1. $\Sigma = \{0, 1\}$

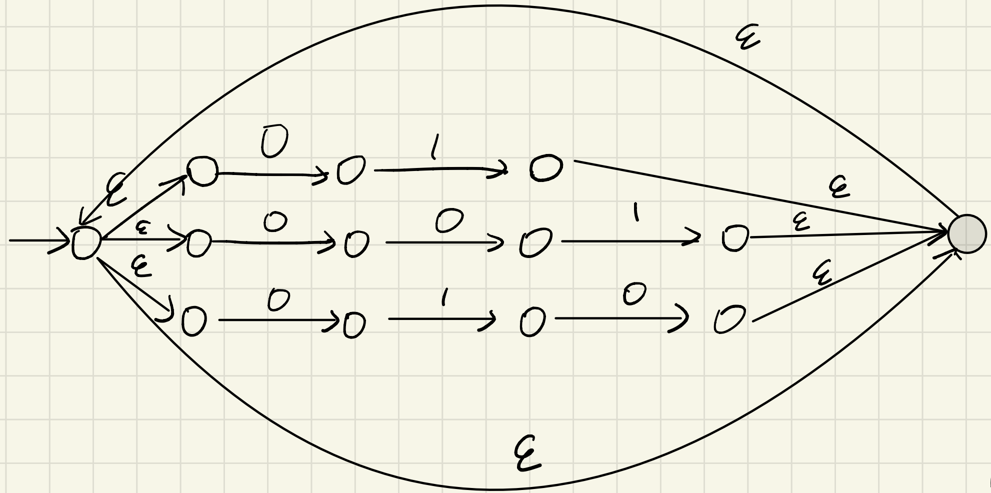
(b) $0^* 1 0^* 1 0^* 1 \Sigma^*$

(e) $0(\{0,1\}\{0,1\})^* + \{10, 11\}(\{0,1\}\{0,1\})^*$

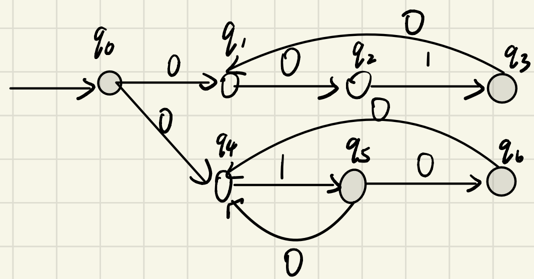
(l) $(1^* 00 + 01^* 0 + 001^*)^*$

(n) $\{0, 1\}\{0,1\}^*$

2.



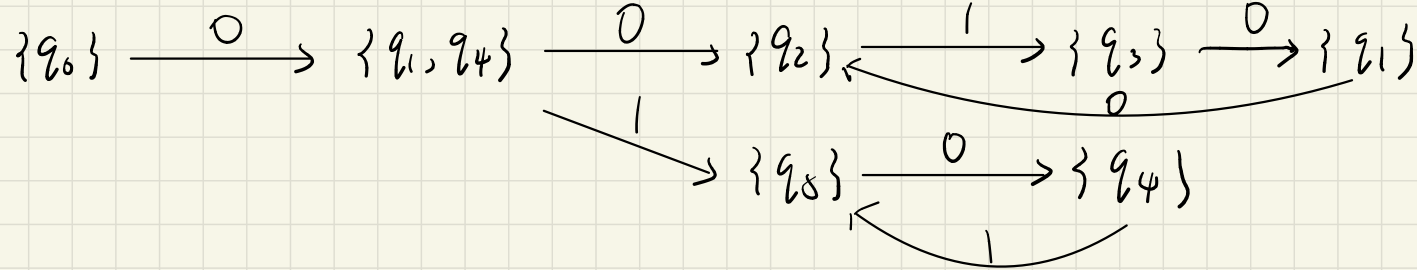
$\Rightarrow$



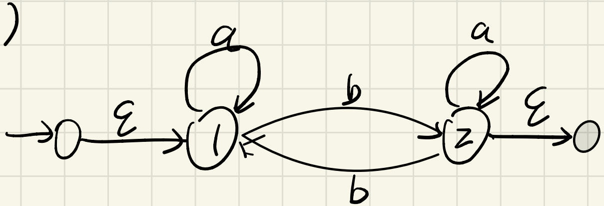
$\Rightarrow$

	0	1
$\{q_0\}$	$\{q_1, q_4\}$	ϕ
$\{q_1, q_4\}$	$\{q_2\}$	$\{q_5\}$
$\{q_2\}$	ϕ	$\{q_3\}$
$\{q_5\}$	$\{q_4\}$	ϕ
$\{q_3\}$	$\{q_1\}$	ϕ
$\{q_4\}$	ϕ	$\{q_5\}$
$\{q_1\}$	$\{q_2\}$	ϕ

