Foundations of Computer Science

Discuss how lazy lists and mutable lists can be coded in ML. How do they compare with ML’s built-in lists? Illustrate your answer by considering the operations of reversing a list and of concatenating two lists. Your discussion should mention the main programming hazards. [6 marks]

The function odds is to return the list of alternate elements of its input. For example, \texttt{odds[\texttt{a, b, c, d, e}]} = \texttt{[a, c, e]} and \texttt{odds[a, b]} = \texttt{[a]}. Code odds using

\begin{enumerate}[(a)]
  \item ordinary ML lists [3 marks]
  \item lazy lists [5 marks]
  \item mutable lists (as an imperative operation — so that \texttt{odds} has type '\texttt{\texttt{a mlist} \rightarrow \texttt{unit}}' for a suitable datatype \texttt{'a mlist} of mutable lists, to be defined) [6 marks]
\end{enumerate}