Situation Calculus
Assignment I
WS 2017/2018

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Organizational Issues

• Dates
  – 05.10.2017 8:45-11:00 (HS i12) lecture and first assignment
  – 12.10.2017 8:45-11:00 (HS i12) lecture and programming assignment
  – 11.10.2017 18:00-18:45 (HS i11) practice
  – 18.10.2017 18:00-18:45 (HS i11) practice and solution for first assignment
  – 16.10.2017 12:00 (office IST) submission first assignment
  – 09.11.2016 23:59 (group SVN) submission programming assignment
Packet Delivery Robot

https://www.youtube.com/watch?v=qE8wfe8-fUY
Assignment

- model the **domain** of a packet delivery robot
- fetches and delivers **packets** in a city
- **initial**: robot is at position A, there are delivery requests for packets
- **goal**: serve all delivery requests
The Robot’s World

existing requests:
- packet 1 to location C
- packet 2 to location A
- packet 3 to location I
Packet Delivery Robot Domain

- **entities:**
  - robot - is able to take actions
  - packets – can be transported by the robot
  - locations – places where the robot and the packets are located

- **actions:**
  - only the robot is able to execute actions
  - the robot is able to move to an adjunct location
  - the robot is able to load a packet from its current location
  - the robot is able to unload a packet to its current location
  - the robot can maximal transport two packets at a time
Task 1 – Model the Rescue Robot Domain

• model the domain in the Situation Calculus
• all definitions have to be expressed in proper First Order Logic
• define constants, predicates, fluents and actions if necessary
• define for all actions proper preconditions
• define for all fluents successor state axioms
• define the initial database $D_{S_0}$ for the situation shown on slide 5
• hints
  • assume a logical theory for natural numbers and addition/subtraction/comparison
Task 2 - Regression

• use your basis action theory to show if the following properties hold or not using regression:

a) it is possible to move to I if the robot moved to D in the initial situation
b) the robot is at location B after the robot moved to B in the initial situation and then loaded packet 1

• provide the proper formal queries!
Submission

• on paper with student’s name and id
• multiple sheets have to be stapled
• solve the assignment individually – no group work
• submission box in front of IST office
• deadline: 16.10.2017, 12:00 – firm!

• discussion of the solution during 2. practice hour
• selected students will be asked to explain their solution on the blackboard
• selected students not present or not able to explain will get no points
# Credits

<table>
<thead>
<tr>
<th>Task</th>
<th>Points</th>
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<tbody>
<tr>
<td>axiomatization of the domain</td>
<td>25</td>
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<tr>
<td>regression</td>
<td>25</td>
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<td>programming assignment</td>
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<td><strong>Sum</strong></td>
<td><strong>100</strong></td>
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Questions ?