

Q1A Let $L_1 = \{w : w \in \{0,1\}^*, w \text{ contains exactly one } 1\}$

and let the grammar G_1 be

$$\begin{aligned} S &\rightarrow A1A \\ A &\rightarrow 0A \mid \epsilon \end{aligned}$$

G_1 generates L_1 . But does the following grammar

G_2 ; given by $S \rightarrow A1A$ also generate L_1 ?

$$A \rightarrow A0 \mid 0$$

If not, state what language G_2 actually generates.

Answer :

Q1B Construct a CFG to generate

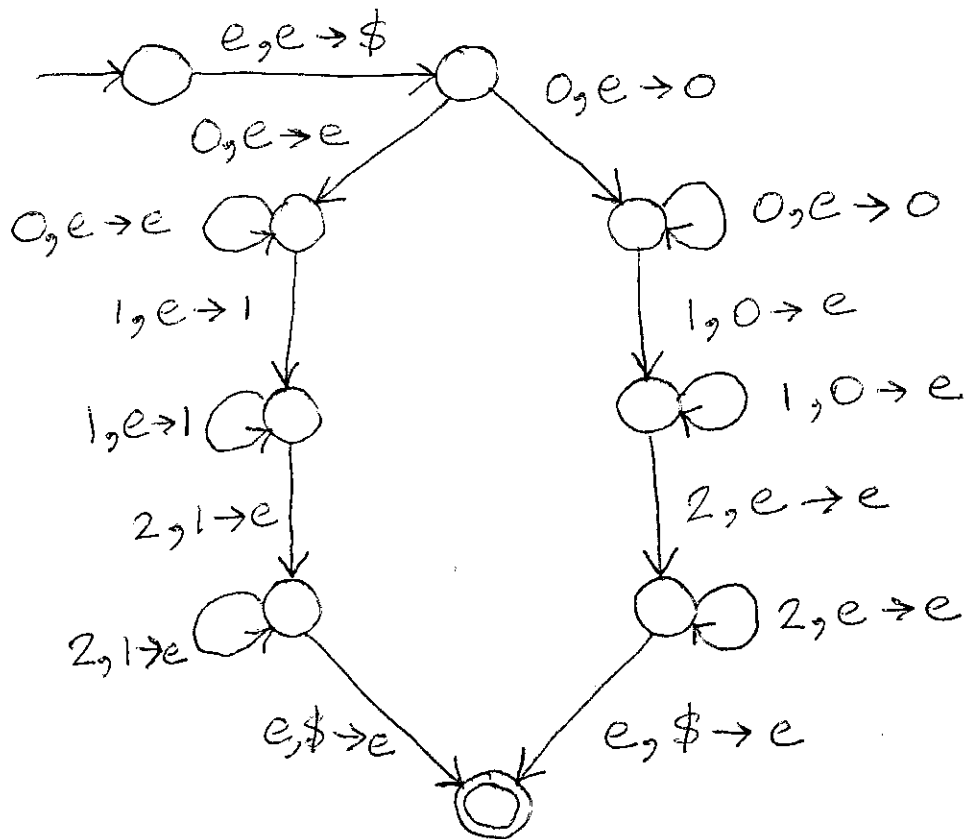
$$L = \{w : w \in \{0,1\}^*, w \text{ contains at least two copies of the substring } 011\}.$$

Answer :

Q2

Let $L_2 = \{0^i 1^j 2^k : i=j \text{ or } j=k\}$. The following PDA M_2 claims to accept L_2 . What's wrong with M_2 : specifically,

- what language does M_2 accept, and
- how does M_2 need to change to accept L_2 ?



Answer :