Write a program to find how many items are duplicates (repeats) of earlier items.

Let the list be \( L \). Let \( n \) and \( j \) be natural state variables. The result will be reported as \( n' \). Let's call the specification \( S \), defined as

\[
S \equiv n' = \phi(\$i: 1,..\#L; L_i=L(i-1)) \land t' = t+\#L-1
\]

Also define

\[
P \equiv 1 \leq j \leq \#L \land n' = n + \phi(\$i: j,..\#L; L_i=L(i-1)) \land t' = t+\#L-j
\]

The problem is solved by the refinements

\[
S \Leftarrow n:= 0. \ j:= 1. \ P
\]

\[
P \Leftarrow \text{if } j=\#L \text{ then } \text{ok } \text{ else if } L_j=L(j-1) \text{ then } n:= n+1 \text{ else } \text{ok } \text{ fi.}
\]

\[
\text{if } j:= j+1. \ t:= t+1. \ P \text{ fi}
\]

Proof: NOT YET WRITTEN

Maybe the best way is to check if the list is nonempty, sort it, then use the solution of part (a).