1), at(monkey,L), L<>L1.
         caused -at(box,L) after pushBox(L1), at(box,L), L<>L1.
         executable pushBox(L) if at(monkey,L1), at(box,L1), not onBox.

         caused onBox after climbBox.
         executable climbBox if not onBox, at(monkey,L), at(box,L).

         caused hasBanana after graspBanana.
         executable graspBanana if onBox, at(monkey,L), at(banana,L).

         inertial at(O,L).
         inertial onBox.
         inertial hasBanana.

initially: at(monkey,1).
           at(box,2).
           at(banana,3).
```

PLANNING PLATFORMS

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



esteban-g / dlvmonkeyexample

esteban-g Add files via upload 1200ed5 now 4 commits

src/main	second	1 minute ago
target	first commit	2 minutes ago
README.md	third	13 seconds ago
pom.xml	third	13 seconds ago

README.md

ISE 2020 course

Umeå University, Sweden

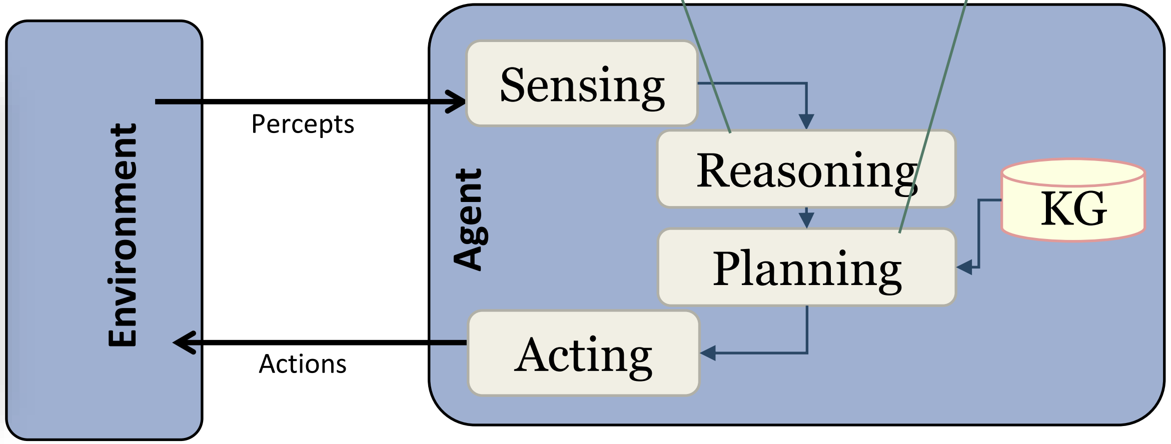
REASONING + PLANNING

Modular-based platform/agent

For example using SWRL (Java/Py)

For example with DLV + Java

https://hubs.mozilla.com/



