(P-list) Given a non-empty list \( S \) of natural numbers, define a \( P \)-list as a non-empty list \( P \) of natural numbers such that each item of \( P \) is an index of \( S \), and

\[
\forall i: 1,...,#P \cdot P(i-1) < P \leq S(P(i-1))
\]

Write a program to find the length of a longest \( P \)-list for a given list \( S \).