Covered Topics Under UNIT-3 of "CD- COMPILER DESIGN (KIT-052)"

shwetatiwari08@recabn.ac.in
shwetatiwari08aug@gmail.com

CD: UNIT-3

Syntax-Directed Translation

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MS. SHWETA TIWARI
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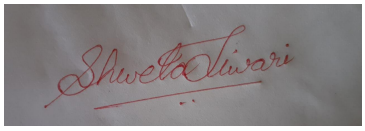

shwetatiwari08@recabn.ac.in
shwetatiwari08aug@gmail.com

TOPIC On : UNIT-3

Syntax-Directed Translation: How to evaluate expressions, SDT schemes Advantages

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By SHWETA TIWARI

Under On: Syntax-Directed Translation

PREPARED FOR
Engineering Students
All Engineering College

PREPARED BY
SHWETA TIWARI
Guest Faculty

How to Evalutate expression

Given one SDT and input And find output with corresponding input.

(1) Question

input aadbc

SDT	S R	Action
S → AB	Print(1)	1
A → a	(2)	2
B → bC	(3)	3
B → dB	(4)	4
C → c	(5)	

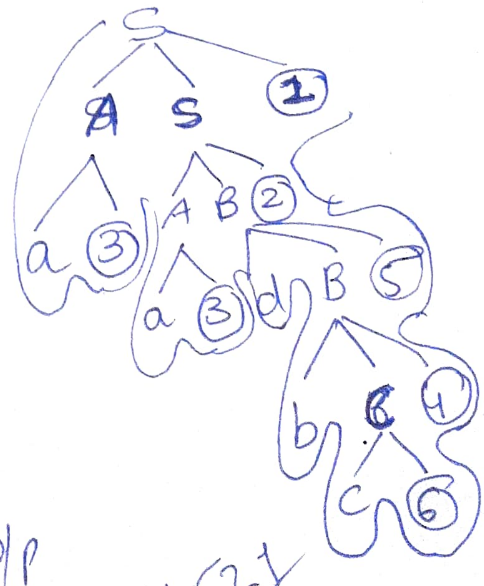
			Rule
S → AS	Print(1)	1	1
S → AB	Pf(2)	2	2
A → a	Pf(3)	3	3
B → bC	Pf(4)	4	4
B → dB	Pf(5)	5	5
C → c	Pf(6)	6	6

(1) Top-Down-Approach

(TtoD & LtoR)*

input → aadbc

S → AS
~~→ aAB~~
→ aS
→ aAB
→ aaB
→ aadB
aadB
→ aadbC
aadbc



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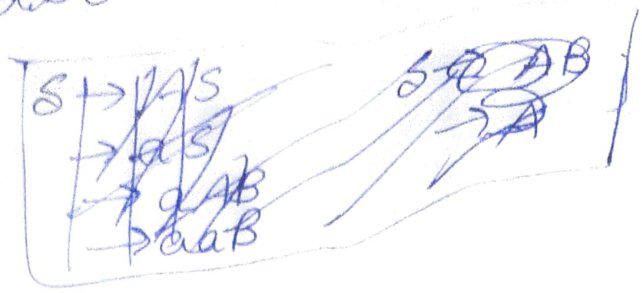
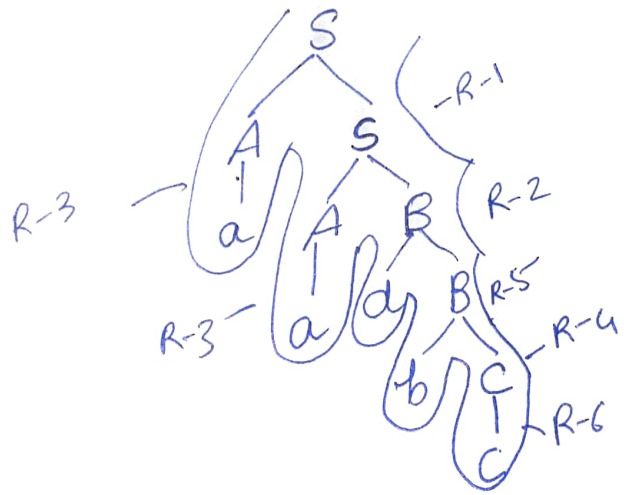
Bottom-up App. (work on reduction RHS reduced by LHS(NT))

Input → aadbc



S → AS
→ AAB
→ AAdB
→ AAdbC
AAdbc
Aadbc
aadbc



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Syntax Directed Translation Schemes

* SDT schemes is similar to SDD, except that the order of evaluation of the semantic rules is explicitly shown.

It is also a CFG in which semantic rules are embedded with the right side of production with, attributes are also associated with the grammar symbols.

