a) $p \rightarrow$ Head $q = $ Tail.

, $S = $ starting state.
where the pattern has not started
form.

	S	H	HH	HHH
S	q	p	0	0
H	q	0	p	0
HH	q	0	0	p
HHH	0	0	0	p/1

let the above transition matrix be T

$$P(HHH \text{ in } n^{th} \text{ toss}) = [T]^n \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

similarly for HTTH.

	S	H	HT	HTT	HTTH
S	q	p	0	0	0
H	~~q~~ 0	~~p~~ p	q	0	0
HT	~~q~~ 0	~~p~~ p	0	q	0
HTT	q	0	0	0	p
TTH	0	0	0	0	1