Slip test - 2.

1. Convert into GNF form:

$A_1 \rightarrow A_2 A_3$

$A_2 \rightarrow A_3 A_1 \mid b$

$A_3 \rightarrow A_1 A_2 \mid a.$

$A \rightarrow a\alpha$

Step 1:

All are in CNF.

Step 2:

$A_1 \rightarrow A_2 A_3$

$A_2 \rightarrow A_3 A_1 \mid b$

$A_3 \rightarrow A_1 A_2 \mid a.$

Step 3:

Camparision RHS and LHS.

$A_1 \rightarrow A_2 A_3$ safe

$A_2 \rightarrow A_3 A_1 \mid b$ safe

$A_3 \rightarrow A_1 A_2 \mid a$

Replace with alternative production.

$A_3 \rightarrow A_1 A_2 \mid a.$

$A_3 \rightarrow A_2 A_3 A_2 \mid a.$

$A_3 \rightarrow A_3 A_1 A_3 A_2 \mid b A_3 A_2$

by.

Resultant:

$A_1 \rightarrow A_2 A_3$

$A_2 \rightarrow A_3 A_1 \mid b A_3 A_2$

$A_3 \rightarrow A_3 A_1 A_3 A_2 \mid b A_3 A_2 \mid a$.

Step : 4.

$A_3 \rightarrow A_3 A_1 A_3 A_2 \mid b A_3 A_2 \mid a$.

RHS and LHS both are same.

$A_3 \rightarrow b A_3 A_2 \mid a$.

Add B_3

$A_3 \rightarrow b A_3 A_2 B_3 \mid a B_3$.

$B_3 \rightarrow A_1 A_3 A_2$

$B_3 \rightarrow A_1 A_3 A_2 B_3$

Resultant:

$A_1 \rightarrow A_2 A_3$

$A_2 \rightarrow A_3 A_1 \mid b A_3 A_2$

$A_3 \rightarrow b A_3 A_2 \mid a \mid b A_3 A_2 B_3 \mid a B_3$.

$B_3 \rightarrow A_1 A_3 A_2 \mid A_1 A_3 A_2 B_3$.

For A_2:

$A_2 \rightarrow A_3 A_1 \mid b A_3 A_2$.

$A_2 \rightarrow (b A_3 A_2 \mid a \mid b A_3 A_2 B_3 \mid a B_3) A_1 \mid b$

$A_2 \rightarrow b A_3 A_2 A_1 \mid a A_1 \mid b A_3 A_2 B_3 A_1 \mid a B_3 A_1 \mid$

Resultant:

$A_1 \rightarrow A_2 A_3$

$A_2 \rightarrow bA_3A_2A_1 \mid aA_1 \mid bA_3A_2B_3A_1 \mid aB_3A_1 \mid \perp$.

$A_3 \rightarrow bA_3A_2 \mid a \mid bA_3A_2B_3 \mid aB_3$.

For A_1:

$A_1 \rightarrow A_2 A_3$

$A_1 \rightarrow (bA_3A_2A_1 \mid aA_1 \mid bA_3A_2B_3A_1 \mid aB_3A_1 \mid b)$ A_3.

$A_1 \rightarrow \{bA_3A_2A_1A_3 \mid aA_1A_3 \mid bA_3A_2B_3A_1 \mid aB_3A_1$ $A_3 \mid bA_3$.

Resultant:

$A_1 \rightarrow bA_3A_2A_1A_3 \mid aA_1A_3 \mid bA_3A_2B_3A_1 \mid aB_3A_1$ $A_3 \mid bA_3$.

$A_2 \rightarrow bA_3A_2A_1 \mid aA_1 \mid bA_3A_2B_3A_1 \mid aB_3A_1 \mid b$.

$A_3 \rightarrow bA_3A_2 \mid a \mid bA_3A_2B_3 \mid aB_3$.

$B_3 \rightarrow A_1A_3A_2$ ~~$\mid A_1A_3A_2B_3$~~

$B_3 \rightarrow (bA_3A_3A_1A_3 \mid aA_1A_3 \mid bA_3A_2B_3A_1 \mid aB_3A_1A_3 \mid bA_3)A_3A_2$.

$B_3 \rightarrow bA_3A_2A_1A_3A_3A_2 \mid aA_1A_3A_3A_2 \mid bA_3A_2B_3A_1A_3A_2 \mid aB_3A_1A_3A_3A_2 \mid bA_3A_3A_2$.