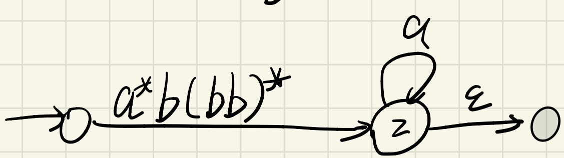
$\Rightarrow$



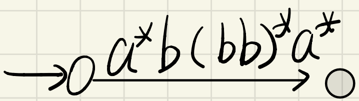
3. (a)



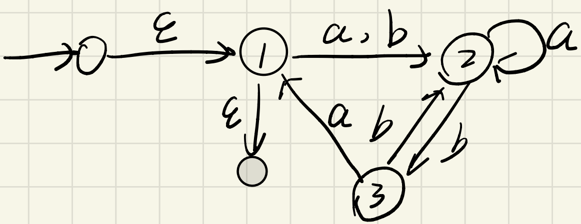
去掉1:



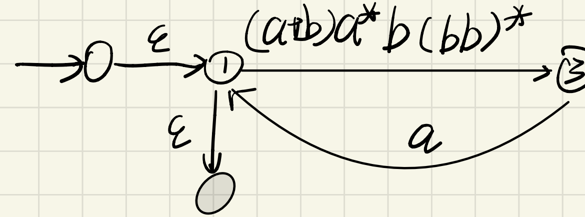
去掉2:



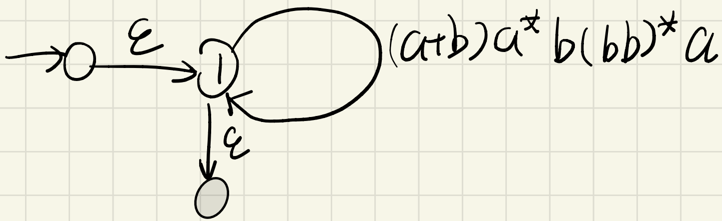
4. (b)



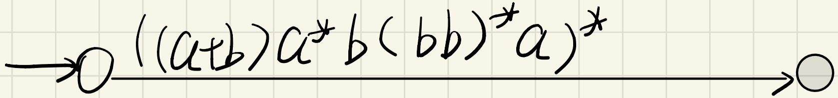
⇒去掉2:



⇒去掉3:



⇒去掉1:



4. No, $L=(a+b)(a+b)^*$　　$L_0=\{s \mid s$ 中 a 的数 $=b$ 的数$\}$

显然，$L_0 \subseteq L$ 且 L_0 非正则.

5. $\forall\, l \in L_F$ 为 finite language，则有 $l=\{s_1,\cdots,s_N\}$. N 为有限数

那么有正则语言 $L=s_1+\cdots+s_N$ s.t. $L=l$，得证.

6. (a) 设 $pl=p$，记 s^p 为长度为 p 的字符串. $\tilde{s}^p$ 为其逆，那么 $\forall\, l \in L$，$\exists s(l)$，s.t.

$l=s(l)^{\lfloor \frac{|l|}{2} \rfloor}(0+1+\varepsilon)\,\tilde{s}(l)^{\lfloor \frac{|l|}{2} \rfloor}$

于是取 $w=s^p(0+1+\varepsilon)\tilde{s}^p=xyz$　$\because |xy|\le p$　$\therefore y=s^{ij}$ 且 $1\le i\le j\le p$

则 $xy^2z=s^p s^{ij}(0+1+\varepsilon)\tilde{s}^p \notin L$　得矛盾.

(b) 设 $pl=p$，取 $w=0^p1^{3p}=xyz$　$\because |xy|\le p \Rightarrow y=0^i$

则 $xy^2z=0^{p+i}1^{3p} \notin L \Rightarrow$ 得矛盾.

(C) 设 $pl=p$，取 $w=0^p1^p0^p1^p0^p1^p$ $\because |xy|\le p \Rightarrow y=0^i$

则 $xy^2z=0^{p+i}1^p0^p1^p0^p1^p \notin L_3 \Rightarrow$ 得矛盾.