Automata
Week 4

软73
[illegible]
2017013569

清華大學

3.1.1 (b) 设 $L(r_0)=\{0,1\}$

$L(r_1)=\{1\}$

$r_0^* r_1 \cdot r_0 \cdot r_0 \cdot r_0 \cdot r_0 \cdot r_0 \cdot r_0 \cdot r_0 \cdot r_0 \cdot r_0 = (0+1)^* \cdot 1 \cdot (0+1)^9$

(c) ~~设 $L(r_0)=\{0,1\}$~~

设 $L(r_0)=\{0\}$

$L(r_1)=\{1,\varepsilon\}$

$L(r_2)=\{0,\varepsilon\}$

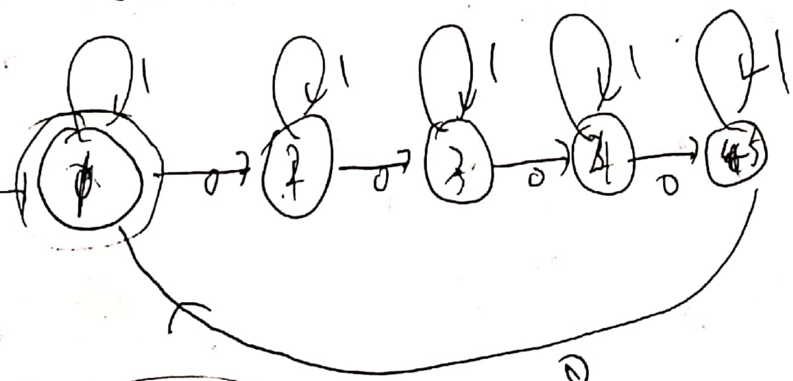
$L(r_3)=\{0\}$

$L(r_4)=\{1,1\}$

$\big(\varepsilon+(1,\varepsilon)(01,0)^*0\big)\{\varepsilon,1\}\big(\varepsilon+0(01,0)^*(0,\varepsilon)\big)$

$=\big(\varepsilon+(1+\varepsilon)(0\cdot1+0)^*\cdot 0\big)(1\cdot1+\varepsilon)\big(\varepsilon+0\cdot(0\cdot1+0)^*(0+\varepsilon)\big)$

3.1.2 (b) 先考虑其DFA

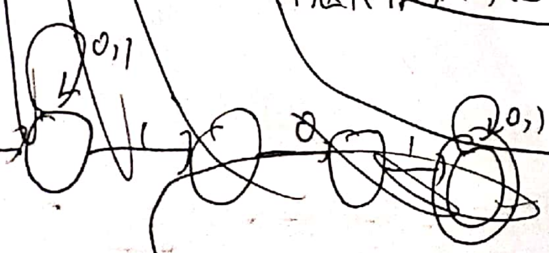


~~再...~~:

$1^* \cdot (0\cdot 1^* \cdot 0 \cdot 1^* \cdot 0 \cdot 1^* \cdot 0 \cdot 1^* \cdot 0)^* \cdot 1^*$

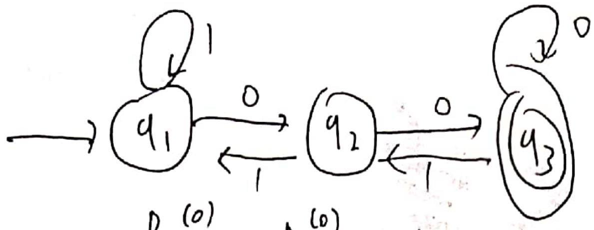
1.3 (a)

含1的(前):



不包

3.2.1:



(a) $R_{ij}^{(0)}$: $R_{11}^{(0)} = \varepsilon + 1$ $R_{21}^{(0)} = 1$ $R_{31}^{(0)} = \phi$

$R_{12}^{(0)} = 0$ $R_{22}^{(0)} = \varepsilon$ $R_{32}^{(0)} = 1$

$R_{13}^{(0)} = \phi$ $R_{23}^{(0)} = 0$ $R_{33}^{(0)} = 0 + \varepsilon$

(b) $R_{ij}^{(1)}$: $R_{11}^{(1)} = (\varepsilon+1)^* = 1^*$ $R_{21}^{(1)} = 1\cdot(\varepsilon+1)^* = 1\cdot 1^*$ $R_{31}^{(1)} = \phi$

