Example: NFA$_{JP}$

Define an NFA that recognizes the following language L over $\Sigma = \{a, b\}$:

$$L = \{ w \mid w \text{ ends with aa} \}.$$

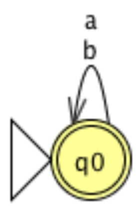
Recall that an NFA is defined as a 5-tuple (Q, Σ, δ, q0, F) where

- Q is a finite set of states
- Σ is a finite alphabet
- δ is the transition function, $\delta: Q \times \Sigma_\varepsilon \rightarrow \text{PowerSet}(Q)$
- q0 is the start state (q0 □ Q)
- F is a set of accept states (F □ Q)

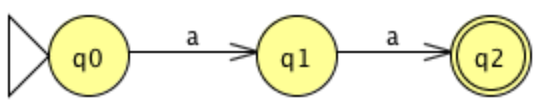
Sample Solution

One approach is to consider strings in the language L as the set of all strings over {a, b} concatenated with the string aa. This suggests building FA that recognize each of these languages and concatenating those FA.

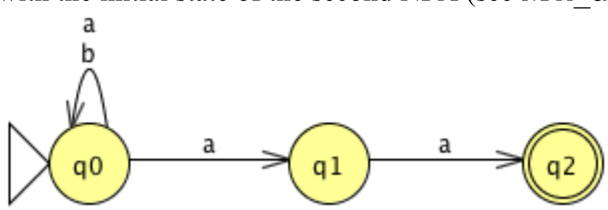
First, build an NFA that recognizes the set of all strings {a, b}* (see `NFA_abstar.jff`).



Next, build an NFA that recognizes the string aa, such as the following (see `NFA_aa.jff`).



Now create an NFA that recognizes the sequence of these strings (their concatenation) by combining the final state of the first NFA with the initial state of the second NFA (see `NFA_abstar_aa.jff`).



Thus an NFA that recognizes language L may be described as

({q0, q1, q2}, {a, b}, δ as defined by the state diagram, q0, {q2}).