DEPARTMENT *of* COMPUTING
College of Business & Technology
EAST TENNESSEE STATE UNIVERSITY

CSCI 5260 – Artificial Intelligence

Lab 8 – Classical Planning

Overview

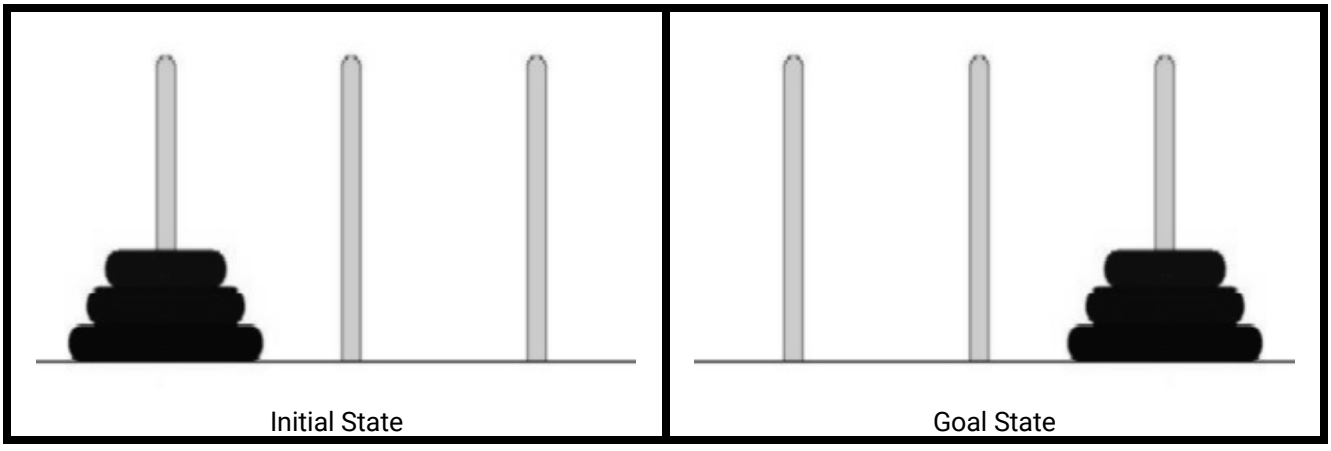
The Towers of Hanoi is a mathematical game. It consists of three pegs, and a number of discs of different sizes which can slot onto any peg. The puzzle starts with the discs neatly stacked in order of size on one peg, smallest at the top, thus making a conical shape.

The object of the game is to move the entire stack to another peg, obeying the following rules:

a) Only one disc may be moved at a time.
b) A disc can only be placed onto a larger disc (it doesn't have to be the adjacent size, though: the smallest disc may sit directly on the largest disc).

Step 1 – PDDL

Write the Towers of Hanoi domain in PDDL using the following methods. For this example, we have three discs as pictured. Add your PDDL code into the Lab 8 Word Document.



Initial State | Goal State

- Elements:
  - T1, T2, T3 – The three towers
  - D1, D2, D3 – The three discs, in order of increasing size
- Predicates:
  - *clear(X)* which is true if tower X is empty
  - *on(A, B or Y)* which is true if disc A is on top of disc B or tower Y
  - *smaller(A, B)* which is true if disc A is smaller than disc B
- Action:

- *move(A, B/X, C/Y)* which relocates disc A from disc B or tower X to disc C or tower Y. Note *empty* would indicate the first peg that is empty.

Step 2 – Solution

Using your PDDL definition, generate a solution. You may use http://editor.planning.domains to solve the problem. Paste your solution into the Lab8 Word Document.

Step 3 – Plan Graph

Draw the first four levels (two steps past S_0 and two actions past S_0) of the plan graph for the problem.

Step 4 – Heuristic

Given the information you have just devised, can you describe a heuristic that would help you solve the problem? If you say "no," you need to justify why. If you say "yes," describe the heuristic.

Submission

Create a Word Document named **Lab8.docx** with your responses. If you write it out on paper rather than electronically, pictures or scans are fine.

Submit to the Lab 8 dropbox at or before Monday, March 29, 2021 by 11:59 PM.

Grading

A letter grade will be assigned for each response. The letter grades are based on both correctness and the adequacy of answers. Points are assigned as follows:

		A	B	C	D	F	Zero
		Excellent	Above Average	Average	Below Average	Poor	No Attempt
		10	8	6	4	2	0
Towers of Hanoi in PDDL	Step 1						
	Step 2						
	Step 3						
	Step 4						