$R_{22}^{(1)} = \varepsilon + 1\cdot(\varepsilon+1)^*\cdot 0 = \varepsilon + 1\cdot 1^*\cdot 0$ $R_{32}^{(1)} = 1$

$R_{12}^{(1)} = (\varepsilon+1)^*\cdot 0 = 1^*\cdot 0$ $R_{33}^{(1)} = 0 + \varepsilon$

$R_{23}^{(1)} = 0$

$R_{13}^{(1)} = \phi$

$\cancel{1^* + 1^*\cdot 0\cdot(\varepsilon+1\cdot 1^*\cdot 0)^* = 1^* + 1^*\cdot 0\cdot(1\cdot 1^*\cdot 0)^*}$

$\cancel{R_{ij}^{(2)}: R_{11}^{(2)} = (\varepsilon+1)^* + (\varepsilon+1)^*\cdot 0\cdot(\varepsilon+1\cdot(\varepsilon+1)^*\cdot 0)^*}$

$\cancel{R_{12}^{(2)}} = \cancel{(\varepsilon+1)^*\cdot 0} + 1^*\cdot 0$

(c) $R_{ij}^{(2)}$: $R_{11}^{(2)} = 1^* + 1^*\cdot 0\cdot(1\cdot 1^*\cdot 0)^*\cdot 1\cdot 1^*$

$R_{12}^{(2)} = 1^*\cdot 0 + 1^*\cdot 0\cdot(1\cdot 1^*\cdot 0)^*\cdot 1\cdot 1^*$

$R_{13}^{(2)} = 1^*\cdot 0\cdot(1\cdot 1^*\cdot 0)^*\cdot 0$

$R_{21}^{(2)} = (1\cdot 1^*\cdot 0)^*\cdot 1\cdot 1^*$

$R_{22}^{(2)} = (1\cdot 1^*\cdot 0)^*$

$R_{23}^{(2)} = 0 + (1\cdot 1^*\cdot 0)^*\cdot 0 = (1\cdot 1^*\cdot 0)^*\cdot 0$

$R_{31}^{(2)} = 1\cdot(1\cdot 1^*\cdot 0)^*\cdot 1\cdot 1^*$

$R_{32}^{(2)} = 1 + 1\cdot(1\cdot 1^*\cdot 0)^* = 1\cdot(1\cdot 1^*\cdot 0)^*$

$R_{33}^{(2)} = 0 + \varepsilon + 1\cdot(1\cdot 1^*\cdot 0)^*\cdot 0$

$\cancel{= (0+\varepsilon+1\cdot(1\cdot 1^*\cdot 0)^*\cdot 0)^*}$

(d) [illegible] $R_{13}^{(3)} = R_{13}^{(2)} + R_{13}^{(2)}\cdot(R_{33}^{(2)})^*\cdot R_{33}^{(2)}$

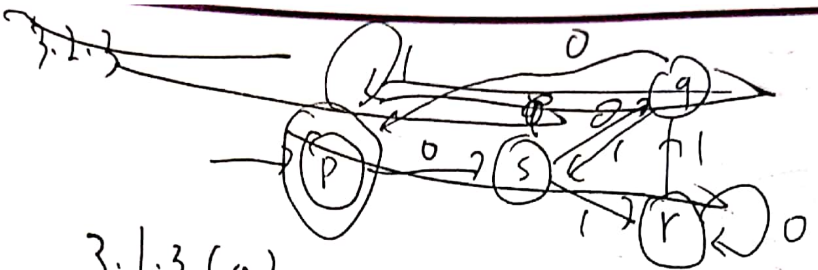
$= 1^*\cdot 0(1\cdot 1^*\cdot 0)^*\cdot 0 + 1^*\cdot 0(1\cdot 1^*\cdot 0)^*\cdot 0\cdot(0+\varepsilon+1\cdot(1\cdot 1^*\cdot 0)^*0)^*$

$= 1^*\cdot 0\,(1\cdot 1^*\cdot 0)^*\cdot 0\,(0+1\cdot(1\cdot 1^*\cdot 0)^*0)^*$

$= \cancel{1^*\cdot 0\cdot(1\cdot 1^*\cdot 0)^*\cdot 0\cdot(0+1\cdot 1^*\cdot 0)^*}$

