Lecture 20

GProlog
Example: Hanoi Puzzle

Materials adapted from John Fisher
Example: Hanoi Puzzle

?- move(3, left, right, middle).

Move top disk from left to right
Move top disk from left to center
Move top disk from right to center
Move top disk from left to right
Move top disk from center to left
Move top disk from center to right
Move top disk from left to right

yes

Materials adapted from John Fisher
Example: Hanoi Puzzle

\[
\text{move}(1,X,Y,\_) :- \\
\quad \text{write('Move top disk from '),} \\
\quad \text{write(X),} \\
\quad \text{write(' to '),} \\
\quad \text{write(Y),} \\
\quad \text{nl.}
\]
\[
\text{move}(N,X,Y,Z) :- \\
\quad N>1, \\
\quad \text{M is } N-1, \\
\quad \text{move(M,X,Z,Y),} \\
\quad \text{move}(1,X,Y,\_), \\
\quad \text{move(M,Z,Y,X).}
\]

Materials adapted from John Fisher
Example: Hanoi Puzzle

move(1,X,Y,_) :-
    write('Move top disk from '),
    write(X),
    write(' to '),
    write(Y),
    nl.
move(N,X,Y,Z) :-
    N>1,
    M is N-1,
    move(M,X,Z,Y),
    move(1,X,Y,_),
    move(M,Z,Y,X).

?- move(3, left, right, middle).

Materials adapted from John Fisher
Example: Hanoi Puzzle

move(1, X, Y, _):- 
    write('Move top disk from '), 
    write(X), 
    write(' to '), 
    write(Y), 
    nl. 
move(N, X, Y, Z):- 
    N>1, 
    M is N-1, 
    move(M, X, Z, Y), 
    move(1, X, Y, _), 
    move(M, Z, Y, X).

?- move(3, left, right, left).

Materials adapted from John Fisher
Exercises

?- append([1, 2, 3], [a, b, c], Result).
Result=[1, 2, 3, a, b, c]

?- filter([1, 2, 3, 10, 4, 11, 12, 5], 6, Result).
Result=[10, 11, 12]

?- reverse([1, 2, 3, 4], Result).
Result=[4, 3, 2, 1]

?- permutate([1, 2], Result).
Result=[1, 2];
Result=[2, 1];

Materials adapted from John Fisher