

Homework 0

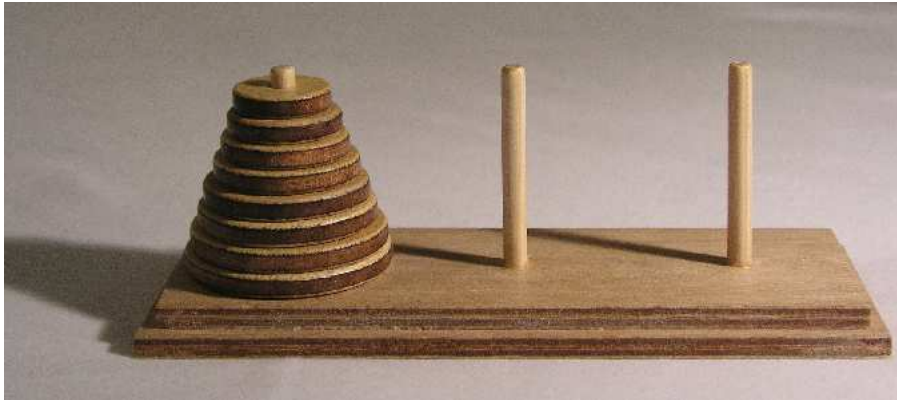
Warmup

Due: 6:00pm on 09/16/09

Problem 0.1

Turn in your collaboration policy to a TA on hours, or to Yuri's office (CIT 409).

Problem 0.2



The Tower of Hanoi puzzle was invented in 1883. You are given three pegs and three disks which are initially stacked in decreasing size on the left peg. The object of the puzzle is to recreate the stack on the right peg while observing two restrictions: you can only move one disk at a time, and a larger disk can never be placed on top of a smaller disk.

- What are the possible states after 2 moves? after 3 moves?
- What is the optimal (i.e. fewest number of moves) solution?
- Argue that your solution is optimal?
- Are there other optimal solutions (i.e. same number as moves as your first solution)?
- Extra Credit:* It is said that only a god can solve the thirty-four disk, three peg Towers of Hanoi puzzle. Given one second per move, how long would it take you complete the puzzle?

Problem 0.3

A new disease has been discovered, but the test for it, while accurate, is very expensive. A doctor is trying to determine if people have the disease by only looking at a few symptoms. He

has data from his last few patients who have taken the expensive test. Here are the results:

	<i>Cough</i>	<i>TummyAche</i>	<i>SoreThroat</i>	<i>Chills</i>	<i>HasDisease</i>
<i>PatientA</i>	<i>no</i>	<i>no</i>	<i>yes</i>	<i>yes</i>	<i>no</i>
<i>PatientB</i>	<i>yes</i>	<i>yes</i>	<i>no</i>	<i>no</i>	<i>no</i>
<i>PatientC</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>no</i>	<i>yes</i>
<i>PatientD</i>	<i>no</i>	<i>no</i>	<i>yes</i>	<i>no</i>	<i>no</i>
<i>PatientE</i>	<i>no</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>

Now Patient F walks into the doctor's office and has the following symptoms:

	<i>Cough</i>	<i>TummyAche</i>	<i>SoreThroat</i>	<i>Chills</i>
<i>PatientF</i>	<i>no</i>	<i>yes</i>	<i>yes</i>	<i>no</i>

Do you think Patient F has the disease? why? (Hint: Your answer should be more than one word long)

Problem 0.4

Matt only has three dollars but is determined to buy lunch on Thayer street. Yuri has four dollars and loves to gamble. Matt challenges Yuri to a simple game. They agree to flip a fair coin. If it's heads, Matt gives Yuri a dollar. If it's tails, Yuri gives Matt a dollar. They decide to stop either when one person has all seven dollars. What is the probability that Matt takes home seven dollars?

Problem 0.5

Your first project will be to create a program to solve puzzles of a nature similar to this game: <http://www.miniclip.com/games/bloxorz/>. The objective of the game is to drop the 1x2x1 block through the hole in the middle of the stage without falling off of the sides. Obstacles, such as bridges triggered by switches, may also lie between you and your goal.

Try solving the first two levels. Did you find a path to the goal in the fewest number of moves? How did you go about finding a path? Did you use a systematic or a more random approach? Please turn in the passcode for level 3.