Page No.
Class
Roll No.
Date: / /202

Practical No. 08

Title :- Write a C program to check whether a string belong to grammer or not

Theory :-

A context-free grammer (CFG) is a set of recursive rules (or productions) used to generate patterns of strings

A CFG consists of the following components

- A set of terminals symbols, which are the characters of the alphabets that appears in the strings generated by the grammer
- A set of non-terminals symbols which ~~are~~ placeholders for patterns of terminals symbols that can be generated by the non-terminal symbols
- A set of productions which are rules for replacing (or rewriting) non-terminals symbols (on the left side of the production)
- A start symbol, which is a special non-terminals symbols that appears in the initial strings generated by the grammers.

Page No.
Class
Roll No.
Date: / /

Defn:- A context-free grammer (CFG) consisting of finite set of grammer rules is a quadruple (N, T, P, S) where

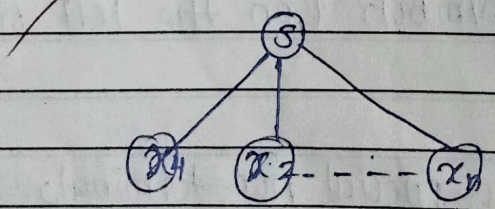
- N is a set of non-terminals symbols
- T is a set of terminal where $N \cap T = Null$
- P is a set of rule P, $N \rightarrow (N \cup T)^*$ ie the left hand side of the production rule P does have any right context
- S is the start symbol.

Example:-

- The grammer ({A}, {a, b, c}, P, A) → aA, A → abc.
- the grammer ({S, a, b}, {a, b}; P, S → aSa S → bSb; S →
- The grammar ({S, f}, {0, 1}, P, S) P: S → 00S / 11F; F → 00

Representation Technique

- Root vertex - must be labelled by the start symbol
- Vertex - labeled by a non-terminals symbol
- leaves - labelled by a terminal symbol or ϵ



There are two different approach to draw a derivation tree.

Page No.
Class
Roll No.
Date: / /202

Top-down approach
- starts with the starting symbol S.
- Goes down to tree leaves using production.

Bottom-up approach.
- starts from tree leaves
- proceeds upward to the root which is the starting symbol S.

Derivation or yield of a tree.
The derivation or the yield of a parse tree is final string obtained by concatenating the labels of the leaves of the tree from left to right ignoring the nulls however if all the leaves are null derivation is null.

Ex.
Let a CFG (N, T, P, S) be
N = {S}, T = {a, b} starting symbol = S, P = S → SS | aSb | ϵ
one derivation from the above CFG is "abaabb".
S → SS → aSbS → abaSb → abaaSbb → abaabb.