

1. [5 pts] Write the formal English description of each set described by the regular expression below. Assume alphabet $\Sigma = \{0, 1\}$.

A) 1^*01^*

$L = \{a \mid a \text{ contains exactly one '0' in the string}\}$

B) $(\Sigma\Sigma\Sigma)^*$

$L = \{b \mid \text{the length of } b \text{ string can be divided by 3}\}$

C) $(0\Sigma^*0) \cup (1\Sigma^*1) \cup 0 \cup 1$

$L = \{c \mid c \text{ is either a single character, or starts \& ends with 0, or starts \& ends with 1}\}$

D) $0^* \cup 1^*$

$L = \{d \mid d \text{ contains only '0's or only '1's but not both}\}$

E) $(10)^+(\Sigma \cup \epsilon)$

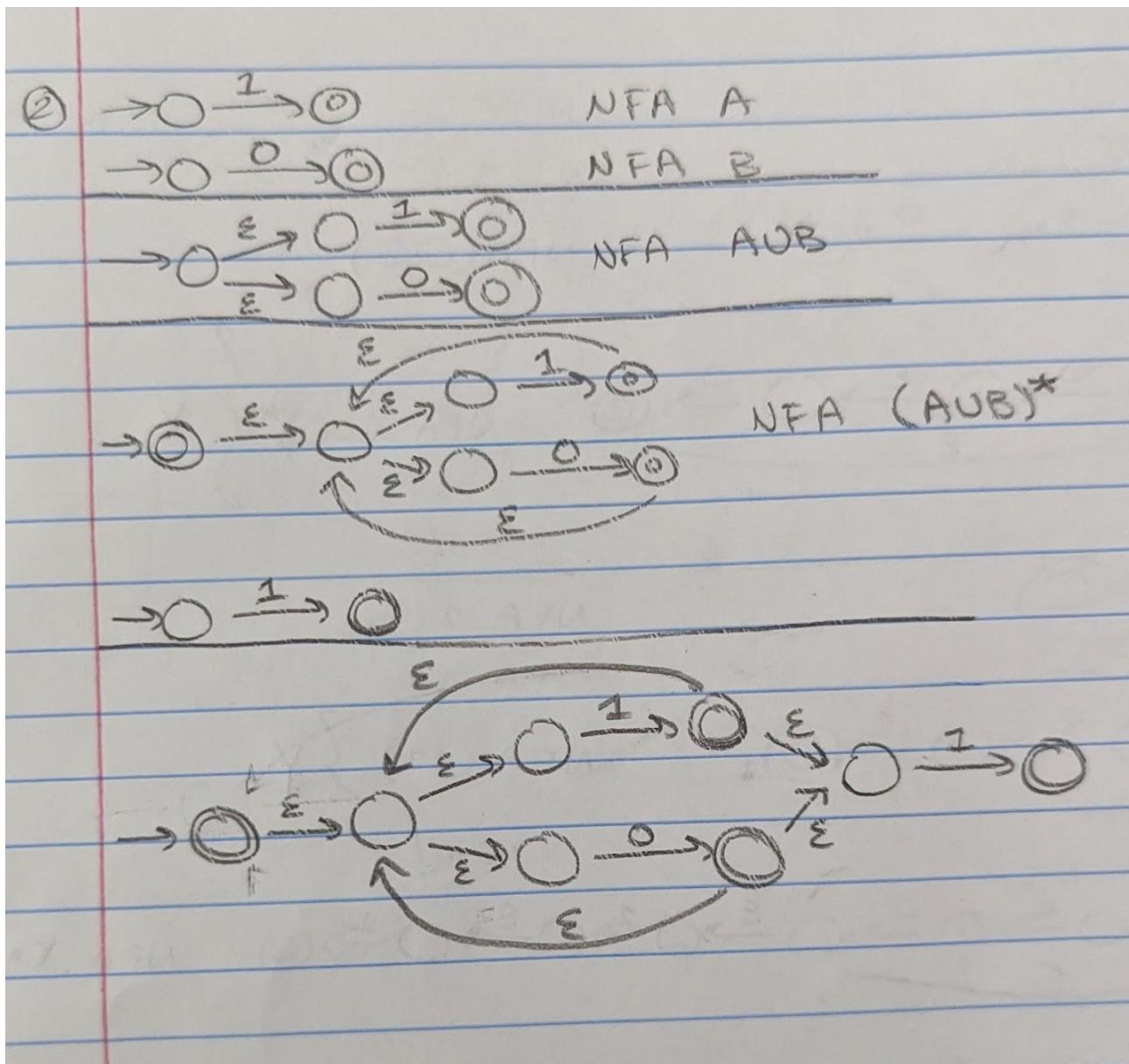
$L = \{e \mid e \text{ begins with the substring '10' at least once and then possibly followed by some character}\}$

