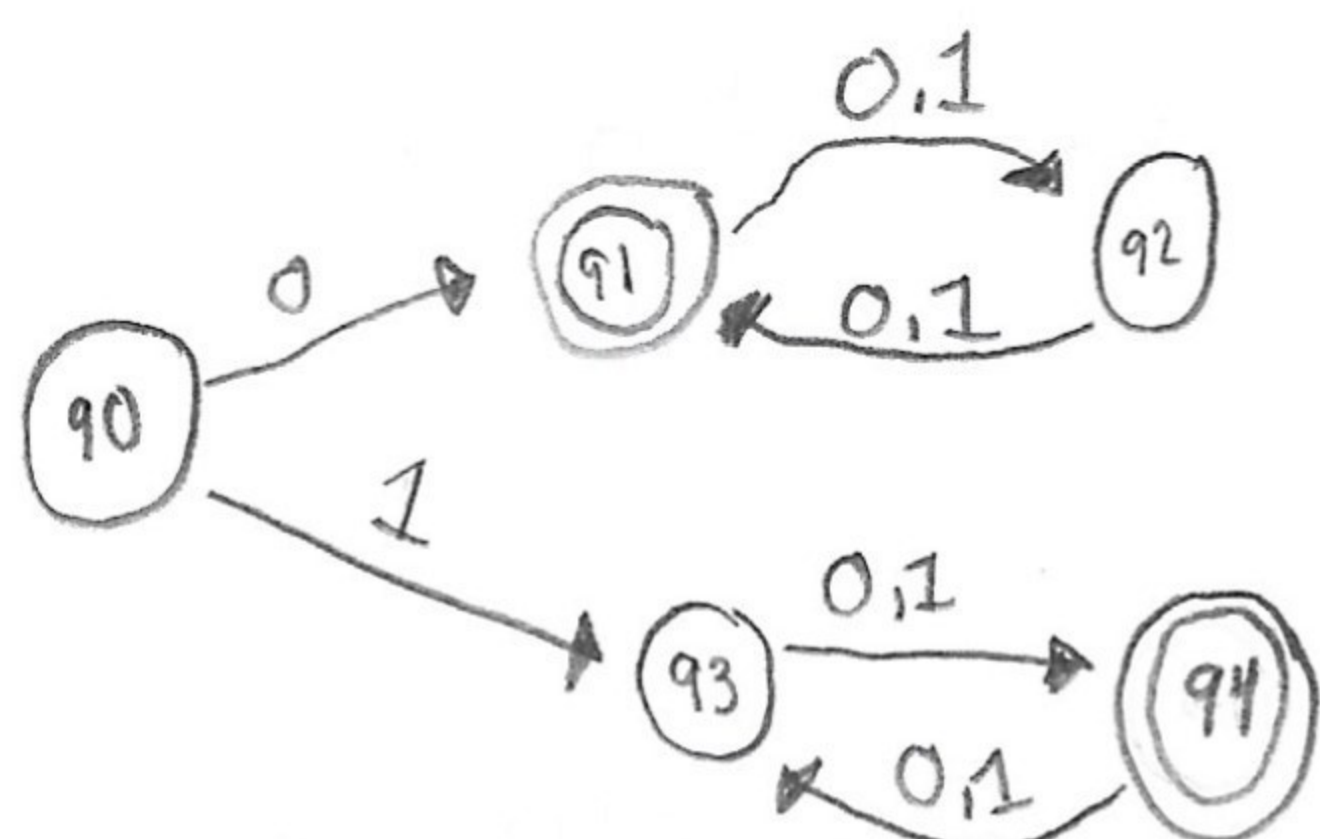