1. Top-Down Approach
2. Bottom-Up "

* How to evaluate Arithmetic expression using SDT

P & D.	S.R	Action/Rule
$E \to E \& T$	{ E.val = E.val * T.val }	(1)
$E \to T$	{ E.val = T.val }	(2)
$T \to T @ F$	{ T.val = T.val - F.val }	(3)
$T \to F$	{ T.val = f.val }	(4)
$F \to num$	{ f.val = num }	(5)

Input — 4 & 8 @ 5 & 7 @ 3

Top-Down Approach

4 & 8 @ 5 & 7 @ 3

$E \rightarrow E \& T$

~~$E \& T @ T$~~

LMD

$\rightarrow E \& T \& T$

$\rightarrow T \& T \& T$

$\rightarrow F \& T \& T$

$\rightarrow num \& T \& T$

$\rightarrow num \& T @ F \& T$

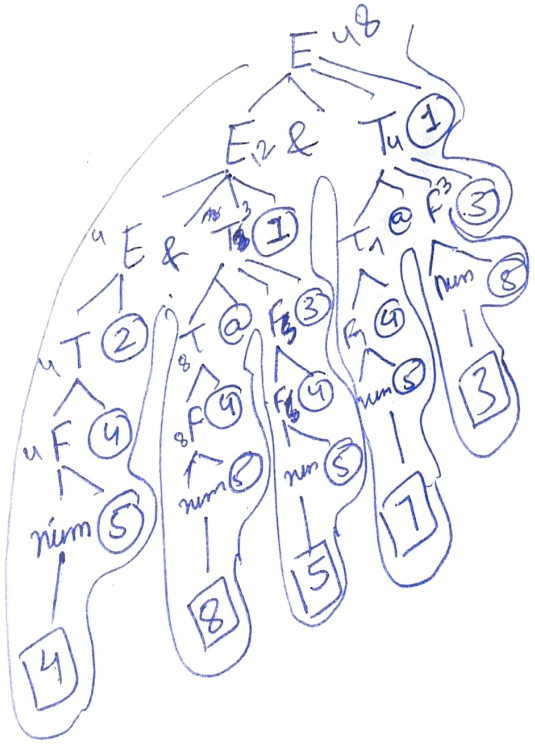
$\rightarrow num \& F @ num \& T @ F$

$\rightarrow num \& num @ num \& F @ num$

$\rightarrow num \& num @ num \& num @ num$

& → *

@ → -

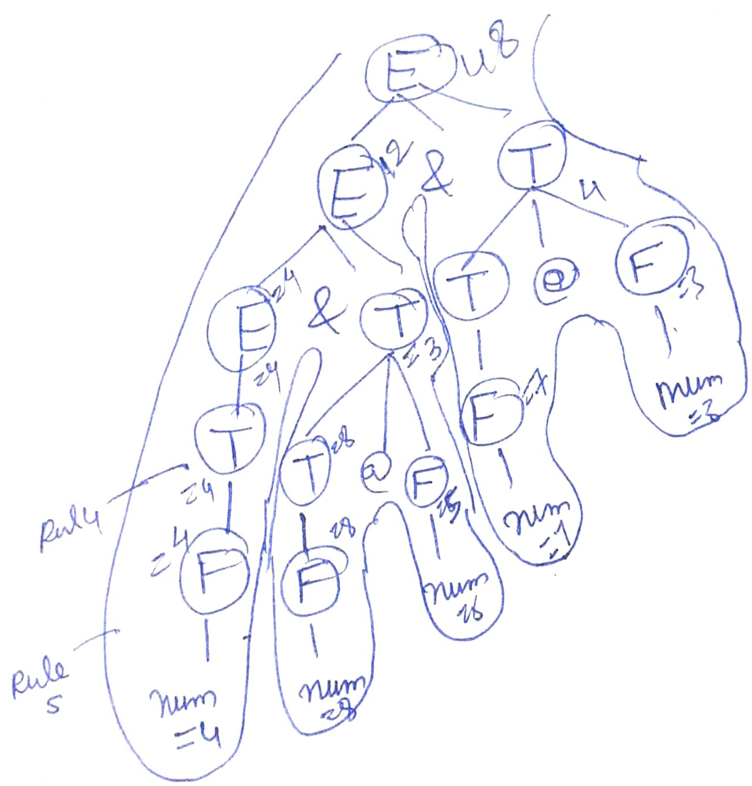


input → 4&8@5&7@3

Bottom-Up.

E → E&T
→ E&T@F
→ E&F@F
→ E&T&F@F
→ E&T@F&F@F
→ E&F@F&F@F
→ T&F@F&F@F
→ F&F@F&F@F

& → *
@ → -



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