

—2022—

MADE EASY
WORKBOOK



**Detailed Explanations of
Try Yourself Questions**

Computer Science & IT
Compiler Design



MADE EASY
— Publications

1

Introduction and Lexical Analysis



Detailed Explanation of Try Yourself Questions

T1 : Solution

(a)

Lexical analyzer produces an error when an illegal character appears in the string pattern that makes invalid token.

....

2

Parsing and Syntax Directed Translation



Detailed Explanation of Try Yourself Questions

T1 : Solution

(b)

For any particular string:

parse trees = # LMD's = # RMD's

\therefore

$l = P = r$

T2 : Solution

(d)

In L-attributed, all attributes follow synthesized attributed notation or restricted inherited attribute notation (parent or left sibling).

In S-attribute, all attributes follow synthesized attribute notation only.

$F \rightarrow (E)G \{F.val = E.val = G.val\}$ This notation is not in L-attributed, and also not S-attributed.

T3 : Solution

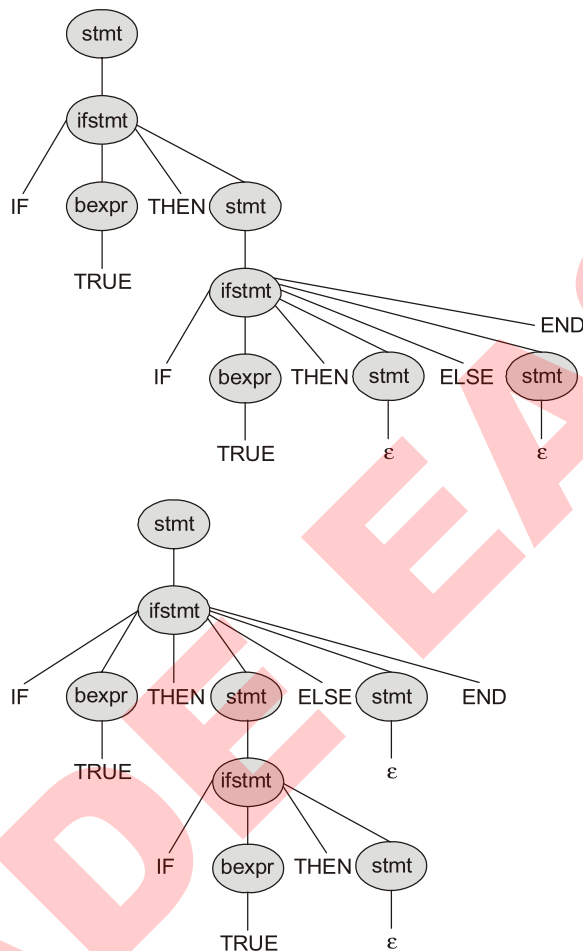
(d)

Recursive descent parser can not use left recursive grammar but it can use right recursive grammar.

T4 : Solution

(a)

For string : "IF TRUE THEN IF TRUE THEN ELSE END" has two parse trees.



∴ The given grammar is ambiguous, hence it is not LL(1) and also not LR(1).

T5 : Solution

(d)

Set 1 has RR conflict.

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

$B \rightarrow ba., \{b, c\}$

$\{b\} \cap \{b, c\} \neq \emptyset$

∴ Grammar produces RR conflict for CLR (1).

T6 : Solution

(d)

Set 3 contain $S \rightarrow \cdot$ as reduced item.

Follow (S) = { }, \$}

In row 3, entry for column ')' and '\$' will be " r_b ".

$$E_1 = r_b, E_2 = r_b \quad [\because b : S \rightarrow \epsilon]$$

In set 5, on S it goes to set 6.

In row 5, entry for non-terminals 'S' is state 6.

$$E_3 = 6 \quad [\because (5) \xrightarrow{S} (6)]$$

$$E_1 = r_b, E_2 = r_b \text{ and } E_3 = 6$$

T7 : Solution

(c)

FOLLOW (A) = LFOLLOW(A) = RFOLLOW(A)

The set of terminals followed by A are same in all sentential forms.

T8 : Solution

(a)

(a) An unambiguous grammar can have different leftmost and rightmost derivation. However, an unambiguous grammar has only one derivation tree. So option (a) is false.

(b) LL(1) is a top-down parser.

(c) LALR is more powerful than SLR.

(d) For any parser, grammar should be unambiguous.

T9 : Solution

(a)

For Input string: aab

LR parser reduces aS to S to parse the string aab when stack has aaS.

■■■■

3

Runtime Environment



Detailed Explanation of Try Yourself Questions

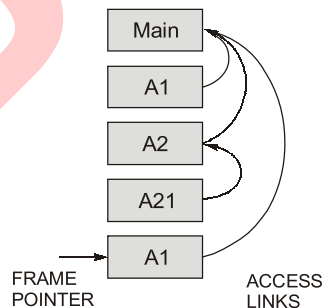
T1 : Solution

(b)

Activation record maintains: Frame pointer, Access link, Local variables, Return address, Return value, etc.

T2 : Solution

(d)



Given calling sequence from the program is: $\text{Main} \rightarrow \text{A1} \rightarrow \text{A2} \rightarrow \text{A21} \rightarrow \text{A1}$
A1 and A2 are defined in Main, so A1 and A2 access links are pointed to Main.
A21 definition is available in A2, hence A21 access link points to A2.

■■■■