CD: COMPILER DESIGN
CD: UNIT-2 09/2022

SEPTEMBER 2022 / IT-3rd year, Vth semester
FALL SEMESTER, YEAR (Vth, 3rd)
FALL SESSION (2022-23)
(CD)
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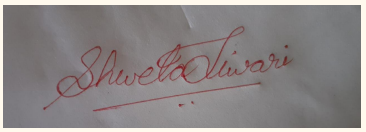
Published: SEPTEMBER, 2022

PREPARED FOR
Engineering Students
All Engineering College



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CD: COMPILER DESIGN

TOPIC On : Ambiguous Grammar

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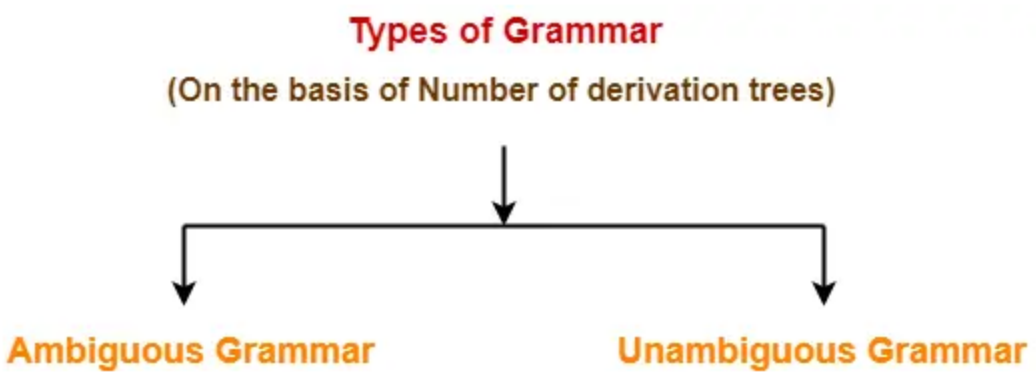
By SHWETA TIWARI

Under On: Unit-2

TOPIC On : Ambiguous Grammar

On the basis of number of derivation trees, grammars are classified as-



1. Ambiguous Grammar
2. Unambiguous Grammar

1. Ambiguous Grammar-

A grammar is said to ambiguous if for any string generated by it, it produces more than one-

- Parse tree
- Or derivation tree
- Or syntax tree
- Or leftmost derivation
- Or rightmost derivation

Example-

Consider the following grammar-

$E \rightarrow E + E / E \times E / id$

Ambiguous Grammar

This grammar is an example of ambiguous grammar.

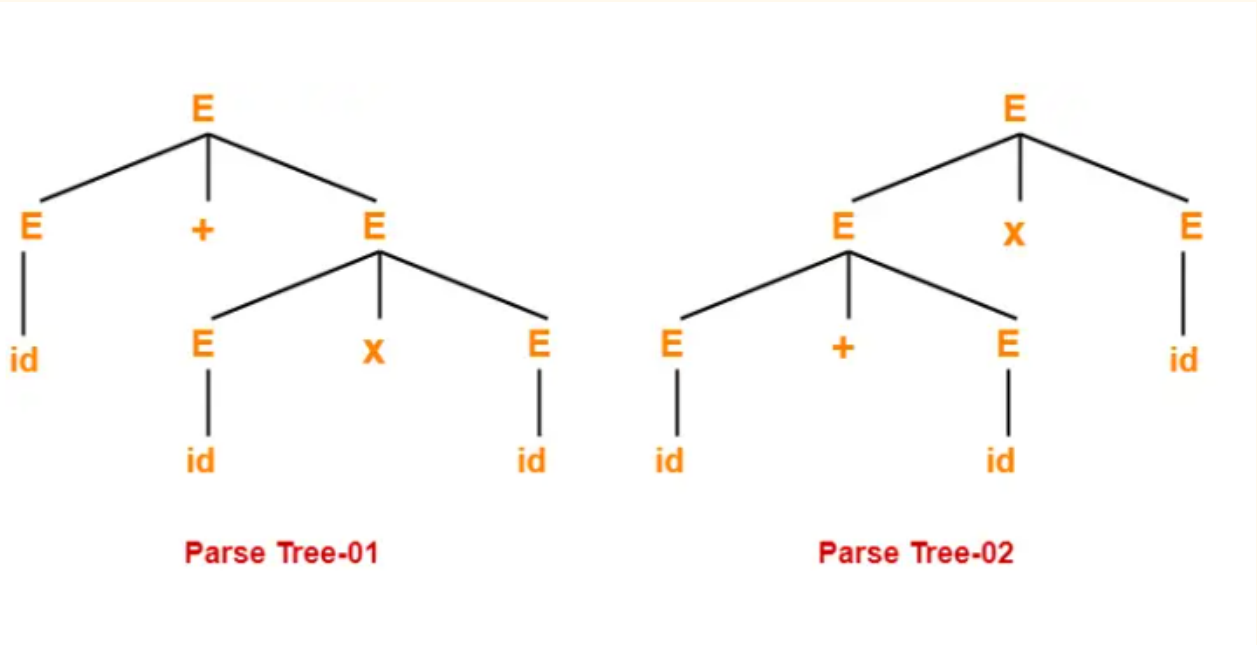
Any of the following reasons can be stated to prove the grammar ambiguous-

