Solution to HW2

Part 1

\[ KB = \{[g,g],[g]\} \]

Part 2

\[ lc(KB,C) ::= lcA(C,\{\},KB). \]

Approach 1: add one conclusion at a time

\[ lcA(C,AC,KB) ::= \text{member}([H|B],KB), \]
\[ \text{all}(B,AC), \]
\[ \text{nonmember}(H,AC), \% \text{alternative: remove } [H|B] \text{ from } KB \]
\[ lcA(C,[H|AC],KB), !. \]
\[ lcA(C,C,\_). \]

Approach 2: do all of \( C_{n+1} \)

\[ lcA(C,AC,KB) ::= \text{setof}(H,c(H,AC,KB),More), \]
\[ \text{append}(More,AC,NA), \]
\[ lcA(C,NA,KB), !. \]
\[ lcA(C,C,\_). \]

\[ c(H,A,KB) ::= \text{member}([H|B],KB), \]
\[ \text{all}(B,A), \]
\[ \text{nonmember}(H,A). \% \text{alternative: remove } [H|B] \text{ from } KB \]

Common to both approaches are

\[ \text{all}([\_],\_). \]
\[ \text{all}([H|T],L) ::= \text{member}(H,L), \text{all}(T,L). \]
\[ \text{nonmember}(\_,[\_]). \]
\[ \text{nonmember}(X,[H|T]) ::= X \neq H, \text{nonmember}(X,T). \]

Part 3

\[ \text{queryRule}([H],KB) ::= \text{query}(H,KB). \]
\[ \text{queryRule}([H,A|T],KB) ::= \text{queryRule}([H|T],[A]|KB). \]