Given list $P$, find list $L$ such that for every index $n$ of list $P$, $L_n$ is the length of the longest list that is both a proper prefix and a proper suffix of $P[0..n+1]$. Here is a program to find $L$.

\begin{verbatim}
A \leftarrow i := 0. L := \#P*0. j := 1. B
B \leftarrow \text{if } j \geq \#P \text{ then } ok \text{ else } L := j \rightarrow i \mid L. j := j+1. B \text{ fi}
C \leftarrow \text{if } P_i = P_j \text{ then } i := i+1
    \text{else if } i = 0 \text{ then } ok
    \text{else } i := L(i-1). C \text{ fi fi}
\end{verbatim}
Find specifications $A$, $B$, and $C$ so that $A$ is the problem and the three refinements are theorems.

(b) Given list $S$ (subject), list $P$ (pattern), and list $L$ (as in part (a)), determine if $P$ is a segment of $S$, and if so, where it occurs. Here is a program.

\begin{verbatim}
D \leftarrow m := 0. n := 0. E
E \leftarrow \text{if } m = \#P \text{ then } h := n - \#P \text{ else } F \text{ fi}
F \leftarrow \text{if } n = \#S \text{ then } h := \infty
    \text{else if } P_m = S_n \text{ then } m := m+1. n := n+1. E
    \text{else } G \text{ fi fi}
G \leftarrow \text{if } m = 0 \text{ then } n := n+1. F \text{ else } m := L(m-1). G \text{ fi
Find specifications $D$, $E$, $F$, and $G$ so that $D$ is the problem and the four refinements are theorems.