Day:- wednesday
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Compiler Design
Assignment - 1

N.V.S.k kalyani
17UNIA0584
III rd B.tech CSE -C

1. Define SDD with an example?

Syntax Directed Definition (SDD) is a context free grammar together with attributes and semantic rules.

Attributes are associated with grammar symbols and rules are associated with productions.

Ex:- If 'x' is a symbol and 'a' is one of its attributes, then we write x.a of denote the value of 'a' at a particular parse tree node x.

A syntax directed definition specifies the value of attributes by associating semantic rules with the grammar productions.

Production	semantic Rules
$E \rightarrow E + T$	$E.val = E.val + T.val$

2. Define Annotated parse tree, dependency graph and give Example?

Annotated parse tree :-

A parse tree showing the values of attributes at each node is called an annotated parse tree.
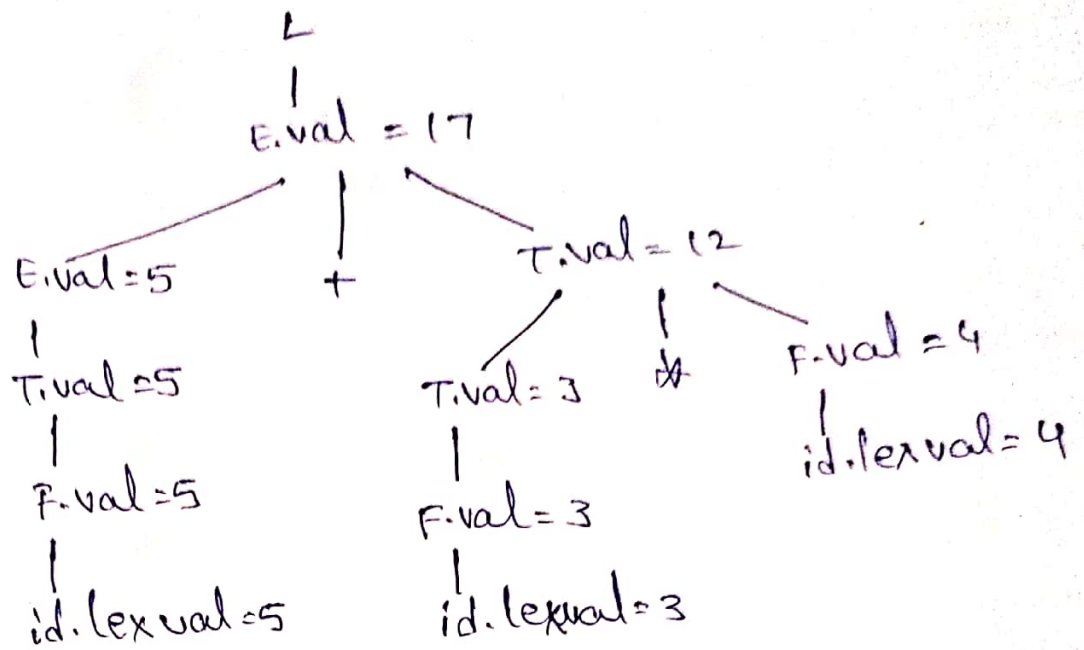
The process of computing the attribute values at the nodes is called annotating of the parse tree.
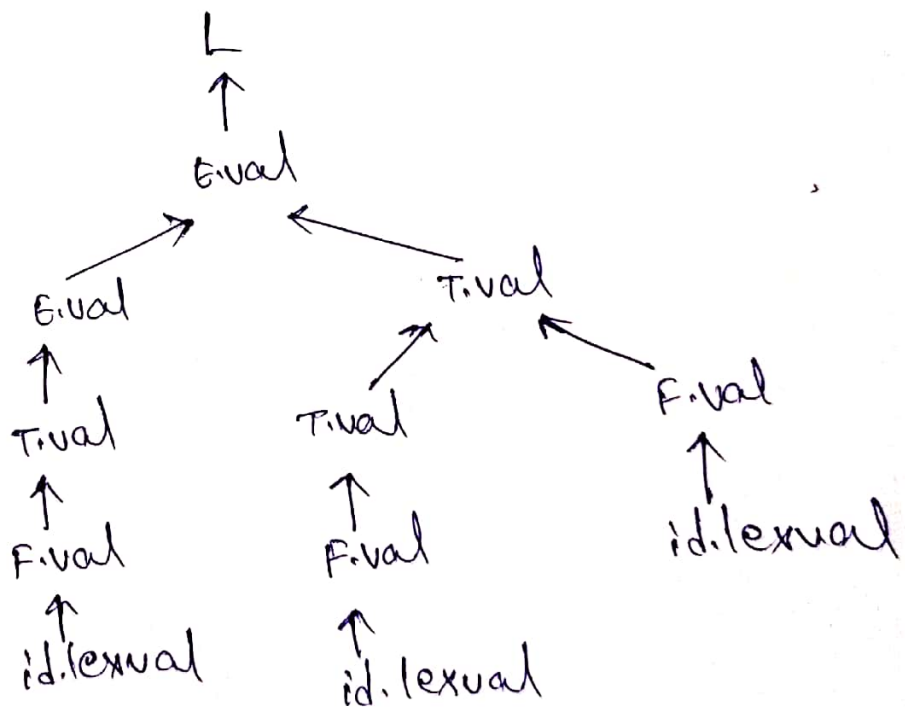
Ex:-
$L \rightarrow E$
$E \rightarrow E + T \mid T$
$T \rightarrow T * F \mid F$
$F \rightarrow (E) \mid id$ and derive the string 5.+3 * 4

