CSC236 winter 2020, quiz week 11_1

Question.

Given a language L, define $Extra(L)$ to be the strings formed by concatenating an additional symbol from Σ to a string in L. i.e. $Extra(L) = \{x \in \Sigma^* \mid \exists w \in L, a \in \Sigma, x = wa\}$.

For example, given $L = \{abba, baa\}$ over the alphabet $\Sigma = \{a, b\}$, $Extra(L) = \{abbaa, abbab, baaa, baab\}$.

Describe a procedure for constructing an FSA that accepts $Extra(\mathcal{L}(M))$ given an arbitrary DFSA M. (You may use non-determinism.)

Solution.

We create M' by adding a new state q_e to M. q_e will be M''s only accepting state. For each state which was accepting in M, we add transitions from that state to q_e labelled with every symbol in Σ.

Note that M' is nondeterministic now, since states that were accepting in M may have more than one outgoing transition labelled with the same character.