



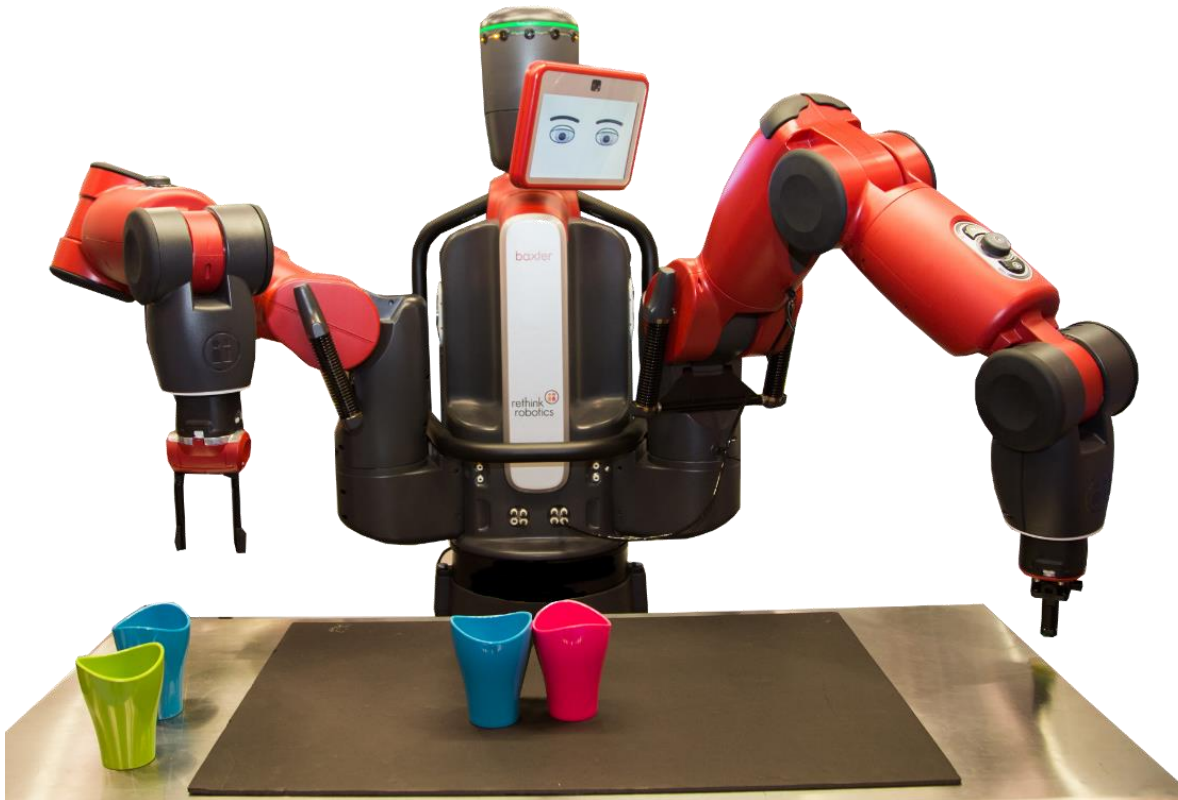
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Artificial Intelligence

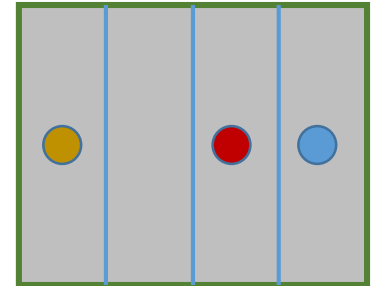
Exercises: Classical Planning - STRIPS & PDDL Solutions

Francesco Riccio
email: riccio@diag.uniroma1.it

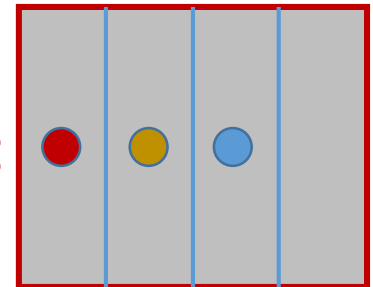
One arm robot problem



I:



G:



One arm robot problem

;; The One arm robot problem (domain file)

```
(define (domain arm-domain)
  (:requirements :strips)
  (:predicates (at ?x ?y) (clear ?x) (pos ?x) (cup ?x))

  (:action move
    :parameters (?cup ?from ?to)
    :precondition (and
      (cup ?cup)
      (pos ?from)
      (pos ?to)
      (at ?cup ?from) (clear ?to))

    :effect (and (at ?cup ?to) (not (at ?cup ?from))
      (clear ?from) (not (clear ?to))))
  )
```