$B_3 \rightarrow A_1A_3A_2B_3$.

~~$B_3 \rightarrow bA_3A_2$~~

Rep

$B_3 \rightarrow (bA_3A_2A_1A_3 \mid aA_1A_3 \mid bA_3A_2B_3A_1 \mid aB_3A_1A_3 \mid bA_3) A_3A_2B_3$

$B_3 \rightarrow bA_3A_2A_1A_3A_3A_2B_3 \mid aA_1A_3A_3A_2B_3 \mid$

$bA_3A_2B_3A_1A_3A_2B_3 \mid aB_3A_1A_3A_3A_2B_3 \mid bA_3A_3A_2B_3.$

Resultant:

$A_1 \rightarrow bA_3A_2A_1A_3 \mid aA_1A_3 \mid bA_3A_2B_3A_1A_3 \mid aB_3A_1A_3 \mid bA_3.$

$A_2 \rightarrow bA_3A_2A_1 \mid aA_1 \mid bA_3A_2B_3A_1 \mid aB_3A_1 \mid b.$

$A_3 \rightarrow bA_3A_2 \mid A \mid bA_3A_2B_3 \mid aB_3.$

$B_3 \rightarrow bA_3A_2A_1A_3A_3A_2B_3 \mid aA_1A_3A_3A_2B_3 \mid$

$bA_3A_2B_3A_1A_3A_2B_3 \mid aB_3A_1A_3A_3A_2B_3 \mid$

$bA_3A_3A_2B_3.$

2. Ambiguous:

Any string of a grammar G has a one or more derivations in the same state is called ambiguous.

A Context free grammar G

such that two phase trees.

The equivalent of the grammar is left most derivation or right most derivation.

Eg:

$E \rightarrow E+E \mid E*E \mid (E) \mid id.$

$E \Rightarrow E+E$

$\rightarrow id + (E*E)$

$\rightarrow id + id * E$

$\rightarrow id + id * E.$

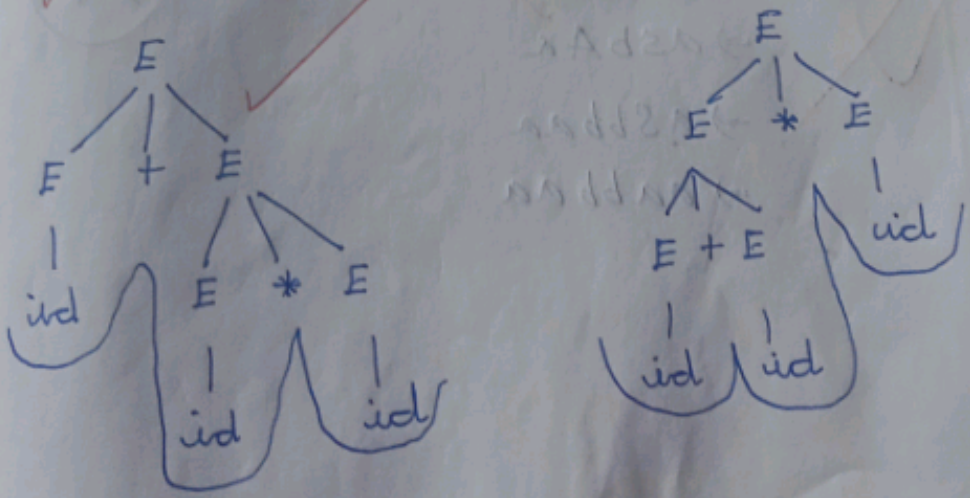
$E \Rightarrow E * E$

$\rightarrow (E+E) * id$

$\Rightarrow id + id * id$

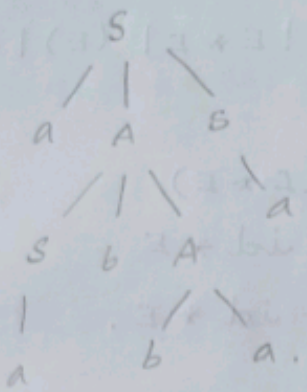
$\rightarrow id + id * id.$

Here we have 2 derivations for the same state.



3. Find the left most derivation and right most derivation from the following derivation tree.

S →



Left most

S → aAs

→ asbAS

→ aabAS

→ aabbaS

→

Right most

S → aAS

→ aAa

→ asbAa

→ aSbbaa

→ aabbaa

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