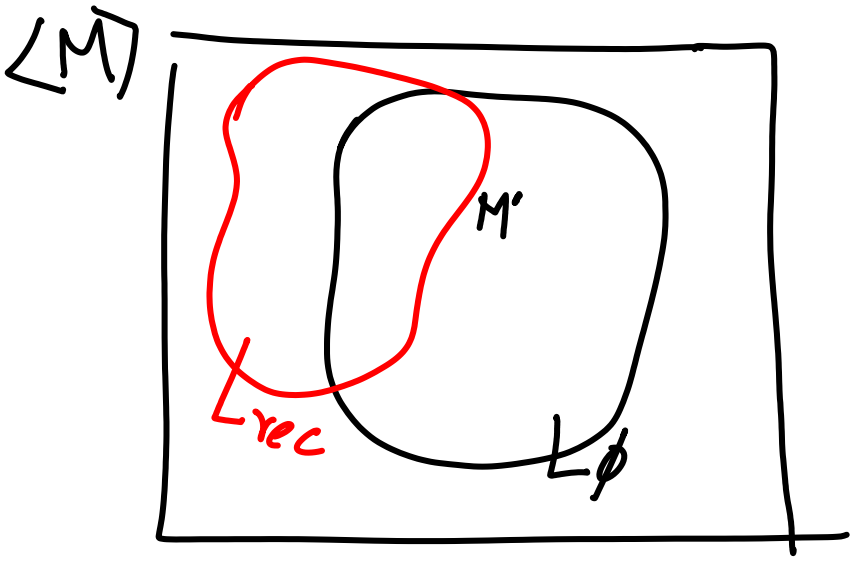
L': Given $\langle M, w \rangle$, can we decide that M makes 3 consecutive right head movement on w?



$L(M') = \phi$

$L(M')$ is recursive

$L_a \quad \{\langle M \rangle \mid L(M) = a\} \qquad a \in \Sigma^*$

Consider some non-recursive language say L_1 and try to reduce $L_1 \leq_f L'$

Choose $L_1 = L_u$

Input to L_u : $\langle M, w \rangle$

" " L' : $\langle M, w \rangle$

$f(M, w) \rightarrow (M', w')$

s.t. M accepts w iff M' makes 3 consecutive right mov

$\delta(q, \Gamma_1) = (p, \Gamma_2, R)$

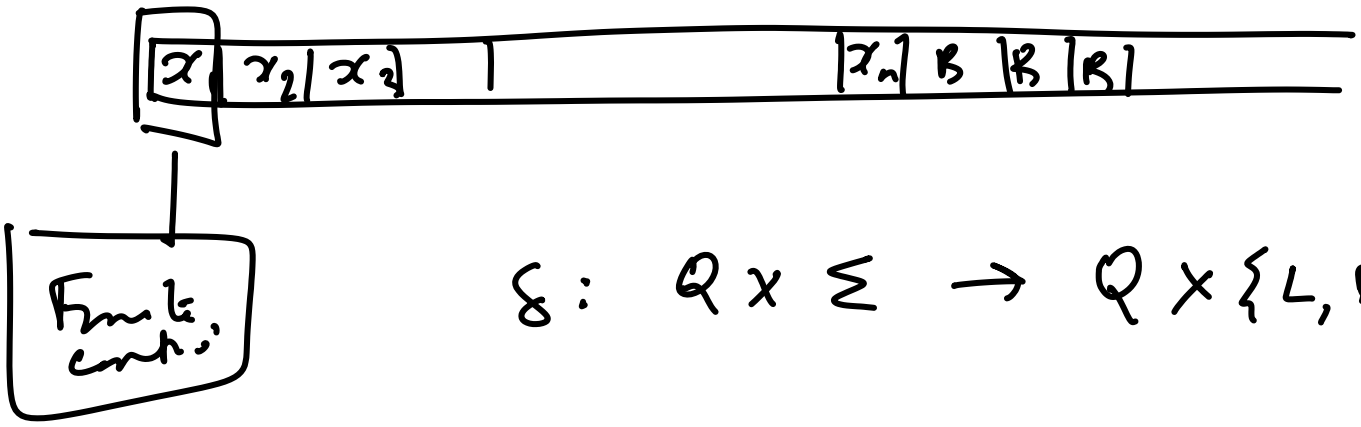
$[q, 1]$ $[p, 2]$

$\langle M \rangle$ is modified to $\langle M' \rangle$ which makes 3 consec Right mov iff M accepted w

$w = w'$

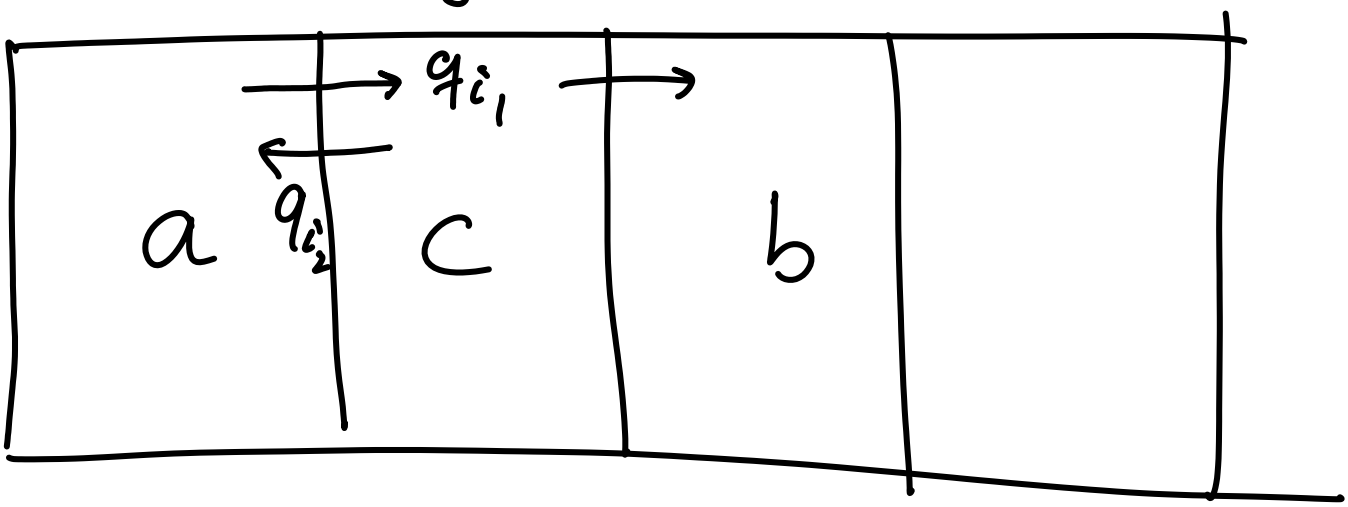
What happens when a TM is not allowed to write on the tape?

We can actually simulate the machine using an NFA



$$\delta : Q \times \Sigma \to Q \times \{L, R\}$$

Crossing Sequence



crossing sequences is finite.