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TY-CS-D

Roll No. 66

Assignment 2.

Q.1 Calculate first and follow for the grammars.

1. $S \rightarrow aBdh$

$B \rightarrow cC$

$C \rightarrow bc/E$

$D \rightarrow EF$

$E \rightarrow g/E$

$F \rightarrow f/E$

first

$S \rightarrow \{a\}$

$B \rightarrow \{c\}$

$C \rightarrow \{b, \epsilon\}$

$D \rightarrow \{g, \epsilon, f, \epsilon\}$ i.e. $\{g, f, \epsilon\}$

$E \rightarrow \{g, \epsilon\}$

$F \rightarrow \{f, \epsilon\}$

follow

$S \rightarrow \{\$ \}$

$B \rightarrow \{g, f, \$ \}$

$C \rightarrow \{g, f, \$ \}$

$D \rightarrow \{h\}$

$E \rightarrow \{f, \epsilon\}$

$F \rightarrow \{h\}$

2. $S \rightarrow A$

$A \rightarrow aB | Ad$

$B \rightarrow b$

$C \rightarrow g$

first

$S \rightarrow \{a\}$

$A \rightarrow \{a\}$

$B \rightarrow \{b\}$

$C \rightarrow \{g\}$

follow

$S \rightarrow \{\$ \}$

$A \rightarrow \{\$, d\}$

$B \rightarrow \{\$, d\}$

$C \rightarrow \{ \}$

3.

$S \rightarrow (L) / a$

$L \rightarrow SL'$

$L' \rightarrow , SL' | \epsilon$

first

$S \rightarrow \{ (, a \}$

$L \rightarrow \{ (, a \}$

$L' \rightarrow \{ , , \epsilon \}$

follow

$S \rightarrow \{ \$, , \}$

$L \rightarrow \{) \}$

$L' \rightarrow \{) \}$

$$4. S \rightarrow AaAb / BbBa$$

$$A \rightarrow \epsilon$$

$$B \rightarrow \epsilon$$

first

$$S \rightarrow \{ \epsilon, a, b \}$$

$$A \rightarrow \{ \epsilon \}$$

$$B \rightarrow \{ \epsilon \}$$

follow

$$S \rightarrow \{ \$ \}$$

$$A \rightarrow \{ a, b \}$$

$$B \rightarrow \{ b, a \}$$

$$5. E \rightarrow E + T / T$$

$$T \rightarrow T * F / F$$

$$F \rightarrow (E) / id$$

first

$$E \rightarrow TE'$$

$$E' \rightarrow +TE' / \epsilon$$

$$T \rightarrow FT'$$

$$T' \rightarrow *FT' / \epsilon$$

$$F \rightarrow (E) / id$$

first

follow

$$E \rightarrow \{ (, id \}$$

$$E' \rightarrow \{ +, \epsilon \}$$

$$T \rightarrow \{ (, id \}$$

$$T' \rightarrow \{ *, \epsilon \}$$

$$F \rightarrow \{ (, id \}$$

$$E \rightarrow \{ \$,) \}$$

$$E' \rightarrow \{ \$,) \}$$

$$T \rightarrow \{ +, \$,) \}$$

$$T' \rightarrow \{ *, +, \$,) \}$$

$$F \rightarrow \{ *, +, \$,) \}$$

$$6. S \rightarrow ACB / CbB / Ba$$

$$A \rightarrow da / BC$$

$$B \rightarrow g / \epsilon$$

$$C \rightarrow h / \epsilon$$

first

$$S \rightarrow \{ d, h, g, b, a \}$$

$$A \rightarrow \{ d, g, h, \epsilon \}$$

$$B \rightarrow \{ g, \epsilon \}$$

$$C \rightarrow \{ h, \epsilon \}$$

follow

$$S \rightarrow \{ \$ \}$$

$$A \rightarrow \{ h, g, \$ \}$$

$$B \rightarrow \{ a, \$, a, h \}$$

$$C \rightarrow \{ g, \$, b \}$$