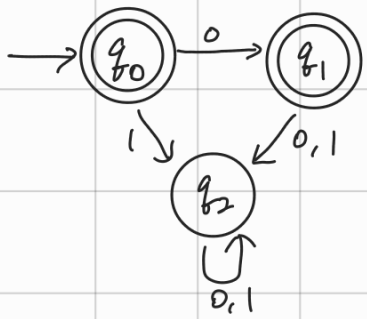
A. $\Sigma = \{0, 1\}$ 일 때 다음 언어를 인식하는 DFA의 Formal Description을 쓰시오.

1.6(k) $\{\varepsilon, 0\}$



$M(\{q_0, q_1, q_2\}, \{0, 1\}, \delta, q_0, \{q_0, q_1\})$

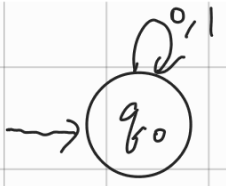
δ 정의:

δ	0	1
q_0	q_1	q_2
q_1	q_2	q_2
q_2	q_2	q_2

or

$\delta((q_0, 0)) = q_1$
$\delta((q_0, 1)) = q_2$
$\delta((q_1, \sigma)) = q_2, \ \forall \sigma \in \Sigma$
$\delta((q_2, \sigma)) = q_2, \ \forall \sigma \in \Sigma$

1.6(m) $\emptyset$



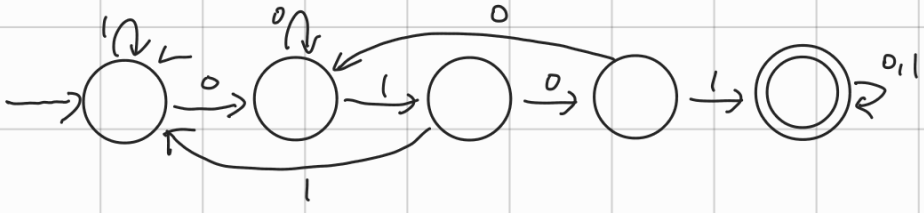
$M(\{q_0\}, \{0, 1\}, \delta_2, q_0, \{\emptyset\})$,

δ 정의:

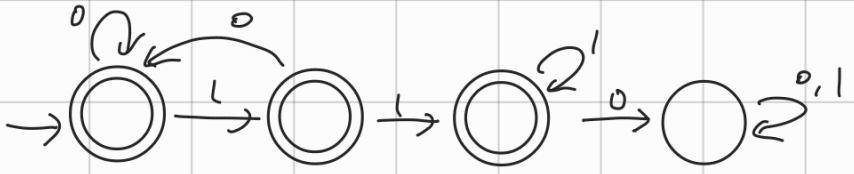
δ	0	1
q_0	q_0	q_0

or $\delta((q_0, \sigma)) = q_0, \ \forall \sigma \in \Sigma$

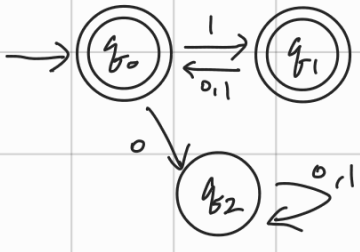
1.6(c) $\{w : w \text{ contains the substring } 0101. \}$



1.6(f) $\{w : w \text{ doesn't contain the substring } 110. \}$



1.6(i) $\{w : \text{every odd position of } w \text{ is a } 1. \}$



$M(\{q_0, q_1, q_2\}, \{0, 1\}, \delta, q_0, \{q_0, q_1\})$

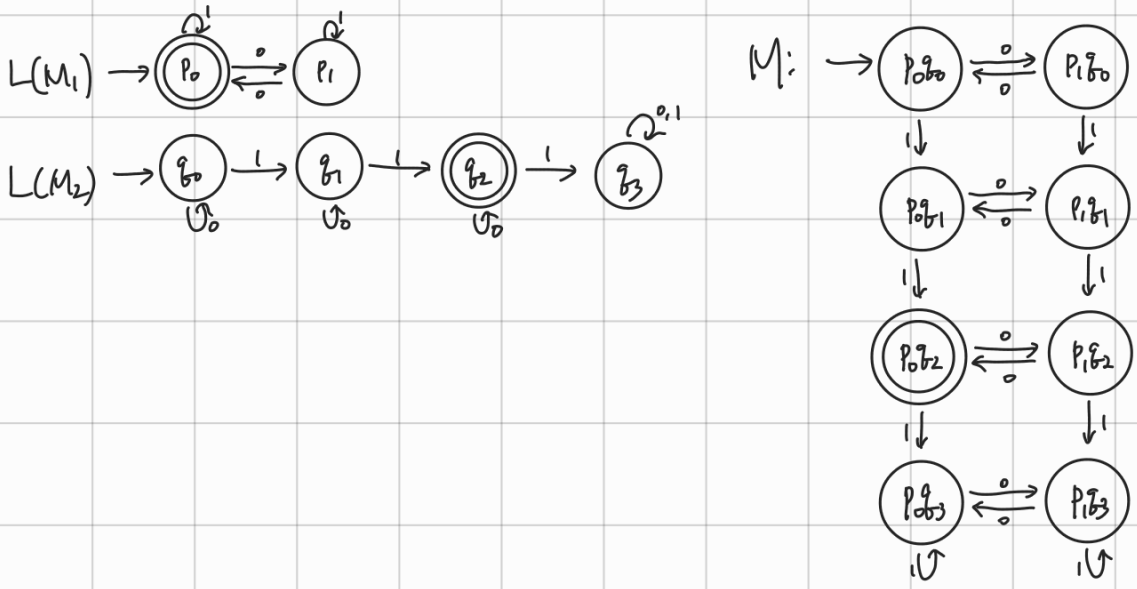
δ	0	1
q_0	q_2	q_1
q_1	q_0	q_0
q_2	q_2	q_2

