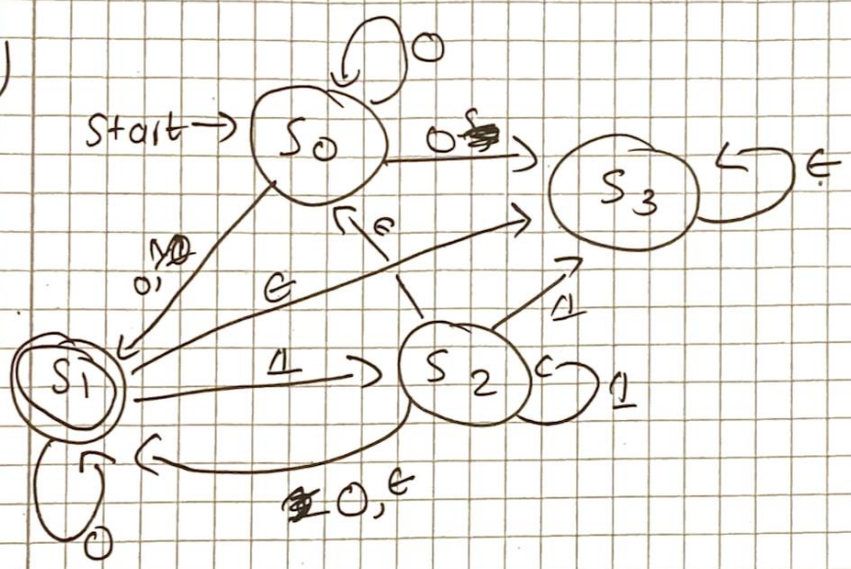
Assignment Sheet 2

Mahiem Agrawal
Subigya Paudel
Maulik Chhetri

Exercise 1

a)



b) $N_2 = (\{Q_0, Q_1, Q_2, Q_3 Q_4\}, \{0, 1\}, \delta, Q_0, \{Q_1, Q_3\})$

Where the transition function δ is

	0	1	ε
Q_0	$\{Q_4\}$	$\{Q_1, Q_4\}$	$\{Q_1, Q_4\}$
Q_1	$\{Q_2\}$	$\{Q_2\}$	$\emptyset$
Q_2	$\{Q_0\}$	$\emptyset$	$\emptyset$
Q_3	$\{Q_1\}$	$\{Q_1\}$	$\{Q_4\}$
Q_4	$\{Q_4, Q_1\}$	$\{Q_4\}$	$\emptyset$

Exercise 2

a) $L = \{ w \text{ string over } \{0, 1\} \mid$

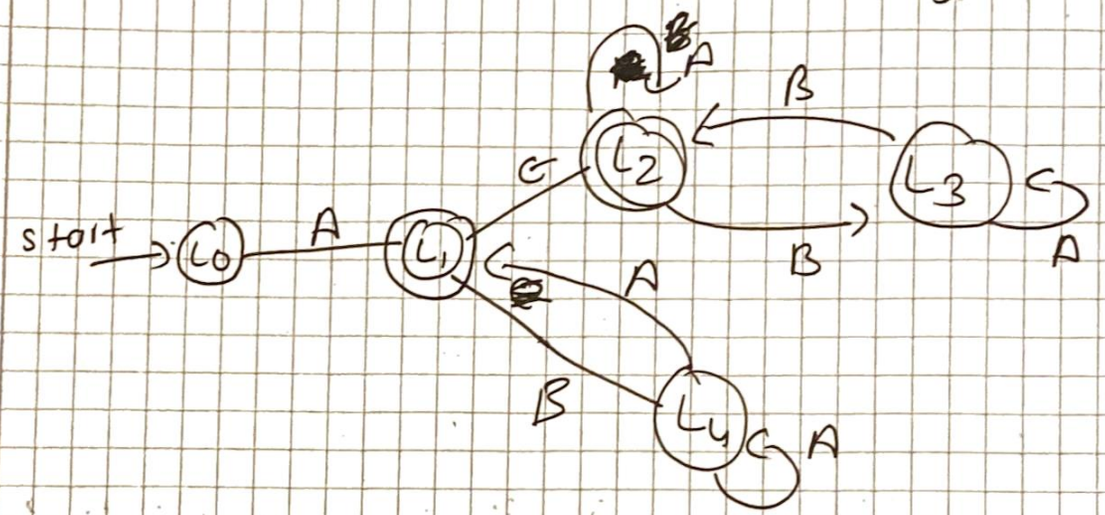
w starts with atleast one 0 and ends with atleast one 1 $\}$