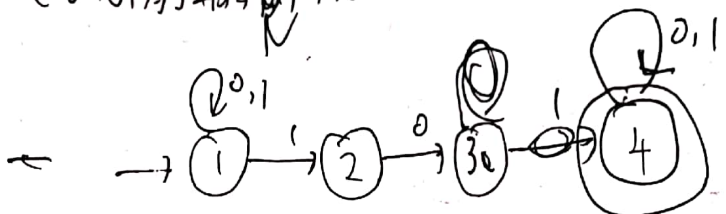
$1^*\cdot 0\,(1\cdot 1^*\cdot 0)^*\cdot 0\,(0+1\cdot(1\cdot 1^*\cdot 0)^*\cdot 0)^*$

~~3.2.3~~

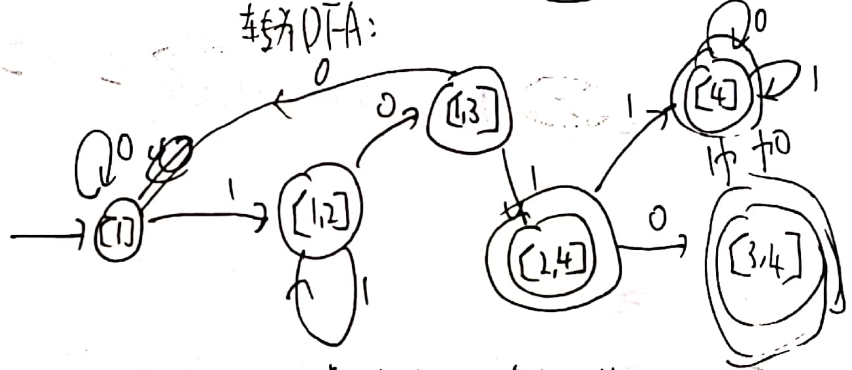


3.1.3 (a)

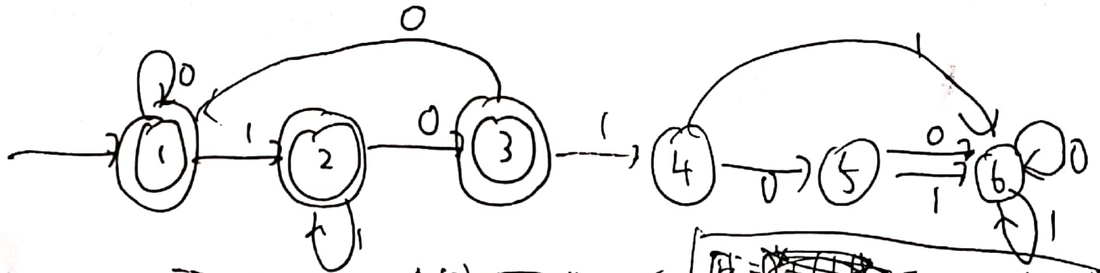
包含101为子串的DFA:



转为DFA:



重标号,转为不含101子串的DFA



$$R^{(0)} = \begin{bmatrix} 0+\varepsilon & 1 & \phi \\ \phi & 1+\varepsilon & 0 \\ 0 & \phi & \varepsilon \end{bmatrix}$$

$$R^{(1)} = \begin{bmatrix} 0^* & 1 & \phi \\ \phi & 1+\varepsilon & 0 \\ 0\cdot 0^* & 0\cdot 0^*\cdot 1 & \varepsilon \end{bmatrix}$$

~~$R_{11}^{(0)} = 0+\varepsilon$~~

$$R^{(2)} = \begin{bmatrix} 0^* & 1\cdot 1^* & 1\cdot 1^*\cdot 0 \\ \phi & 1^* & 1^*\cdot 0 \\ 0\cdot 0^* & 0\cdot 0^*\cdot 1\cdot 1^* & \varepsilon+0\cdot 0^*\cdot 1\cdot 1^*\cdot 0 \end{bmatrix}$$

$R_{11}^{(3)} = 0^* + (1\cdot 1^*\cdot 0)(0\cdot 0^*\cdot 1\cdot 1^*\cdot 0)^*\cdot 0\cdot 0^*$

