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Assignment - 04 ...

* Title:- YACC program to validate variable declarations.

* Problem statement:- Write a program using YACC specifications to implement syntax analysis phase of compiler to validate type and syntax of variable declaration in Java.

* Theory:- Lex recognizes regular expressions, whereas YACC recognizes grammar. Lex divides the input stream into tokens while YACC uses these tokens & groups them together logically.

⇒ Syntax:-

```
%{
    declaration
%}
%%
  rules
%%
subroutines | functions.
```

* Declaration section:-

Here, the definition section is same as that of Lex, where we can define all tokens and include header files. The declarations section is used to define the symbols used to define the target language & their relationship with each other. In particular, the additional information required to resolve ambiguities in the context-free grammar for the target language is provided here.

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* Grammar rules in YACC :-

The rules section defines the CFGs to be accepted by the function YACC generates & associates with those rules C-language actions & additional precedence information. The grammar is as follows:
The rule section is comprised of one or more grammar rules.
A grammar rule has the form :-

A : BODY ;

A → non-terminal.

BODY → sequence of zero or more literals & semantic actions that can then be followed by optional precedence rules.

Only names & literals participate in the formation of the grammar. The semantic actions & precedence rules are used in other ways. The colon & the semi-colon are YACC punctuation.

If there are several rules with the same L.H.S, the vertical bar '|' can be used.

* Programs section :-

This can include the definition of the lexical analyzer yylex() & any other functions; e.g:- those used in the actions specified in the grammar rules. It is unspecified whether the programs section follows the semantic actions in the output file : therefore, if the application contains any macro definitions & declarations intended to apply to the code in the semantic actions, it shall place them within "%{ %}" in the declaration section.

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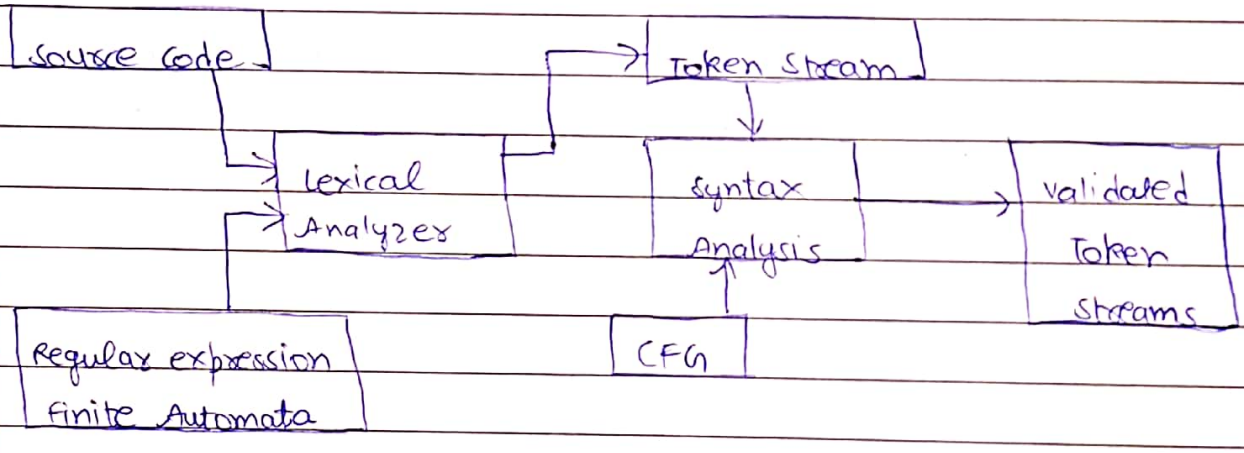
* Interface to the lexical Analyzer:-

The yylex() function is an integer valued function that returns a token number representing the kind of token read if there is a value associated with the token returned by yylex(), it shall be assigned to the external variable yylval.

* Syntax Analyser



⇒ E → E * E
E → E + E
E → id
parsing x + y * 2.

x + y * 2
E + y * 2
E + E * 2
E + E * E
E * E
E

* Testcases:

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	Input	Output	Status
⇒	int a;	Valid syntax	Pass
⇒	int a,b;	Valid syntax	Pass
⇒	int a,b,5;	Invalid syntax	Pass
⇒	int a,b,c	Invalid syntax	Pass

* Conclusion:-

We have successfully implemented and executed a syntax analyzer YACC to validate syntax of Java declaration statements.