1.9 (a) When there is seen accept it all

1.9 (b) counting odd involves a loop
that only remembers this fact (odd)

1.9 (c) with 111 as a substring fail

1.15  

1.17  

1.17 Have a loop for multiple of 3 is
also remember parity of 0's.
All strings with consecutive 1's or 0's.

- A attempt to design $0^n 1^n$ will fail because we can't keep track of #0's beyond the # of machine states.

- MSB first Mod 3.

$$N \rightarrow 2N + b$$

Shift $\rightarrow$ New bit

We don't need to remember N; only $N \mod 3$ ($N \mod 3$).

$$(2N + b) \mod 3 = (2N \mod 3 + b) \mod 3$$

This is the update rule.
$m = \text{remainder of division}$

\[ \begin{align*}
0 \quad & \rightarrow \quad (2 \cdot 0 + b) m^3 = b \\
1 \quad & \rightarrow \quad (2 \cdot 1 + 0) m^3 = 2 \\
1 \quad & \rightarrow \quad (2 \cdot 1 + 1) m^3 = 0 \\
2 \quad & \rightarrow \quad (2 \cdot 2 + 0) m^3 = 1 \\
2 \quad & \rightarrow \quad (2 \cdot 2 + 1) m^3 = 2 \\
\end{align*} \]

Do the writing practice of these math items:

\[ a \in \Sigma \]
\[ a \in \Sigma \]
\[ a \in \Sigma \]
\[ a \in \Sigma \]
\[ a \in \Sigma \]
\[ a \in \Sigma \]

concat \[\Sigma, \ \phi \]?