

① a) $L(G_1) = \{c^n \mid n \geq 0\}$

$L(G_2) = \{c^n d^m \mid n \geq 0 \text{ \& } m = n-1\}$

$L(G_3) = \{c^n d^m \mid n \geq 0 \text{ \& } m \geq 0\}$

$L(G_4) = \{c^n d^m \mid n \geq 1 \text{ \& } m \geq 1\}$

$L(G_5) = \{c^n \mid n \geq 0 \text{ if } n > 0 \text{ then } n \% 2 \neq 0\}$

b) G_4 has an inclusion $A \rightarrow Td$
 $T \rightarrow Td$

c) $L(G_1) \Rightarrow S \rightarrow A \rightarrow AA \rightarrow AAAA$
 $= cccc$

$L(G_2) \Rightarrow S \rightarrow A \rightarrow cAd \rightarrow ccAdd$
 $= ccdd$

$L(G_3) \Rightarrow S \rightarrow A \rightarrow Ad \rightarrow cAd \rightarrow ccAd$
 $= ccdd$

$L(G_4) \Rightarrow S \rightarrow cA \rightarrow ccA \rightarrow ccTd$
 $= ccdd$

$L(G_5) = S \rightarrow A \rightarrow ACA \rightarrow ACAACA$
 $= cccccc$

No.

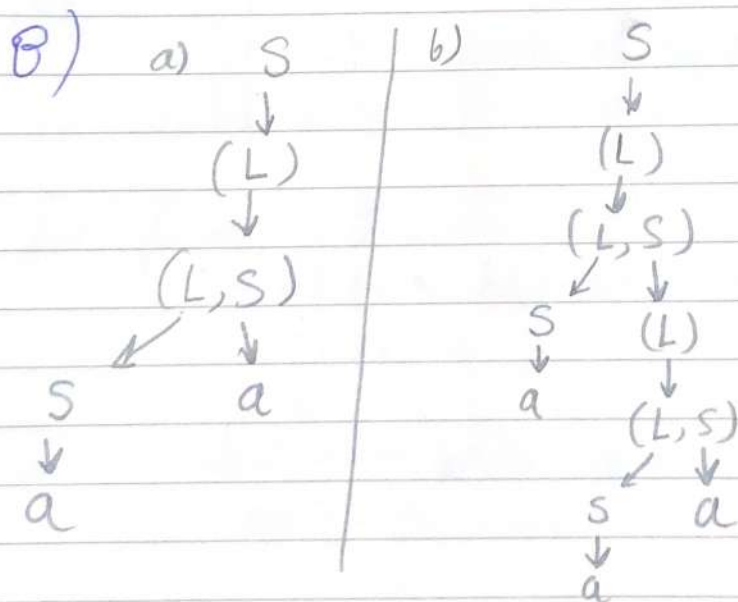
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$$\begin{aligned} \textcircled{2} \quad S &\rightarrow 1A \\ A &\rightarrow 0A \\ A &\rightarrow 0/1 \end{aligned}$$

$$\textcircled{3} \quad 1) S \rightarrow \text{start symbol}$$

$$S, L \rightarrow \text{no Terminal}$$

$$a \rightarrow \text{Terminal}$$



$$c) S \rightarrow (L) \rightarrow (L, s) \rightarrow s \rightarrow a$$

$$S \rightarrow L \rightarrow (L, s) \rightarrow s \rightarrow a$$

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④

$$S \rightarrow -L | L$$

$$L \rightarrow D.D$$

$$D \rightarrow DD$$

$$D \rightarrow 0 | 1 | \dots | 9 | \lambda$$

⑤

$$aS \rightarrow bT \rightarrow bbT \rightarrow bbU \rightarrow bbcU \rightarrow bbc$$

$$b) a^* b^* c^*$$

$$⑥) L(G) = \{ a^n b^m \mid n, m \geq 0 \}$$

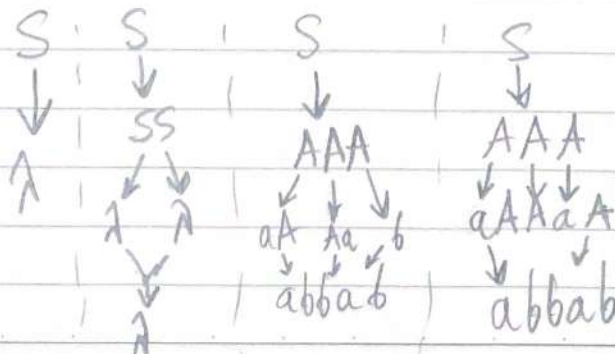
$$b) S \rightarrow AAA \rightarrow aAAA$$

$$\rightarrow abAA$$

$$\rightarrow abbA \rightarrow abbaA \rightarrow abbaAa$$

$$\rightarrow abbaba.$$

c)



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