PROJECT MANAGEMENT

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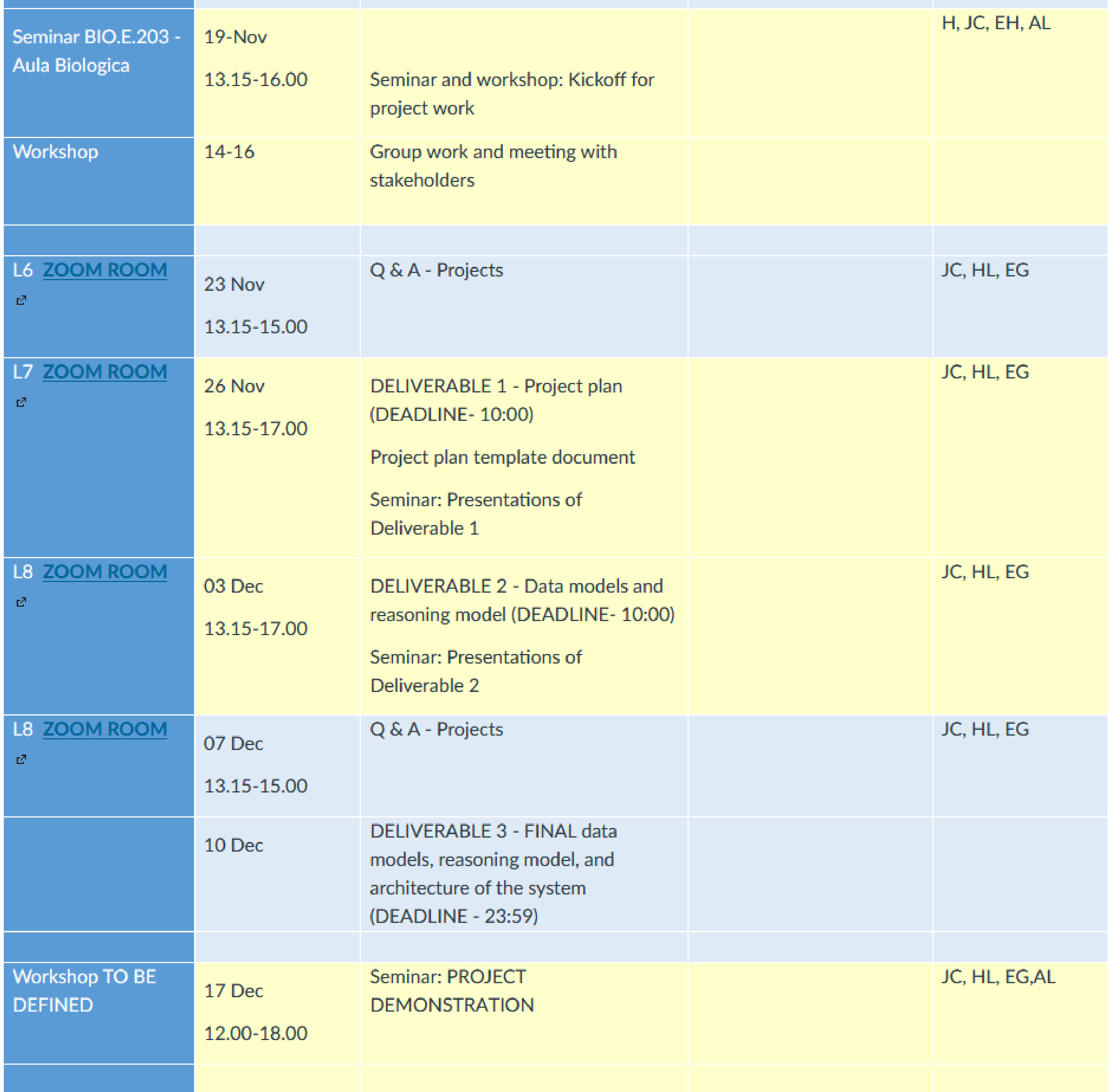
PROJECT MANAGEMENT

- 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



Seminar BIO.E.203 - Aula Biologica	19-Nov 13.15-16.00	Seminar and workshop: Kickoff for project work		H, JC, EH, AL
Workshop	14-16	Group work and meeting with stakeholders		
L6 ZOOM ROOM	23 Nov 13.15-15.00	Q & A - Projects		JC, HL, EG
L7 ZOOM ROOM	26 Nov 13.15-17.00	DELIVERABLE 1 - Project plan (DEADLINE- 10:00) Project plan template document Seminar: Presentations of Deliverable 1		JC, HL, EG
L8 ZOOM ROOM	03 Dec 13.15-17.00	DELIVERABLE 2 - Data models and reasoning model (DEADLINE- 10:00) Seminar: Presentations of Deliverable 2		JC, HL, EG
L8 ZOOM ROOM	07 Dec 13.15-15.00	Q & A - Projects		JC, HL, EG
	10 Dec	DELIVERABLE 3 - FINAL data models, reasoning model, and architecture of the system (DEADLINE - 23:59)		
Workshop TO BE DEFINED	17 Dec 12.00-18.00	Seminar: PROJECT DEMONSTRATION		JC, HL, EG,AL

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THANK YOU