

GATE PSUs

State Engg. Exams

MADE EASY
WORKBOOK 2024



**Detailed Explanations of
Try Yourself *Questions***

Computer Science & IT
Compiler Design



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 Syntex Directed Translation



Detailed Explanation *of* Try Yourself Questions

T1 : Solution

(b)

For any particular string:

$$\# \text{ parse trees} = \# \text{ LMD's} = \# \text{ RMD's}$$

$$\therefore l = P = r$$

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

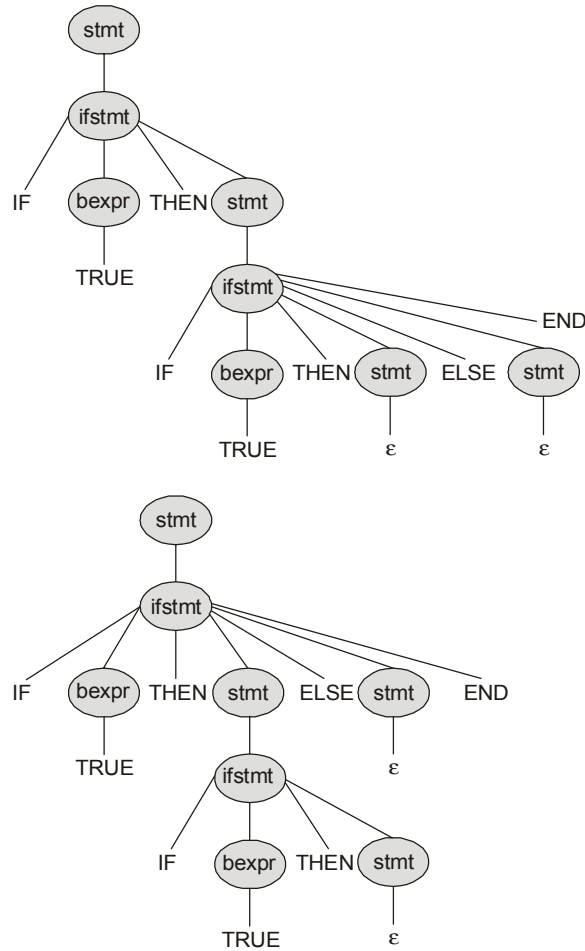
(d)

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.



4

Runtime Environment



Detailed Explanation of Try Yourself Questions

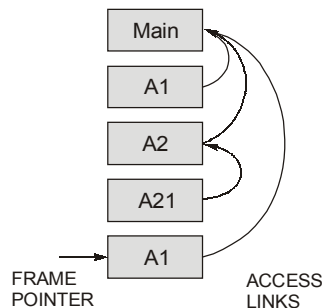
T1 : Solution

(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: Main \rightarrow A1 \rightarrow A2 \rightarrow A21 \rightarrow 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.

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