Prolog Mini-Exercises

These questions use the Prolog rules in the lecture notes.

1. What are all the answers that Prolog returns for the following goals?

\[
\begin{align*}
X & = [a, b, c]. \\
[X|Xs] & = [a, b, c]. \\
[X, Y] & = [a, b, c]. \\
[X, Y, X] & = [a, Z, Z]. \\
\text{likes(mary,X).} \\
\text{take_before(X,cse312).}
\end{align*}
\]

2. What are all the answers that Prolog returns for the following goals?

\[
\begin{align*}
\text{append([a, b, c], [d], X).} \\
\text{append([1, 2, 3], A, [1, 2, 3, 4, 5, 6]).} \\
\text{append([1, 2, 3], A, [2, 3, 4, 5, 6]).} \\
\text{append(A, B, [1, 2]).} \\
\text{append(A, [3|B], [1, 2, 3, 4, 5, 3, 7, 11]).} \\
\text{member(X, [1, 2, 3, 4]).}
\end{align*}
\]

3. Write a Prolog rule \textit{twins} that succeeds if the second argument is a list containing all the elements of the first list, repeated. For example, \textit{twins([a, b, c], S). succeeds with S=[a, a, b, b, c, c].}

4. Write a Prolog rule to reverse a list.

5. Write a Prolog rule to sum the numbers in a list. (You can assume that the list consists of numbers.)

6. What are all the answers that Prolog returns for the following goals?

\[
\begin{align*}
X & \text{ is } 10 \times 5, \ Y & \text{ is } X+2. \\
X & = 10 \times 5, \ Y & = X+2. \\
X & \text{ is } 10 \times 5, \ Y & = X+2.
\end{align*}
\]