

- NH To exemplify the core concepts of GOAL, we will employ the
 - Blocks World consists of N numbered blocks b1...bN and
 - Blocks can be stacked over oneanother by using move(X, Y) actions. E.g., move(b1, b2) would move block *b*1 on top of *b*2 if both blocks are clear.
 - A configuration in the Blocks World can be indentified with a set of facts of the form on(X, Y). For each block X, the agent perceives one fact on(X, Y).
 - Laws of Blocks World: At most one block is directly on top of another, a block cannot be directly on top of more than two
 - Problem: Given some initial configuration of the blocks, the agent's task is to perform a sequence of stacking actions such that a configuration is achieved which satisfies the

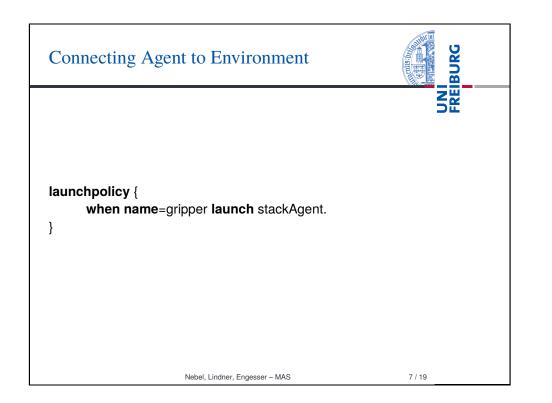
Initializing BlocksWorld Environment

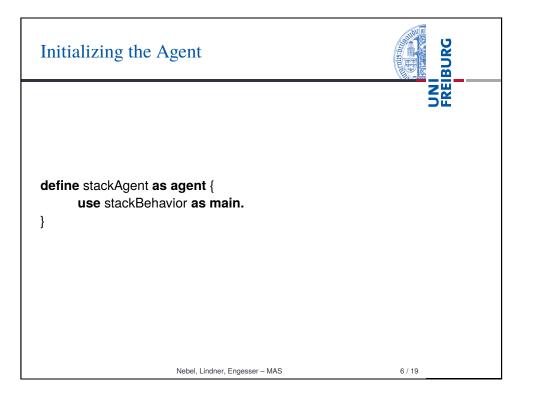


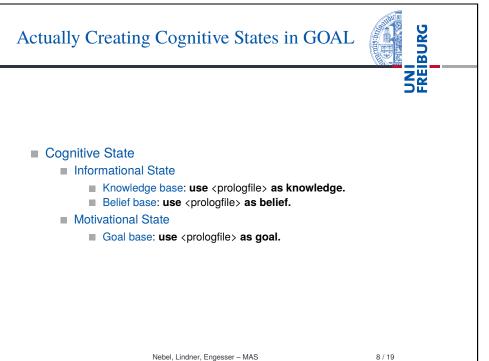
- use "blocksworld-1.2.0.jar" as environment with start = [2, 3, 0, 5, 0, 7, 0].
- The environment is implemented as a Java program.
- The start parameter reads: b1 is on top of b2, b2 is on top of b3, b3 is on the table etc.

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Domain Knowledge



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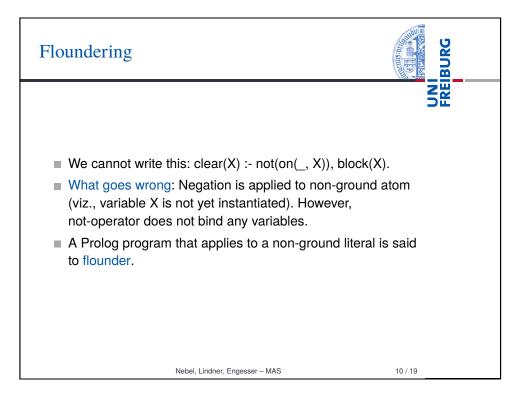
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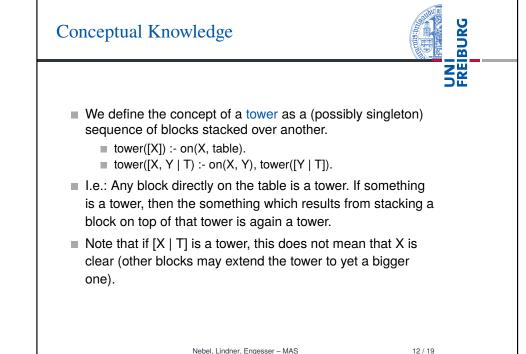
- We define the predicate block/1 to make explicit that everything that is on top of something is a block:
 - \blacksquare block(X) :- on(X,).
 - (A block which is not on top of another block is on the table. Hence, every block will qualify as a block according to this rule.)
- We define the predicate clear/1 to identify those entities which have no other block on top of them, i.e., those on top of which other blocks can be stacked. Any block can always be put on the table, therefore, the table also is clear according to this reading.
 - clear(table).
 - clear(X) :- block(X), not(on(, X)).
- As on/2 is only used in bodies, we have to specify on/2 as dynamic:
 - :-dynamic on/2.

