Left Recursive:

A grammar is said to be left Recursive if it is of the form.

A----------> Aα

A----------> β

Discussion

If we expand A, It will result in recursion as follows

A----------> Aα

A----------> AAα

A---------->AA Aα

A----------> AAAAα

A----------> AAAAAα

…….

To remove this problem, the given grammar is re-written as

A---------->αA'

A'----------> β/ε

The two grammars are defining same language i.e. both are same. The 1st one has left recursion and the 2nd one has left recursion.

Examples

Let we have

E----------> E+T

E---------->T

Now check if the left most "E" repeats itself then there is left recursion.

Here

A=E

A'=E'

α=+T

β=T

so

A---------->βA'

A'---------->αA'/ ε

E---------->TE'

E'----------> +TE'

Thus the correct grammar is

E---------->TE'

E'----------> +TE'

Let we have another example:

X---------->Xby

X---------->a
Eliminate Left Recursion:
Here
A=X
A’=X’
α=by
β=a
A---------->βA’
A’---------->αA’/ ε
X---------->aX’
X’----------> byX’/ε