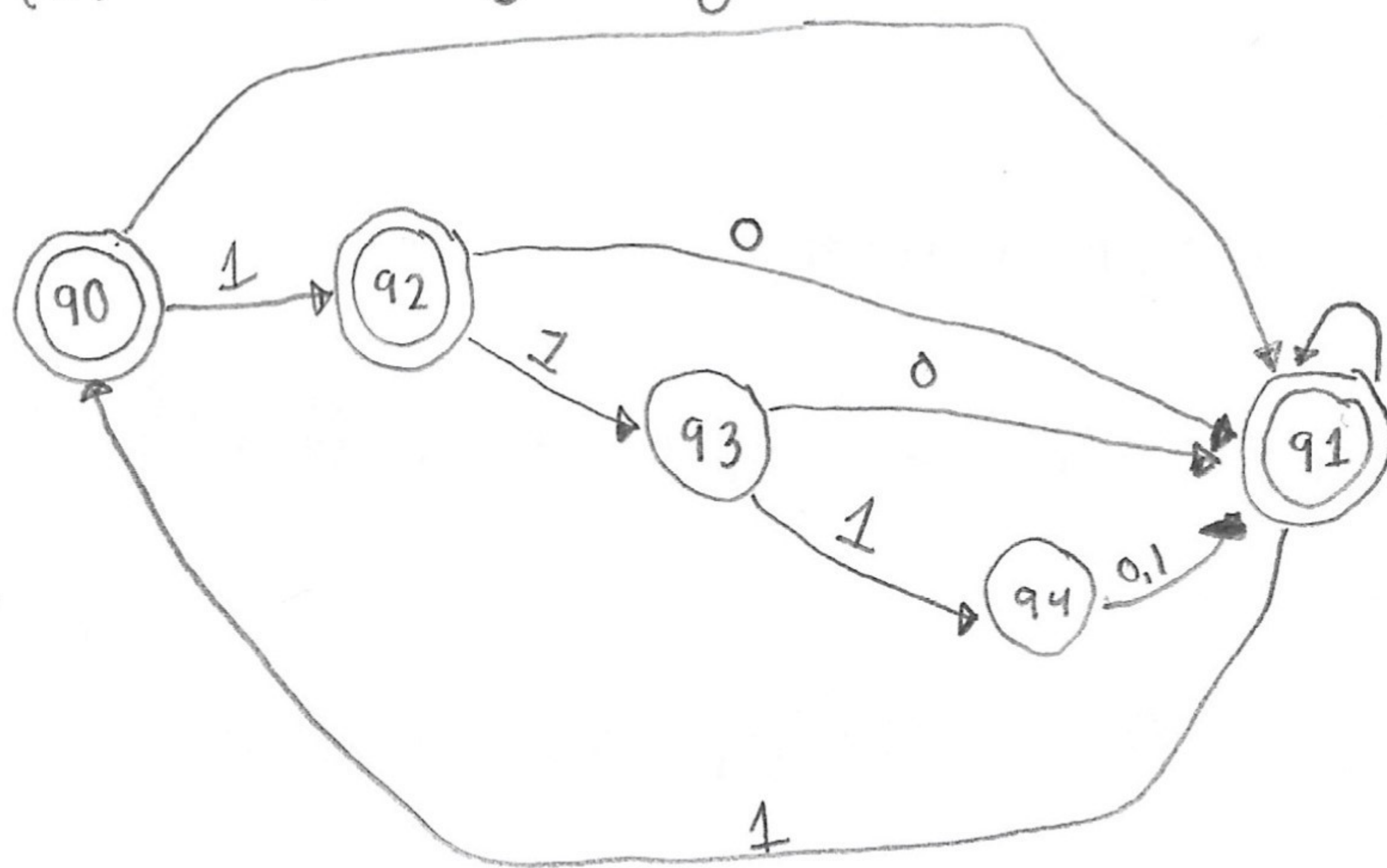


