

1. Give context free grammars that generate the following languages.
Assume that the alphabet $\Sigma = \{0, 1\}$;

(a) $\{w \mid w \text{ starts and ends with same symbol}\}$

$$S \rightarrow 0A0 \mid 1A1 \mid 0 \mid 1$$

$$A \rightarrow 0A \mid 1A \mid \epsilon$$

(b) $\{w \mid \text{the length of } w \text{ is odd}\}$

$$S \rightarrow 0A \mid 1A$$

$$A \rightarrow 0S \mid 1S \mid \epsilon$$