Go down

vvvvvvvvvvvvvvvv

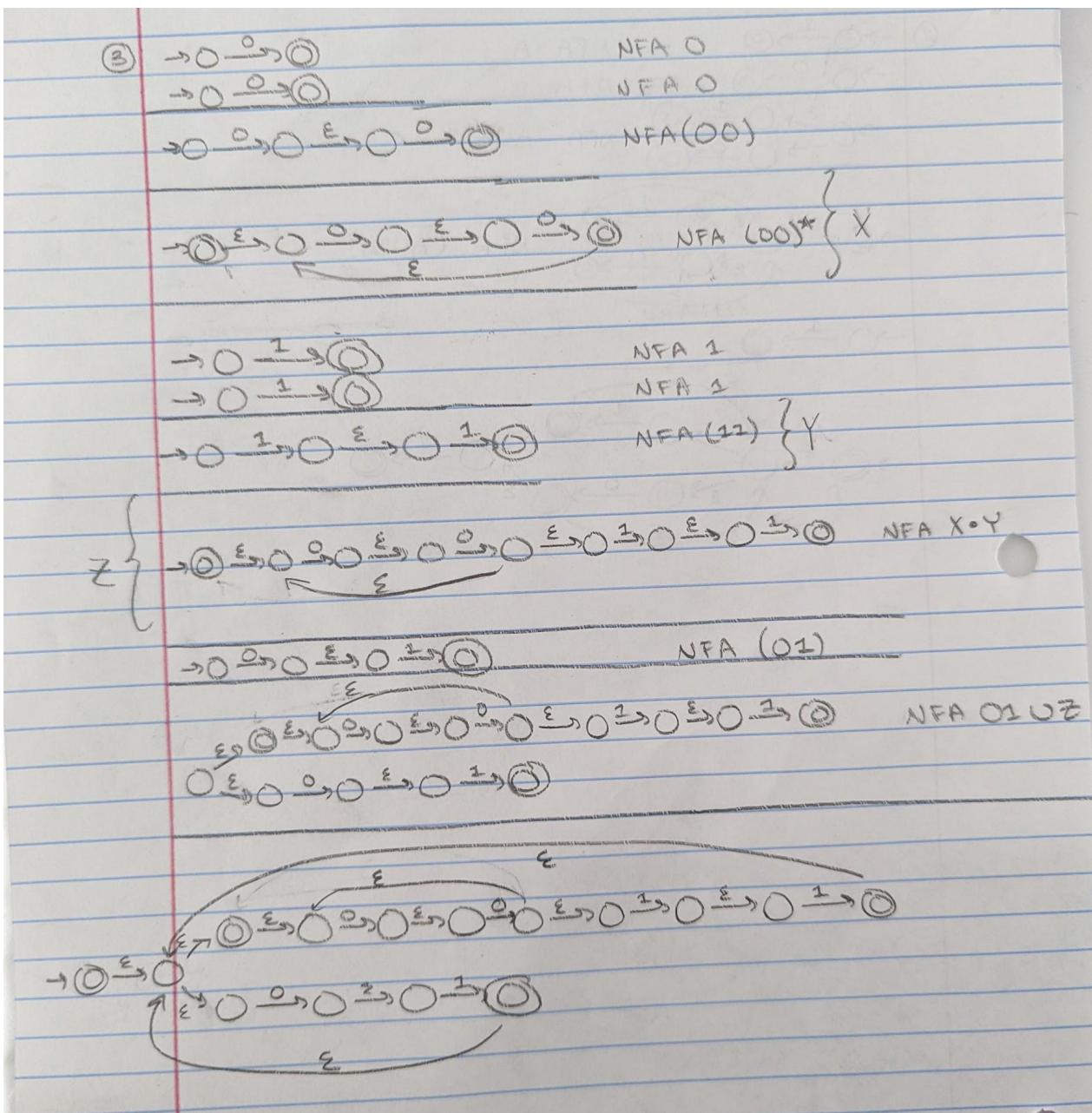
2. [5 pts] Let $\Sigma = \{0, 1\}$, use the procedure described in class to convert the following RE into an NFA. Show step-by-step construction and no simplification.

$(0 \cup 1)^*1$



3. [5 pts] Use the procedure described in Lemma 1.55 (textbook pp.88) to convert the following RE into an NFA. Show step-by-step construction.

$$(((00)^*(11)) \cup 01)^*$$



4. [5 pts] Use the procedure described in Lemma 1.60 (textbook pp.90) to convert the following DFA into a regular expression. Eliminate states in the order of q_2 , q_0 and q_1 . Assume alphabet $\Sigma = \{a, b\}$.

