

CS355: Programming Paradigms Lab

Lab 8: Prolog

October 21st, 2024

Q1. Write a predicate `myLength(L,N)` capturing the condition that the list `L` contains `N` elements.

Q2. Write a predicate `split(L,N,L1,L2)` that captures the condition that `L1` and `L2` form a split of the list `L`, with the length of `L1` being `N`.

Q3. You would have heard of the towers of Hanoi problem. There are three pegs numbered `a`, `b` and `c`, with disk `a` containing `n` disks and the other two empty. The disks are placed in order with the largest at the bottom. The problem is to shift the disks from peg `a` to peg `b`, taking the help of peg `c` under the constraint that no peg will at any time contain a larger disk on top of a smaller disk. You should write a Prolog predicate `moves(N,A,B,C,L)` that is true if one can move `N` disks from peg `A` to peg `B` using `C` in a series of moves given by `L`. As an example, the goal `moves(3,a,b,c,L)` is satisfiable with `L` as `[to(a,b), to(a,c), to(b,c), to(a,b), to(c,a), to(c,b), to(a,b)]`, where `to(a,b)` means the topmost disk of peg `a` is moved to peg `b`. In your solution, for a satisfiable query, ensure that your program terminates after producing an answer, without waiting for any input and/or saying false at the end.