Scanned with CamScanner

L

E.val = 17

E.val = 5   +   T.val = 12

T.val = 5   T.val = 3   *   F.val = 4

F.val = 5   F.val = 3   id.lexval = 4

id.lexval = 5   id.lexval = 3

Dependency graph:

L

E.val

E.val   T.val

T.val   T.val   F.val

F.val   F.val   id.lexval
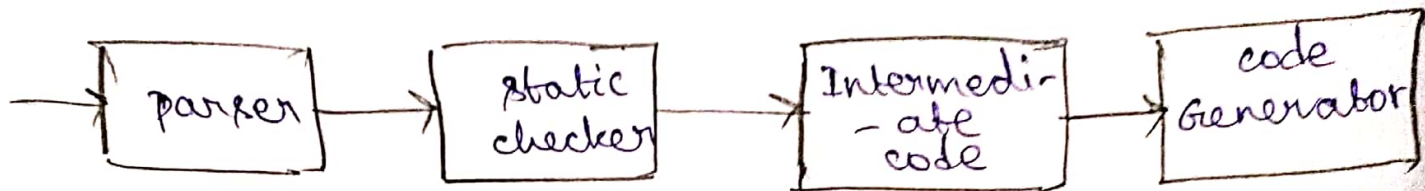
id.lexval   id.lexval

3. what is the need of intermediate code in compiler design explain in brief.

Intermediate code generation :-

1. Intermediate code is the interface between front end and back end in a compiler.
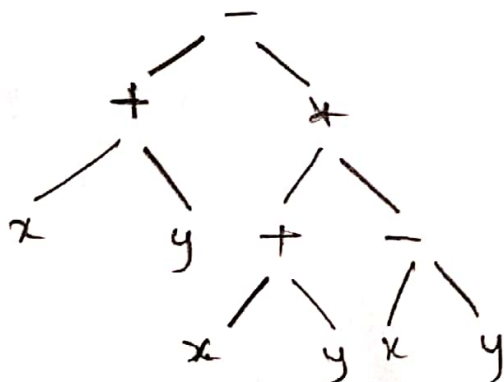
2. In order to translate a source program into target code a compiler may constructs a sequence of intermediate representations called intermediate code.
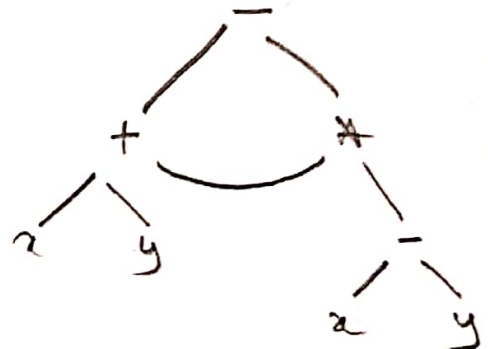
$$\rightarrow \boxed{\text{parser}} \rightarrow \boxed{\begin{array}{c}\text{static}\\\text{checker}\end{array}} \rightarrow \boxed{\begin{array}{c}\text{Intermedi-}\\\text{ate}\\\text{code}\end{array}} \rightarrow \boxed{\begin{array}{c}\text{code}\\\text{Generator}\end{array}}$$

4. construct the syntax tree and DAG for the expression

$$((x+y) - (x+y) * (x-y))$$

Sol.

syntax tree   Directed Alyclic Graph (DAG)

5. Translate the airthemetic expression $f = a*(b+c) - d/e$ into three address code.

Sol:

Given Expression is $f = a*(b+c) - d/e$

Three address code is

$$t_1 = d/e$$
$$t_2 = b+c$$
$$t_3 = a*t_2$$
$$t_4 = t_3 - t_1$$