



$$R = \epsilon \rightarrow ①$$

$$P = Ra + Sa \rightarrow ②$$

$$S = Rb + Pb \rightarrow ③$$

$$② \quad P = Ra + Sa$$

$$P = \epsilon a + Sa$$

$$P = a + Sa$$

substitute S

$$P = a + (b + Pb)a$$

$$P = a + ba + Pba$$

Arden's Theorem

$$P = (a + ba)(ba)^*$$

$$③ \quad S = Rb + Pb$$

$$S = \epsilon b + Pb$$

$$S = b + Pb$$

substitute P

$$S = b + (a + Sa)b$$

$$S = b + ab + Sab$$

Arden's Theorem

$$S = (b + ab)(ab)^*$$

$$\text{RegEx} = R + P + S$$

$$\text{RegEx} = \epsilon + (a + ba)(ba)^* + (b + ab)(ab)^*$$

$$\text{RegEx} = (a(ba)^* \mid b(ab)^*)^*$$