

CS 461

Program 3 – logic programming

Due November 5

The Toys Escape! In this project, we will use logic programming to solve a particular puzzle. The Prolog language is designed for this (its name is based on PROgramming LOGic). *Programs must be written in Prolog to receive credit.* Prolog is installed on Flarsheim lab computers and available as a free download for all major operating systems. See <http://www.swi-prolog.org/versions.txt> for more details.

Buzz, Woody, Rex, and Hamm have to escape from Zurg. They merely have to cross one last bridge before they are free. However, the bridge is fragile and can hold at most two of them at the same time. Moreover, to cross the bridge a flashlight is needed to avoid traps and broken parts. The problem is that our friends have only one flashlight with one battery that lasts for only 60 minutes. The toys need different times to cross the bridge (in either direction):

Toy	Time
Buzz	5
Woody	10
Rex	20
Hamm	25

Since there can be only two toys on the bridge at the same time, they cannot cross the bridge all at once. Since they need the flashlight to cross the bridge, whenever two have crossed the bridge, somebody has to go back and bring the flashlight to those toys on the other side that still have to cross the bridge. The problem now is: In which order can the four toys cross the bridge in time (that is, within 60 minutes) to be saved from Zurg?

Write a PROLOG program to find a solution (if one exists) and print it (putting steps into a list would probably be the easiest way). Note that the problem can be modeled as a series of state transitions, beginning with all 4 toys on the left and ending with all 4 toys on the right.

Submit your knowledge base and a transcript of your Prolog console session.