or

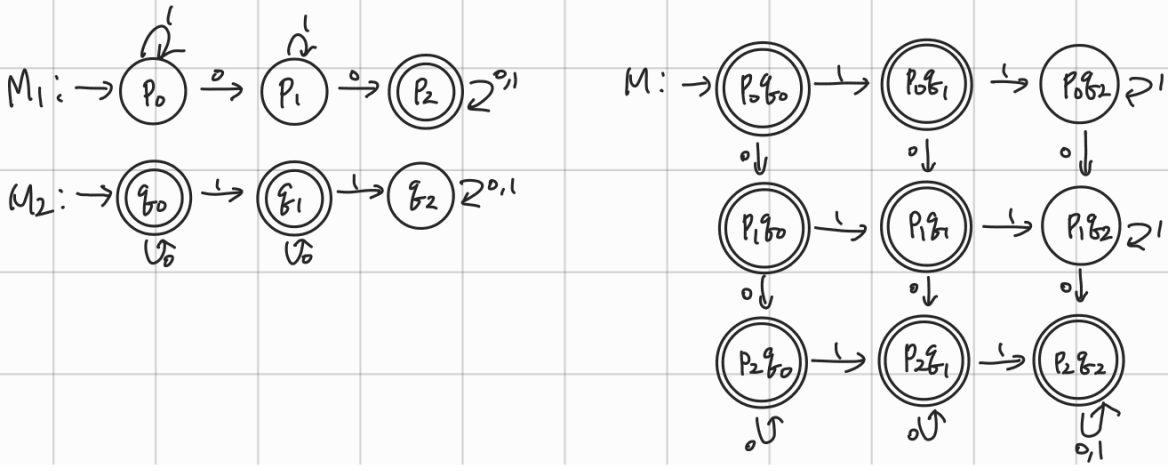
$\delta((q_0, 0)) = q_2$
$\delta((q_0, 1)) = q_1$
$\delta((q_1, \sigma)) = q_0, \ \forall \sigma \in \Sigma$
$\delta((q_2, \sigma)) = q_2, \ \forall \sigma \in \Sigma$

B. $\Sigma = \{0,1\}$ 또는 $\Sigma = \{\mathtt{a},\mathtt{b}\}$ 일 때, 다음 언어들은 $L(M_1) \cap L(M_2)$ 또는 $L(M_1) \cup L(M_2)$ 로 표현될 수 있다. 수업시간에 배운 내용 -강의자료 (p14)-을 참고하여 다음 언어들을 인식하는 DFA 의 State diagram 을 그리고, transition function 테이블을 만드시오.

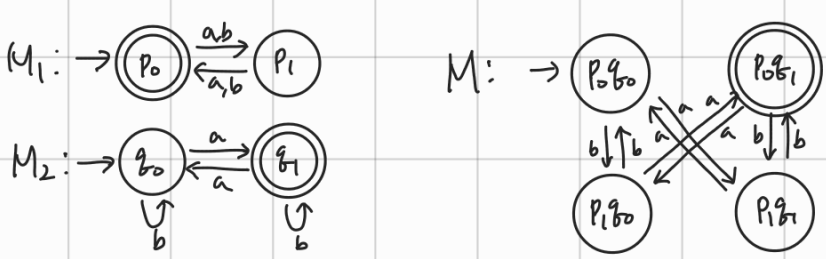
1.6(l′) $\{w : w$ contains an even number of 0s and contains exactly two 1s.$\}$



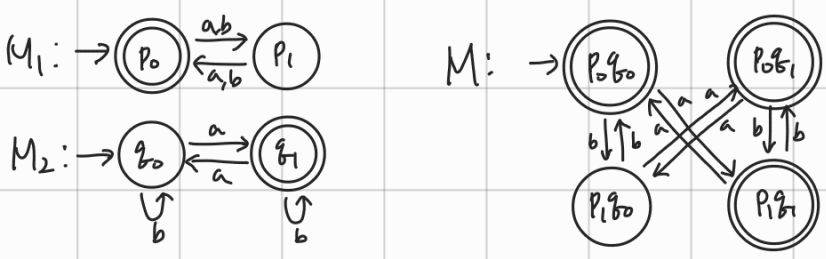
1.6(j′) $\{w : w$ contains at least two 0s *or* at most one 1.$\}$



1.4(g) $\{w : w$ has even length and an odd number of a's.$\}$



1.4(g′) $\{w : w$ has even length *or* an odd number of a's.$\}$



$$L(M) = \underbrace{L_1}_{\| \; L(M_1)} \cup \underbrace{L_2}_{\| \; L(M_2)}$$

$M_1(Q_1, \Sigma, \delta_1, p_0, F_1)$

$M_2(Q_2, \Sigma, \delta_2, q_0, F_2)$

$\Rightarrow M(Q_1 \times Q_2, \Sigma, \delta, (p_0, q_0), F_1 \times Q_2 \cup Q_1 \times F_2)$

$\delta : Q_1 \times Q_2 \times \Sigma \to Q_1 \times Q_2$

$\delta((p_i, q_j, \sigma)) = (\delta_1(p_i, \sigma), \delta_2(q_j, \sigma))$