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Intelligent Systems: Lab Work 1
CLIPS [1]

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[1] To display this document correctly you must have Acrobat Reader v. 7.0 or higher

Índice

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1. Introduction

- The aim of this lab work is to design, analyse and assess from temporal and space viewpoints a rule-based system to solve a given problem.

- Material available at poliformaT:

  1. Tutorial on CLIPS IDE with a couple of solved toy problems.
  2. Solution to the `8-puzzle`: source code and documentation
  3. Problem to solve: bulb robot
  4. User and reference manuals

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2. Schedule

- Session 1: CLIPS IDE and puzzle problem
- Session 2: Bulb robot problem and discussion of RBS design
- Session 3-4: Implementation and debugging
- Session 5: Exam

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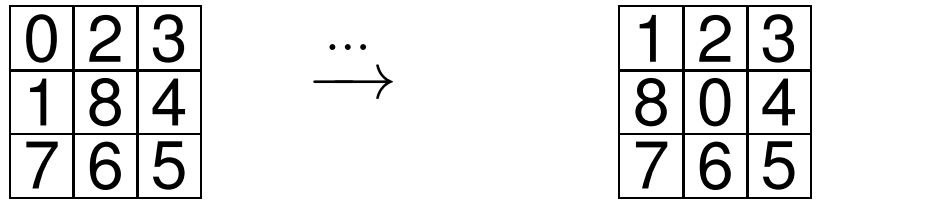
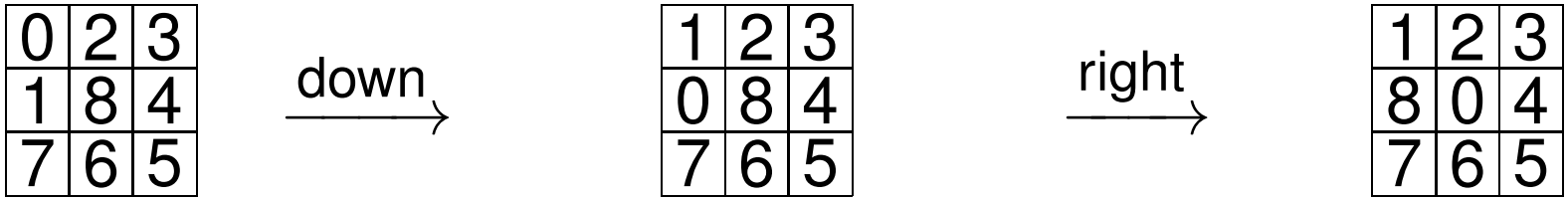
3. Example: 8-puzzle problem

Given an initial state (fact), we must reach the objective shown below by moving the empty tile (tile 0): right, left, down and up.



Initial state Objective state

Solution to the previous initial state:



Initial state Intermediate state Objective state

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Simple RBS for 8-puzzle: puzzle.clp

```
(deffacts fini (puzzle 0 2 3 1 8 4 7 6 5))

(defrule left
(puzzle $?x ?y 0 $?z)
(test (<> (length$ $?x) 2))
(test (<> (length$ $?x) 5)) =>
(assert (puzzle $?x 0 ?y $?z)))

(defrule right
(puzzle $?x 0 ?y $?z)
(test (<> (length$ $?x) 2))
(test (<> (length$ $?x) 5)) =>
(assert (puzzle $?x ?y 0 $?z)))

(defrule up
(puzzle $?x ?a ?b ?c 0 $?y) =>
(assert (puzzle $?x 0 ?b ?c ?a $?y)))

(defrule down
(puzzle $?x 0 ?a ?b ?c $?z) =>
(assert (puzzle $?x ?c ?a ?b 0 $?z)))

(defrule objective
(puzzle 1 2 3 8 0 4 7 6 5) =>
(printout t "Solution found!" crlf)
(halt))
```


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Tracing the 8-puzzle problem

```
(load puzzle.clp)
(set-strategy breadth)
(reset)
(run 1)
...
(run 1)
(run)

(set-strategy depth)
(reset)
(run)   ;; Ctrl + . halts the inference process

(clear) ;; Clear memory before loading a new RBS
```


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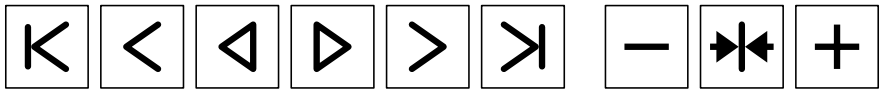
Breadth-search trace



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4. Next steps

1. Go to the PoliformaT folder: *2. SOLVED PROBLEM: PUZZLE*

2. Read and trace extended version of 8-puzzle: *puzanpo.clp*
   - Check documentation: *puzzle.pdf* (breadth/depth search)

3. If you have time left, start to work on the problem to solve:
   - PoliformaT folder: *3. PROBLEM TO SOLVE: BULB ROBOT*

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