\[ \exists w \in \{a, b\}^* \mid w \text{ has neither an nor } bb \text{ as substrings} \]

if \( |w| = 0 \) goto end

lastChar = \( w_0 \)

for \( i = 1 \) to \( |w| - 1 \)

if lastChar = \( w_i \)

return false

lastChar = \( w_i \)

end: return true

lastChar not initialized (start of code)
\{ w \mid \text{w has ab as substring and has even # of a's} \}

\[(q_0, aabb) \rightarrow (q_4, abb) \rightarrow (q_3, bb) \rightarrow (q_2, b) \rightarrow (q_2, \epsilon)\]

\(M\) accepts \(w\) iff \((s, w) \xrightarrow{\ast} (f, \epsilon)\) for some \(f \in F\)
Non-deterministic Finite Automaton (NFA)

- replaces transition fun $\delta$ with transition relation $\Delta$

(formally $\Delta \subseteq K \times (\Sigma \cup \{e\}) \times K$

- "yields in one step" is a relation on machine configurations - current state and rest of string

$\Delta$ 

- info that determines formally $(q, w) \vdash (q', w')$

- what the machine will do if, for some $\sigma \in \Sigma \cup \{e\}$

\[ w = \sigma \cdot w' \text{ and } (q, \sigma, q') \in \Delta \]

$\vdash^*$ is reflexive, transitive closure of $\vdash$

M accepts $w$ iff $(s, w) \vdash^* (f, e)$ for some $f \in F$
Does this accept $abaab$? Yes
        $ab$? Yes
        $bba$? Yes! (at least one)

$(q_0, ab) \vdash (q_0, b) \vdash (q_2, e) \vdash (q_3, e)$