
Assignment 1 (Due: April 29) (10 pts)

1. Tangled Web of Relationships

Formalize family relationships in Prolog to understand and answer queries about the following news item from a July 1922 Zurich newspaper:

I married a widow who had a grown-up daughter. My father, who visited us quite often, fell in love with my step-daughter and married her. Hence, my father became my son-in-law, and my step-daughter became my mother. Some months later, my wife gave birth to a son, who became the brother-in-law of my father as well as my uncle. The wife of my father, that is my step-daughter, also had a son. Thereby, I got a brother, and at the same time, a grandson. My wife is my grandmother, since she is my mother's mother. Hence, I am my wife's husband, and at the same time, her step-grandson; in other words, I am my own grandfather.

[Source: Niklaus Wirth: *Algorithms + Data Structures = Programs*, Prentice-Hall, 1976, pp.170]

2. Puzzled Farmer Needs Your Help

Write a logic program to solve the following puzzle involving state-space search:

A farmer must ferry a wolf, a goat, and a cabbage across a river using a boat that is too small to take more than one of the three across at once. If he leaves the wolf and the goat together, the wolf will eat the goat, and if he leaves the goat with the cabbage, the goat will eat the cabbage. How can he get all three across the river safely?

Hint: Define a state-machine based on the predicate `state/4` that captures which river bank a particular entity is at. (E.g., `state(left,left,right,left)` denotes the state in which the farmer, the wolf, and the cabbage are on the left bank, and the goat is alone on the right bank.)

How to turn in the solution?

Email your well-documented solution file `asg1.pl` to `t.k.prasad@wright.edu`.