****

TDDC17

Artificial Intelligence

Lab 4

Cristopher Dahlström [crida498@student.liu.se](mailto:crida498@student.liu.se)

Jonathan Lundholm [jonlu159@student.liu.se](mailto:jonlu159@student.liu.se)

# Task 1

The chosen domain is: Shakey’s world.

The following assumptions for the world have been made:

* There is always one, and only one, light switch in each room
* Shakey kan push a box through a door without entering the room himself
* There is only one Shakey

## Objects and predicates

|  |  |  |
| --- | --- | --- |
| Objects and predicates | | Comment |
| ITEM | ?item | Small item that can be picked up |
| GRIP | ?grip | Griphook used to pickup items with |
| ROOM | ?room | Location |
| DOOR | ?room1 ?room2 | Connects two locations |
| WIDE-DOOR | ?room1 ?room2 | Connects two locations; can push boxes through it |
| BOX | ?box | Pushable object, required for turning lights on |
| in-room | ?room | Defines which room Shakey is in |
| box-location | ?room ?box | Defines the locations of a specific box |
| is-lit | ?room | Defines whether a room is lit |
| gripped-item | ?item ?grip | Defines whether an item is gripped |
| item-location | ?item ?room | Defines the location of an item |
| gripped | ?grip |  |

## Operators

|  |  |  |
| --- | --- | --- |
| Action | Properties | Comment |
| move | ?from ?to | Moves Shakey from one room to another |
| move\_box | ?box ?from ?to | Moves a specific box from one room to another |
| turn\_light\_on | ?room ?box | Turns the lights on in a room if there is a box to stand on |
| turn\_light\_off | ?room ?box | Turns the lights off in a room if there is a box to stand on |
| grip | ?room ?item ?grip | Grips an item with a gripper |
| drop | ?room ?item ?grip | Drops an item with a gripper |

All operators except for switching the light on and off are self-explanatory. The prerequisite for being able to turn lights on or off is that Shakey stands on a box, but since switching the lights on or off always includes standing on a box, this functionality have been merged into the turn\_light\_on and turn\_light\_off actions.

# Task 2

The methodology for testing the performance is the following.

The initial test was done with a fairly small domain and set of goals that checks whether all different actions Shakey can perform are carried out correctly; this domain is then copied and connected.

For the second test another identical domain was added, with the same properties, connected to the already existing domains with a door; these two domains combine into a bigger domain with higher complexity. This procedure is repeated, thus forming our test-suite.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Solver | Domain complexity | Soft steps | Hard steps | Time |
| FF | 1x |  |  |  |
| FF | 2x |  |  |  |
| FF | 4x |  |  |  |
| FF | 8x |  |  |  |
| FF | 16x |  |  |  |
| IPP | 1x |  |  |  |
| IPP | 2x |  |  |  |
| IPP | 4x |  |  |  |
| IPP | 8x |  |  |  |
| IPP | 16x |  |  |  |