b) $L = \{ w \text{ string over } \{a, b\} \mid$

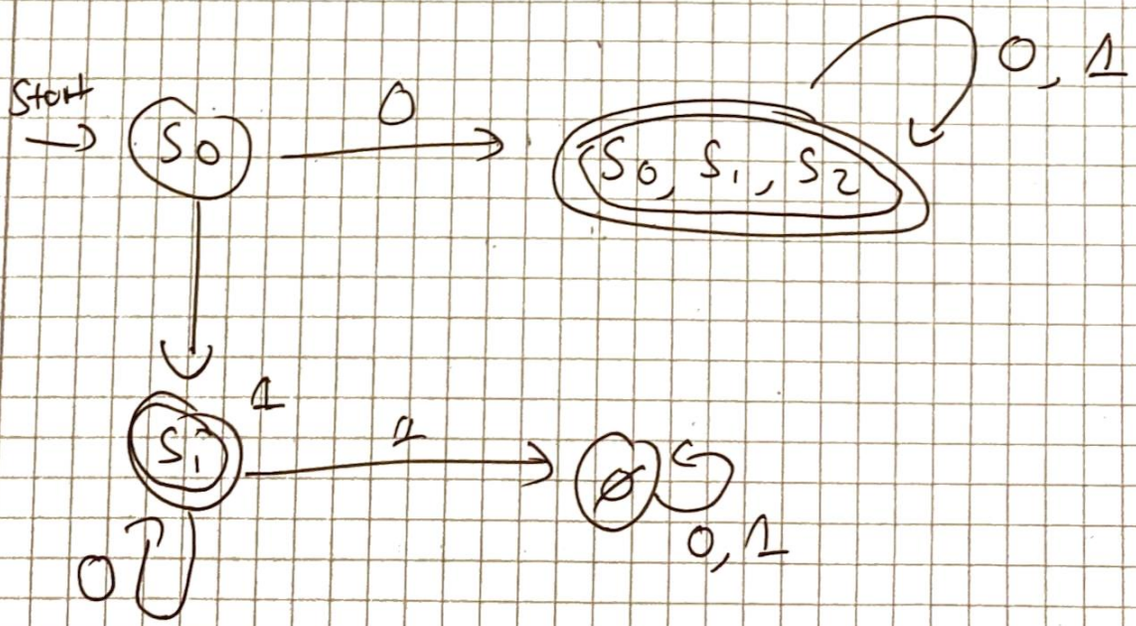
series of atleast one 'a' starting from the beginning and the last 'a' of the series followed by 0 or more pair of ab $\}$.

F Exercise 3

Must begin with A
and
(B followed by A) or (B appears even no. of times)



b)



Exercise 4

a) $L^c = \{ w \in \Sigma^* \mid w \notin L \}$

Solution,

We know,

L is a language accepted by an NFA N.

We ~~know~~ For every NFA there exists another DFA for it so a DFA M ~~would be~~ exists which accepts L

$L(M) = L(N)$

Now For the DFA M.

$$M = \left\{ \{q_1, \dots q_n\}, \Sigma, \delta, \{q^k\}_{k \in 1..r}, \mathcal{P}(q_1 \dots q_n) \right\}$$

where $\mathcal{P}$ is the power set.

Now describing another machine, O

$$O = \left\{ \{q_1, \dots q_n\}, \Sigma, \delta, \{q^k\}_{k \in 1..n}, \{q_1 \dots q_n \mid P(q_1 \dots q_n)\} \right.$$

~~With the simple~~

The simple idea being we have changed all the accept states to reject states and the reject states to accept states.

Therefore this language would accept L^c.