UNIT-III

Subject-Theory of Computation

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Leftmost derivation

- A leftmost derivation is obtained by applying production to the leftmost variable in each step.

Rightmost derivation

- A rightmost derivation is obtained by applying production to the rightmost variable in each step

Generate the string "id + id* id" by leftmost and rightmost derivation, using the following CFG.

$E \rightarrow E + E / E * E / id$

Leftmost Derivation	Rightmost derivation
Id +id * id	Id+id*id
E>E+E	E->E+E
E>**id** + E E>id+ E* E	E-> E + E*E E->E + E * id
E>id+ id* E E>id+ id* id	E->E + id * id E->id + id * id

- Generate the string "ababa" by leftmost and rightmost derivation, using the CFG. S->SbS, S->a

Leftmost	Rightmost
S->SbS ->abS ->abSbS ->ababS ->**ababa**	S->SbS ->Sba ->SbSba ->Sbaba ->**ababa**

HW

Generate the string "aaabbb" by leftmost and rightmost derivation, using the following CFG.

S->aB | ab,A->aAB | a,B->ABb | b

Leftmost:”aaabbb”	rightmost:”aaabbb”
S->aB S->aABb S->aaABBb S->aaaBBb S->aaabBb S->aaabbb	S->aB S->aABb S->aAABbb S->aAAbbb S->aAabbb S->aaabbb

Unambiguous Grammar-

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

Generation of Derivation Tree

- A derivation tree or parse tree is an ordered rooted tree that graphically represents the semantic information a string derived from a context-free grammar.