

# Communicative Interaction

(CI: Communicatieve Interactie)

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## Assignment 4: Towards a knowledgeable agent - Step 1: The knowledge

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### Assignment 4 - What to do?

1. Construct a knowledge base about animals in a zoo (e.g. Artis, Amsterdam). Focus mainly on declarative knowledge. Represent each knowledge item using dedicated predicates with e.g. 2 arguments:  
relation\_name( ConceptA, ConceptB ).

This predicate can be used to capture many kinds of relationships between two concepts. In this assignment you have to use at least the following relationships (but try to invent more relationships):

subtype, e.g. gorilla is a monkey: subtype\_of(gorilla, monkey) or monkey is a mammal: subtype(monkey, mammal).

features or attributes, e.g. Gorilla has colour black: has\_colour(gorilla, black) or Gorilla has length one meter:

has\_length(gorilla, one\_meter).

structural, e.g. Gorilla cage is left of lion cage: left\_of(gorilla\_cage, lion\_cage).

The initial database should contain at least 30 items. You may want to use predicates with 3 arguments (think about what is best!)

E.g. attribute/value relationships can be represented using a special predicate:

has\_attribute( Concept, Attribute, Value ), e.g. attribute(gorilla, has\_colour, black).

2. Next the goal is to add smart inferencing, so that the agent 'knows' more than just the facts defined above.  
One example should be a procedure that implements *inheritance* over subtype relations. This means that attribute/value relationships defined for a certain concept also apply to the subtypes of that concept. Thus if a monkey has black fur, and a gorilla is a monkey, then this gorilla also has black fur.  
The second procedure should perform inferences about the layout and structural appearance of the zoo. E.g. that all the birds are 'indoors' (because the agent can infer that each individual bird is indoors and therefore all birds are indoors, thus, 'IF a feature applies to each individual, THEN it applies to all', etc).  
The third class of procedures is up to you to decide upon.  
Notice that there are many inferences that you can make by using a particular kind of relationship, particularly the 'subtype' relationship.

3. Construct a procedure that verifies the truth of expressions. Expressions use the formats created as discussion above. The user interaction can be kept simple, that is: clauses may be typed directly in Prolog. Make sure that the previously defined procedures are used for the verification.

### Assignment 4 - What to submit?

- A drawing that depicts the knowledge based
- The program code (including text that sufficiently explains it)
- Demonstrate your software during the practical class on Thursday morning (you have two opportunities).

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