Solutions to last week’s exercises: I

- A program for replacing all occurrences of Element1 in a list with Element2:

  Format: replace(Element1, Element2, List1, List2)

  replace(E1, E2, [], []).  

  replace(E1, E2, [H|T], [E2|L]):-
  E1=H,  
  replace(E1, E2, T, L).

  replace(E1, E2, [H|T], [H|L]):-
  E1 / == H,  
  replace(E1, E2, T, L).
Solutions to last week’s exercises: II

A program for counting the number of elements in a list:

Format: count(List, Count).

count([], 0).

count([_|T], Count):-
count(T, Count1),
Count is Count1 + 1.
Exercises with cut

Consider the following program:

\[
\begin{align*}
\text{marks-to-grade}(N, \text{hd}) &: - N \geq 85. \\
\text{marks-to-grade}(N, \text{d}) &: - N < 85, N \geq 75. \\
\text{marks-to-grade}(N, \text{c}) &: - N < 75, N \geq 65. \\
\text{marks-to-grade}(N, \text{p}) &: - N < 65, N \geq 50. \\
\end{align*}
\]

How and why does this differ from the following program:

\[
\begin{align*}
\text{marks-to-grade}(N, \text{hd}) &: - N \geq 85, !. \\
\text{marks-to-grade}(N, \text{d}) &: - N \geq 75, !. \\
\text{marks-to-grade}(N, \text{c}) &: - N \geq 65, !. \\
\text{marks-to-grade}(N, \text{p}) &: - N \geq 50, !. \\
\end{align*}
\]
More exercises with cut

- Consider the following program:
  
  \[
  \text{max}(X, Y, X) \leftarrow X \geq Y, !. \\
  \text{max}(X, Y, Y).
  \]

  The program has an error. Find out what it is and fix it.

- Cut comes in two forms:
  
  - **Green cut:** These do not change the meaning of the program, but may help make it more efficient. An example involves the reformulated version of \texttt{marks-to-grade} in the previous slide.
  
  - **Red cut:** These actually impact the meaning of the program. Examples are the program above, and the implementation of "Q iff P" from the previous tutorial.
Negation as failure

- Another way to implement "Q iff not P": \( Q : - \ / + (P) \).

- Run the following program

\[
\text{home}(X) : - \ / + (\text{out}(X)). \\
\text{out}(sue).
\]

Now run the following queries:

- Is Sue at home?
- Is John at home?
- Is anyone at home?