Problem 1:

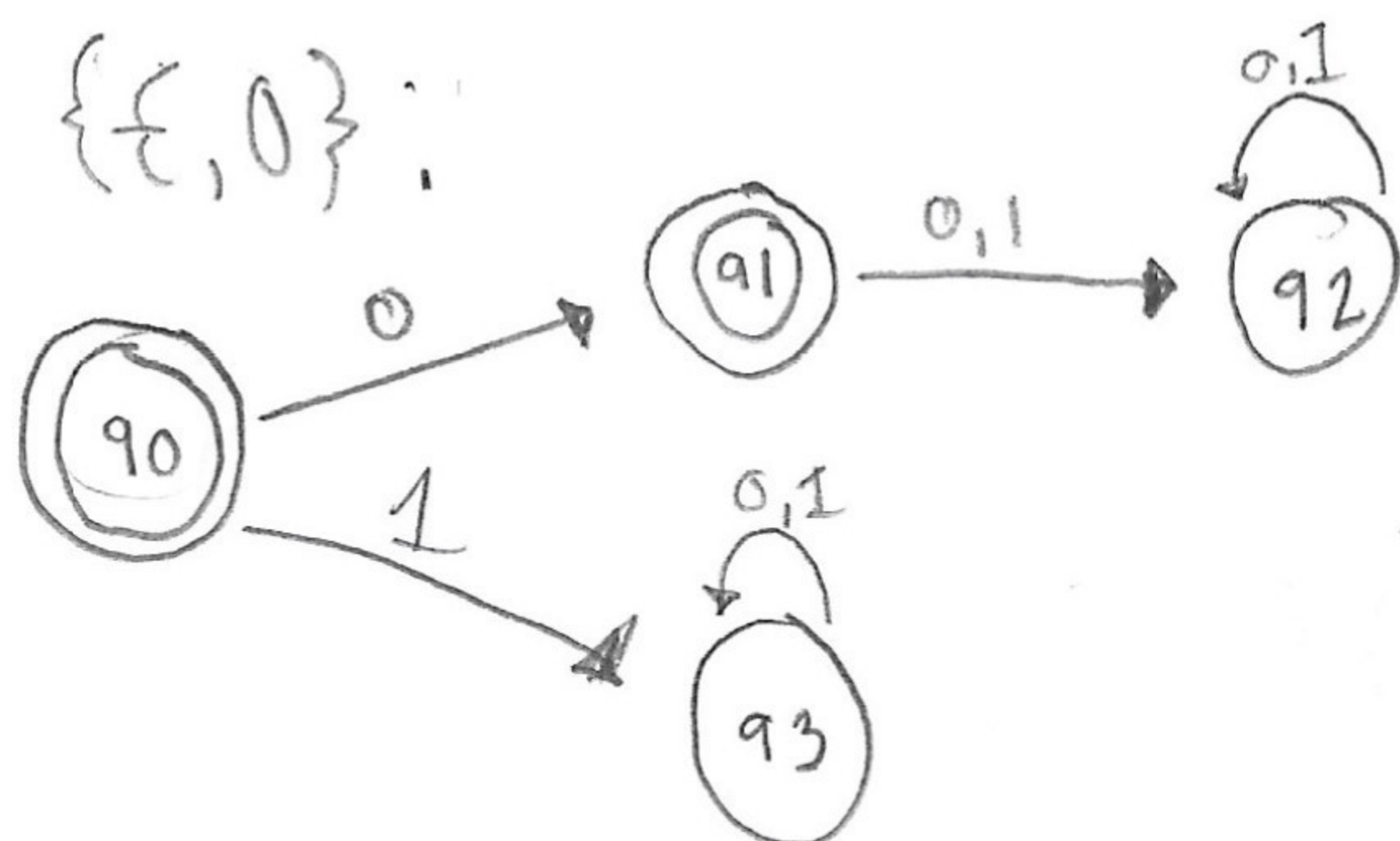
- 1a. $\{w \mid w \text{ starts with } 0 \text{ and has odd length, or starts with } 1 \text{ and has an even length}\}$



- 1b $\{w \mid w \text{ is any string except } 11 \text{ and } 111\}$



- 1c. $\{\epsilon, 0\}$



Problem 2:

$$A - B = A \cap \bar{B}$$

→ To prove $A - B$ is regular we have to look at three points

① we know that regular languages are closed under Union

② Regular languages are closed under complementation

$$\bar{A} = \Sigma^* - A$$

Step 1) construct D.F.A for A

Step 2) Apply complementation algorithm. N.F.A (or) D.F.A
 \therefore It is regular

③ regular languages are closed under Intersection

$$A \cap B = (\bar{A} \cup \bar{B})$$

↓
regular + regular language

$\bar{A} \cup \bar{B}$ - Regular language

$\bar{A} \cup \bar{B}$ - Regular language

$$A - B = A \cap \bar{B}$$

\bar{B} is Regular \because Regulars are closed under complementation

$A \cap \bar{B}$ is Regular \because Regulars are closed under intersection

$\therefore A - B$ is also regular