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Closed-World Assumption

- Negation-as-Failure yields that everything not stated is assumed to be false. E.g., the absence of information about any blocks on, say, block 1 yields the inference that block 1 is clear.
- Cotrast this with entailment you know from e.g. propositional or modal logics.





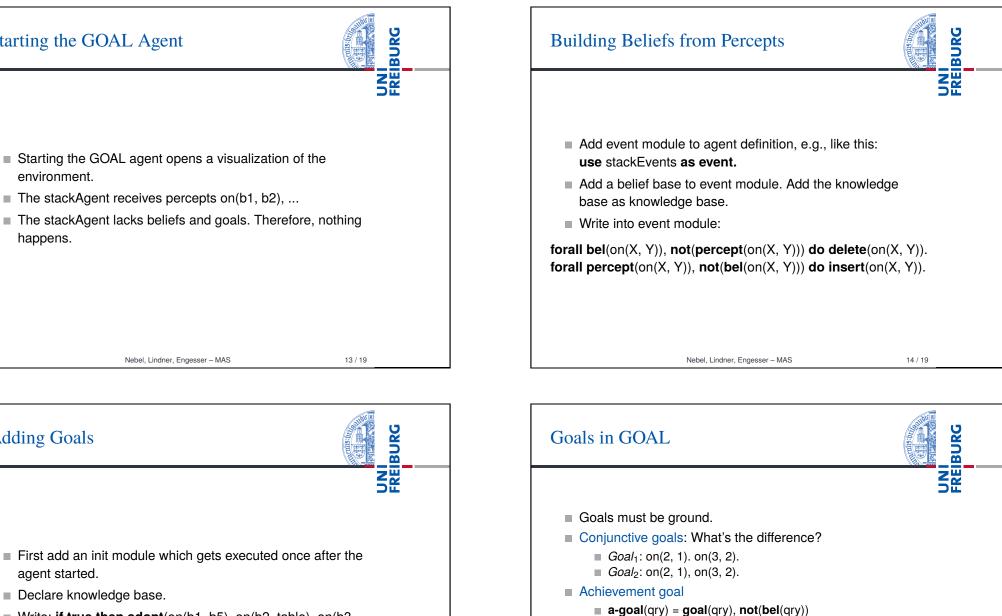
Starting the GOAL Agent

environment.

happens.

Adding Goals

agent started.



Sub-Goals Achieved:

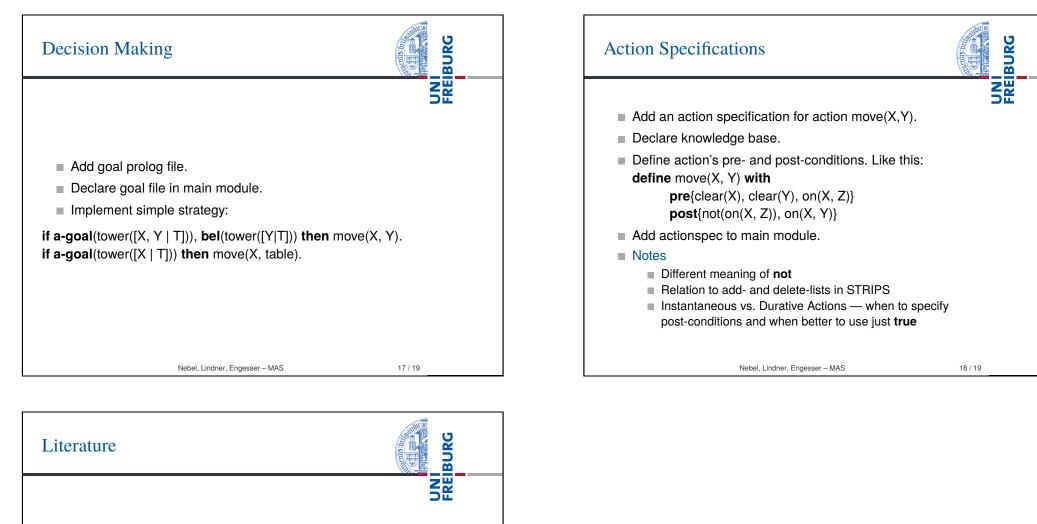
Blind commitment

goal-a(qry) = **goal**(qry), **bel**(qry)

Explicit drop-action, adopt action

Write: if true then adopt(on(b1, b5), on(b2, table), on(b3, table), on(b4, b3), on(b5, b2), on(b6, b4), on(b7, table)).

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Hindriks, K. V., Programming Cognitive Agents in GOAL, Technic Manual, 2017, https://goalapl.atlassian.net/wiki/.	al
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