Reason-01:

Let us consider a string w generated by the grammar-

$w = id + id \times id$

Now, let us draw the parse trees for this string w.



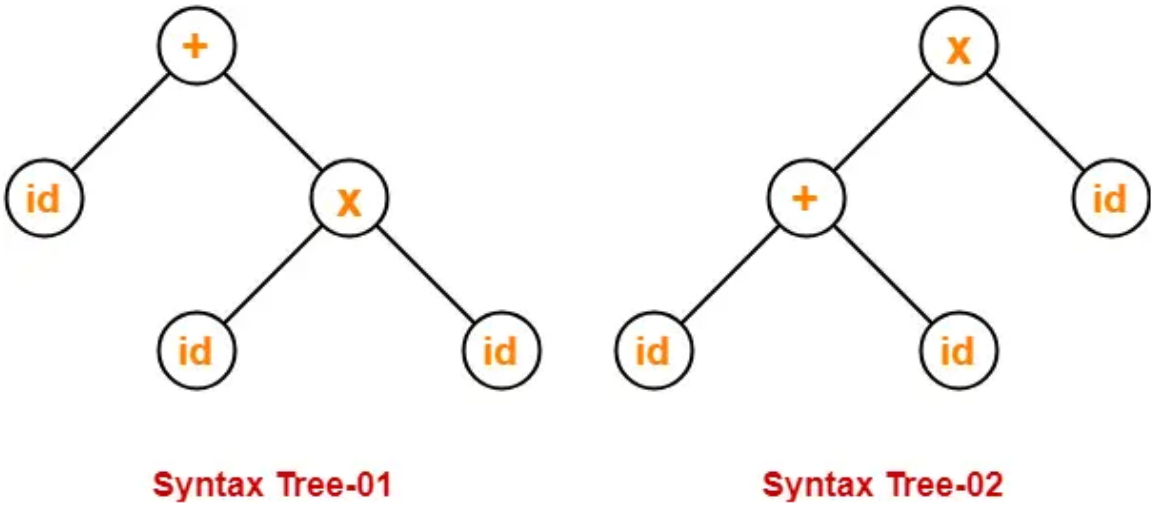
Since two parse trees exist for string w, therefore the grammar is ambiguous.

Reason-02:

Let us consider a string w generated by the grammar-

w = id + id x id

Now, let us draw the syntax trees for this string w.



Since two syntax trees exist for string w, therefore the grammar is ambiguous.

Reason-03:

Let us consider a string w generated by the grammar-

w = id + id x id

Now, let us write the leftmost derivations for this string w.

