Problem 17
Consider the $\beta$-transformation $f_\beta : [0, 1] \to [0, 1]$

$$f_\beta(x) = \begin{cases} 
\beta x & \text{if } 0 \leq x \leq 1/\beta \\
\beta x - 1 & \text{if } 1/\beta < x \leq 1
\end{cases}$$

for $\beta = (1 + \sqrt{5})/2$ (cf. problem 16).

a) Compute the number of admissible $p$-periodic symbol sequences for $p = 1, 2, 3, 4$.

b) Compute the number of periodic points of $f_\beta$ (i.e. the number of elements in $\text{Per}_p(f_\beta)$ for $p = 1, 2, 3, 4$).

Problem 18
Just a remark on boundary points. How does the result of problem 17b) change if one considers instead of $f_\beta$ the slightly different map

$$g_\beta(x) = \begin{cases} 
\beta x & \text{if } 0 \leq x < 1/\beta \\
\beta x - 1 & \text{if } 1/\beta \leq x \leq 1
\end{cases}$$

for $\beta = (1 + \sqrt{5})/2$, i.e. how many elements are contained in $\text{Per}_p(g_\beta)$ for $p = 1, 2, 3, 4$?