Write Prolog programs that define the following predicates. Your programs should ensure that backtracking does not produce spurious alternative solutions.

(a) The \textit{n}th element of a list: \texttt{nth(X,N,L)} instantiates \texttt{X} to the \texttt{N}th element of list \texttt{L}. Assume that list elements are numbered increasing from 1.  

(b) The last element of a list: \texttt{last(X,L)} instantiates \texttt{X} to the last element of list \texttt{L}.

(c) Remove an element from a list: \texttt{remove(X,L,M)} instantiates \texttt{M} to a list containing all the elements of list \texttt{L} except for every occurrence of term \texttt{X}.

(d) Substitute one element for another: \texttt{subst(L,X,Y,M)} instantiates \texttt{M} to a list containing all the elements of list \texttt{L} except that every occurrence of term \texttt{X} in \texttt{L} is replaced by term \texttt{Y} in \texttt{M}.