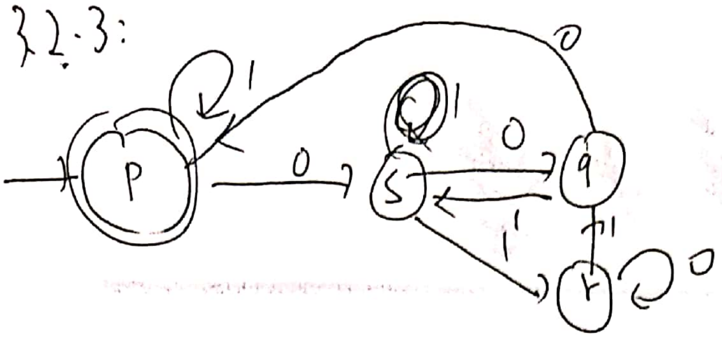
$R_{12}^{(3)} = 1\cdot 1^* + 1\cdot 1^*\cdot 0\cdot(0\cdot 0^*\cdot 1\cdot 1^*\cdot 0)^* 0\cdot 0^*\cdot 1\cdot 1^*$

$R_{13}^{(3)} = (1\cdot 1^*\cdot 0)(0\cdot 0^*\cdot 1\cdot 1^*\cdot 0)^*$

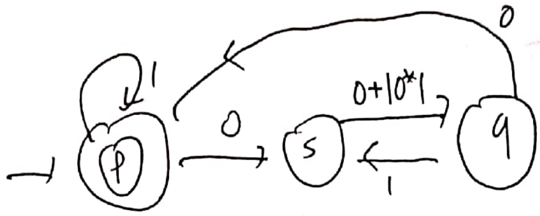
~~所以 $= 0^* + 1\cdot 1^* + (1\cdot 1^*\cdot 0)(0\cdot 0^*\cdot 1\cdot 1^*\cdot 0)^*(0\cdot 0^* + 0\cdot 0^*\cdot 1\cdot 1^* + \varepsilon)$~~

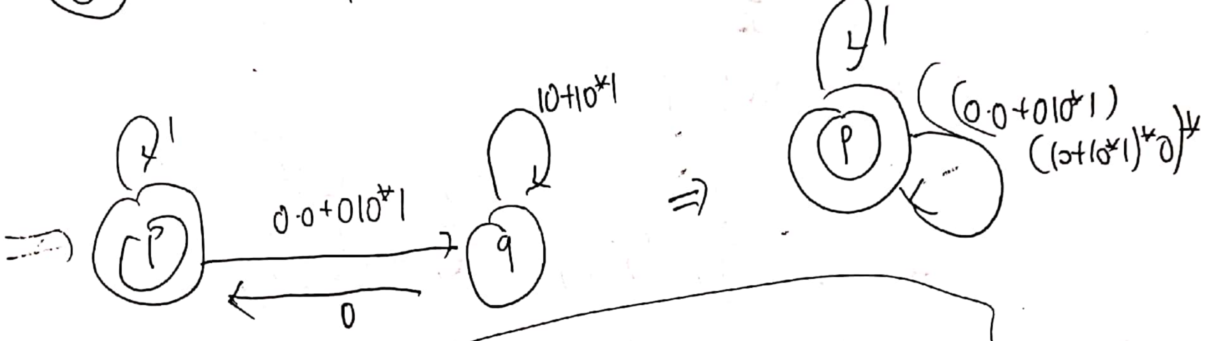
~~所以 $= 0^* + 1\cdot 1^*\cdot 0 + 1\cdot 1^* + 1\cdot 1^*\cdot 0\cdot 0 + 1\cdot 1^*\cdot 0\cdot 0\cdot 0^*\cdot 1\cdot 1^*$~~

3.2.3:



① 消去r





$(1^*+((0\cdot 0+010^*1)(10+10^*1)^*0))^*$

3.4.2.

(b)

$(RS+R)^*R = (R(S+\varepsilon))^*R = \left(\sum_{i=0}^{\infty}(R(S+\varepsilon))^i\right)R$

$R(SR+R)^* = R((S+\varepsilon)R)^* = R\sum_{i=0}^{\infty}((S+\varepsilon)R)^i$

左=右，得证

(d) 不成立：

$\varepsilon \in (R^*S)^*$

ε 不一定属于 $(R+S)^*S$

由 扫描全能王 扫描创建