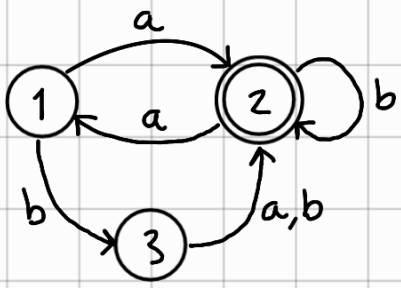
$M = (Q, \Sigma, \delta, q_0, F)$ $\quad Q = \{1,2,3\}$ $\quad \Sigma = \{a,b\}$ $\quad q_0 = 1$ $\quad F = \{2\}$

$\delta =$

	a	b
1	2	3
2	1	2
3	2	2



$$\begin{cases} L_1 = aL_2 \mid bL_3 \\ L_2 = aL_1 \mid bL_2 \mid \lambda \\ L_3 = aL_2 \mid bL_2 \end{cases}$$

$L_2 = aL_1 \mid bL_2 \mid \lambda = \underbrace{bL_2}_{\alpha} \mid \underbrace{aL_1 \mid \lambda}_{\beta}$ $\quad \overset{\text{ARDEN}}{\Rightarrow}$ $\quad L_2 = b^*(aL_1 \mid \lambda)$

α: $\lambda \notin L(\alpha)$

$L_3 = aL_2 \mid bL_2 = (a \mid b)L_2 = (a \mid b)b^*(aL_1 \mid \lambda)$

$L_1 = ab^*(aL_1 \mid \lambda) \mid b(a \mid b)b^*(aL_1 \mid \lambda)$

$= ab^*aL_1 \mid ab^* \mid b(a \mid b)b^*aL_1 \mid b(a \mid b)b^*$

$= \underbrace{(ab^*a \mid b(a \mid b)b^*a)}_{\alpha} L_1 \mid \underbrace{ab^* \mid b(a \mid b)b^*}_{\beta}$

α: $\lambda \notin L(\alpha)$

$\overset{\text{ARDEN}}{\Rightarrow}$ $\quad L_1 = (ab^*a \mid b(a \mid b)b^*a)^*\,(ab^* \mid b(a \mid b)b^*)$