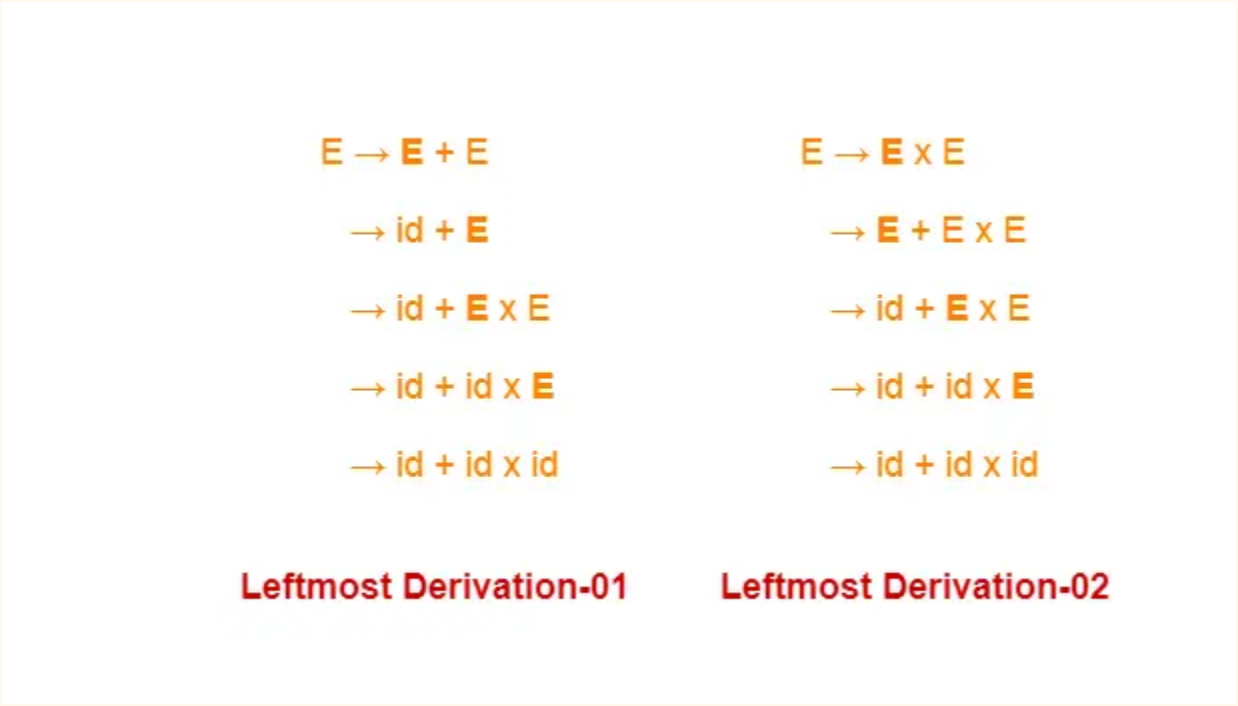
Since two leftmost derivations exist for string w, therefore the grammar is ambiguous.

Reason-04:

Let us consider a string w generated by the grammar-

w = id + id x id

Now, let us write the rightmost derivations for this string w.



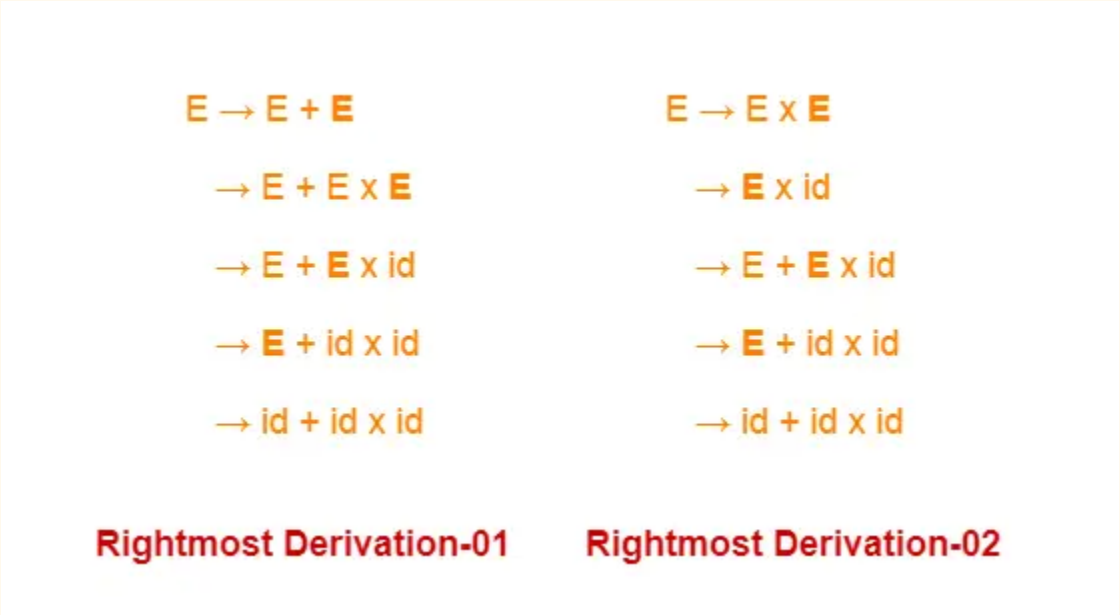
Since two leftmost derivations exist for string w, therefore the grammar is ambiguous.

Reason-04:

Let us consider a string w generated by the grammar-

w = id + id x id

Now, let us write the rightmost derivations for this string w.



Since two rightmost derivations exist for string w, therefore the grammar is ambiguous.

2. Unambiguous Grammar-

A grammar is said to unambiguous if for every string generated by it, it produces exactly one-

- Parse tree
- Or derivation tree
- Or syntax tree
- Or leftmost derivation
- Or rightmost derivation

Example-

Consider the following grammar-

$$E \rightarrow E + T \mid T$$

$$T \rightarrow T \times F \mid F$$

$$F \rightarrow id$$

Unambiguous Grammar