

复习题2

ZBG 中博教育
ZBG EDUCATION

$$\begin{aligned}
 1.1) \quad & \text{FIRST}(E') = \{+, \epsilon\} & \text{Follow}(E) = \{), \#\} \\
 & \text{FIRST}(F) = \{*, \epsilon\} & \text{Follow}(E') = \{), \#\} \\
 & \text{FIRST}(P) = \{(, a, b, \wedge\} & \text{Follow}(T) = \{), +, \#\} \\
 & \text{FIRST}(T) = \{(, a, b, \wedge\} & \text{Follow}(T') = \{), +, \#\} \\
 & \text{FIRST}(F') = \{(, a, b, \wedge\} & \text{Follow}(F) = \{(,), +, a, b, \wedge, \#\} \\
 & \text{FIRST}(E) = \{(, a, b, \wedge\} & \text{Follow}(F') = \{(,), +, a, b, \wedge, \#\} \\
 & \text{FIRST}(T') = \{(, a, b, \wedge, \epsilon\} & \text{Follow}(P) = \{*, (,), +, a, b, \wedge, \#\}
 \end{aligned}$$

12) 所有非终结符的候选式的FIRST集合两两相交为空。

且

$$\text{FIRST}(E') \cap \text{Follow}(E') = \emptyset$$

$$\text{FIRST}(F) \cap \text{Follow}(F) = \emptyset$$

$$\text{FIRST}(T') \cap \text{Follow}(T') = \emptyset$$

因此, 该文法是LL(1)文法

	+	*	()	a	b	^	#
E			$E \rightarrow TE'$		$E \rightarrow TE'$	$E \rightarrow TE'$	$E \rightarrow TE'$	
E'	$E' \rightarrow +E$			$E' \rightarrow \epsilon$				$E' \rightarrow \epsilon$
T			$T \rightarrow FT'$		$T \rightarrow FT'$	$T \rightarrow FT'$	$T \rightarrow FT'$	
T'	$T' \rightarrow \epsilon$		$T' \rightarrow T$	$T' \rightarrow \epsilon$	$T' \rightarrow T$	$T' \rightarrow T$	$T' \rightarrow T$	$T' \rightarrow \epsilon$
F			$F \rightarrow PF'$		$F \rightarrow PF'$	$F \rightarrow PF'$	$F \rightarrow PF'$	
F'	$F' \rightarrow \epsilon$	$F' \rightarrow *F'$	$F' \rightarrow \epsilon$	$F' \rightarrow \epsilon$	$F' \rightarrow \epsilon$	$F' \rightarrow \epsilon$	$F' \rightarrow \epsilon$	$F' \rightarrow \epsilon$
P			$P \rightarrow (E)$		$P \rightarrow a$	$P \rightarrow b$	$P \rightarrow \wedge$	

2. 11) 此文法是LL(1)文法。

所有非终结符的候选式的FIRST集合两两相交为空。

$$\text{FIRST}(A) \cap \text{Follow}(A) = \{a, \epsilon\} \cap \{b, \#\} = \emptyset$$

且

非终结符B的所有产生式为无用产生式。

$$\text{FIRST}(S) = \{a, \epsilon\}$$

$$\text{Follow}(S) = \{\#\}$$

$$\text{FIRST}(A) = \{a, \epsilon\}$$

$$\text{Follow}(A) = \{b, \#\}$$

$$\text{FIRST}(B) = \{b, \epsilon\}$$

$$12) \quad S \rightarrow Ab$$

$$A \rightarrow a|B|\epsilon$$

$$B \rightarrow b|\epsilon$$

$$\begin{aligned} \text{FIRST}(S) &= \{a, b, \varepsilon\} & \text{Follow}(S) &= \{\#\} \\ \text{FIRST}(A) &= \{a, b, \varepsilon\} & \text{Follow}(A) &= \{\#, b\} \\ \text{FIRST}(B) &= \{b, \varepsilon\} & \text{Follow}(B) &= \{\#, b\} \end{aligned}$$

对于非终结符A, $\text{FIRST}(\varepsilon) \cap \text{FIRST}(B) = \{\varepsilon\}$

且 $\text{FIRST}(A) \cap \text{Follow}(A) = \{b\}$

$\text{FIRST}(B) \cap \text{Follow}(B) = \{b\}$

因此, 该文法不是 LL(1) 文法

(3) $S \rightarrow ABBA$

$A \rightarrow a | \varepsilon$

$B \rightarrow b | \varepsilon$

$$\begin{aligned} \text{FIRST}(S) &= \{a, b, \varepsilon\} & \text{Follow}(S) &= \{\#\} \\ \text{FIRST}(A) &= \{a, \varepsilon\} & \text{Follow}(A) &= \{b, a, \#\} \\ \text{FIRST}(B) &= \{b, \varepsilon\} & \text{Follow}(B) &= \{a, b, \#\} \end{aligned}$$

所有非终结符的候选式的 FIRST 集合两两为空

但 $\text{FIRST}(A) \cap \text{Follow}(A) = \{a\}$ 相交

$\text{FIRST}(B) \cap \text{Follow}(B) = \{b\}$

因此, 该文法不是 LL(1) 文法

(4) $S \rightarrow ase | B$

$B \rightarrow bBe | C$

$C \rightarrow cCe | d$

$$\begin{aligned} \text{FIRST}(S) &= \{a, b, c, d\} & \text{Follow}(S) &= \{\#, e\} \\ \text{FIRST}(B) &= \{b, c, d\} & \text{Follow}(B) &= \{\#, e\} \\ \text{FIRST}(C) &= \{c, d\} & \text{Follow}(C) &= \{\#, e\} \end{aligned}$$

所有非终结符的候选式的 FIRST 集合两两相交为空

且没有非终结符的 FIRST 集合中包含 ε , 因此, 这个文法是 LL(1) 文法

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