

TD 2 Planning

Exercise 1:

Let's consider the world of blocks represented by the following two states, such that A, B, and C are blocks and D is a pyramid:

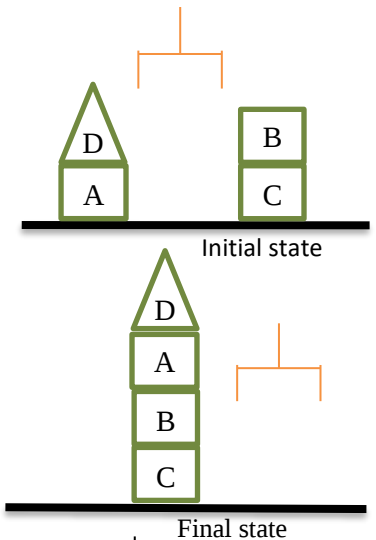
The blocks and the pyramid can be on the table or on the top of another block

There cannot be a block on top of the pyramid.

The robot hand can move only one object (block or pyramid) at a time.

Questions:

1. Give the initial and final state represented in the figure, using logical predicates (first order logic)?
2. Give the actions that can resolve this problem?
3. Give the sequence of actions that lead from the initial state to the final state.



Exercise 2:

The **Tower of Hanoi** is a mathematical game or puzzle consisting of three rods and three disks of various diameters, which can slide onto any tower. The puzzle begins with the disks stacked on the first tower in order of decreasing size, the smallest at the top. The objective of the puzzle is to move the entire stack to the third tower, obeying the following rules:

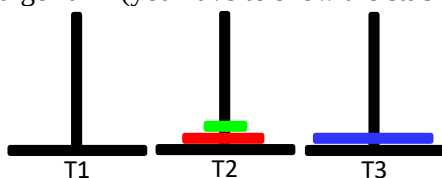
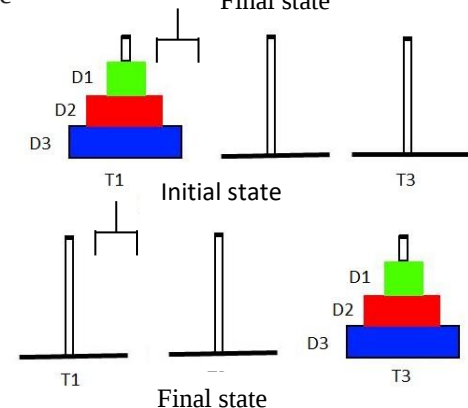
1. Only one disk may be moved at a time.
2. Each move consists of taking the upper disk from one of the stacks and placing it on top of another stack or on an empty tower.
3. No disk may be placed on top of a disk that is smaller than it.

The objective of this exercise is to propose a planner for this problem Using STRIPS, knowing that the objects of these worlds are:

The towers T1, T2 and T3, and the disks D1, D2 and D3.

Questions:

1. Formalize the relationships between the objects of this world using predicate logic (FOL)?
2. Give the initial and final state represented in the figure?
3. Give the actions that can resolve this problem?
4. Give the sequence of actions that lead from the given state to the final state after applying the goal stack planning algorithm (you have to show the stack content in the whole algorithm)?



Exercise 3:

Let's consider the previous exercise where the robot hand needs to move above each tower to perform an action on this tower.

Exercise 4:

Let's consider the previous exercise without the robot hand.