One arm robot problem

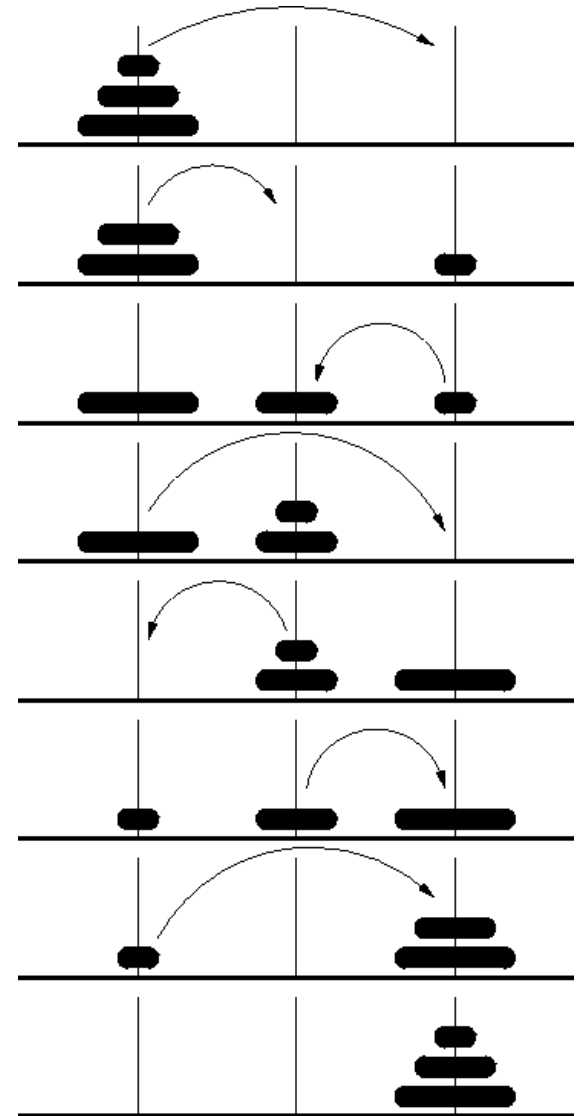
:: The One arm robot problme (problem file)

```
(define (problem hanoi)
  (:domain arm-domain)
  (:objects red blue yellow pos1 pos2 pos3 pos4)
  (:init
    (cup red) (cup blue) (cup yellow)
    (pos pos1) (pos pos2) (pos pos3) (pos pos4)

    (at red pos1) (at blue pos3) (at yellow pos2)
    (clear pos4)
  )
  (:goal (and (at blue pos1) (at red pos2) (at yellow pos3)))
)
```

The Towers of Hanoi problem

Rules for Towers of Hanoi. The goal of the puzzle is to move all the disks from the leftmost peg to the rightmost peg, adhering to the following rules: Move only **one disk at a time**. A **larger disk may not be placed on top of a smaller disk**.



The Towers of Hanoi problem

;; The tower of hanoi problem (domain file)

```
(define (domain hanoi-domain)
  (:requirements :strips)
  (:predicates (disc ?x) (clear ?x) (on ?x ?y) (smaller ?x ?y))

  (:action move
    :parameters (?d ?from ?to)
    :precondition (and (disc ?d) (smaller ?d ?to)
                       (on ?d ?from) (clear ?d) (clear ?to))
    :effect (and (clear ?from) (on ?d ?to)
                 (not (on ?d ?from)) (not (clear ?to))))
  )
)
```

The Towers of Hanoi problem

;; The tower of hanoi problem (problem file)

```
(define (problem hanoi)
  (:domain hanoi-domain)
  (:objects d1 d2 d3 peg1 peg2 peg3)
  (:init (disc d1) (disc d2) (disc d3)
          (on d1 d2) (on d2 d3) (on d1 peg1) (on d2 peg1) (on d3 peg1)

          (clear d1) (clear peg2) (clear peg3)
          (smaller d1 d2) (smaller d1 d3) (smaller d2 d3)

          (smaller d1 peg1) (smaller d1 peg2) (smaller d1 peg3)
          (smaller d2 peg1) (smaller d2 peg2) (smaller d2 peg3)
          (smaller d3 peg1) (smaller d3 peg2) (smaller d3 peg3)
          )
  ; (:goal (and (on d1 peg2)))
  ; (:goal (and (on d1 d2) (on d2 peg2)))
  (:goal (and (on d1 d2) (on d2 d3) (on d3 peg2)))
)
```