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Assignment No. 7

Title: Validation of compound statement.

Problem Statement: Write a program using LEX and YACC to validate compound statements in High Level Language

Objective:
1. To study YACC tool for syntax analysis.
2. To master YACC utility.

Theory:
1. Write about the syntax analysis phase of compiler

Syntax analysis is a second phase of the compiler design process that comes after lexical analysis. It analyses the syntactical structure of the given input. It checks if the given input is in the correct syntax of the programming language in which the input which has been written. It is known as the Parse Tree or Syntax Tree.
The Parse Tree is developed with the help of pre-defined grammar of the language. The syntax analyzer also checks whether a given program fulfills the rules implied by a context-free grammar. If it satisfies, the parser then creates the parse tree of that source program. Otherwise, it will display error messages.

2. Description of Each Section of *.y file with example

Thus, every specification file consists of three sections: the declarations, (grammar) rules, and programs. The sections are separated by double percent ``%%'' marks. (The percent ``%'' is generally used in Yacc specifications as an escape character.)

In other words, a full specification file looks like

```
declarations
 %%
 rules
 %%
 programs
```

The declaration section may be empty. Moreover, if the programs section is omitted, the second %% mark may be omitted also;

thus, the smallest legal Yacc specification is

```
%%
 rules
```

3. Description of standard inbuilt variables and functions like yylval,yyparse(),yyerror().

YACC generates the definition for yyparse() in y.tab.c and LEX generates the definition for yylex() in lex.yy.c. We have also noted that yyparse() repetitively calls yylex() to read tokens from the input stream.

4. Compilation and Execution Process.

```
flex compound.l

yacc -d compound.y

gcc lex.yy.c compound.tab.c

./a.out
```

Input: Source specification (*.y) file for loop statement like If statemets,while and do-while statements.
Output: statement is grammatically correct or not.

Conclusion: Parser for validation of compound statement is successfully done.

Platform: Linux (Lex and Yacc)

FAQs:

1. What is role of y.tab.h file?

y.tab.h

Before writing the LEX program, there must be some way by which the YACC program can tell the LEX program that DIGIT is a valid token that has been declared in the YACC program. This communication is facilitated by the file "y.tab.h" which contains the declarations of all the tokens in the YACC program. The "y.tab.h" is automatically generated by YACC when the 'yacc' command is executed with the -d flag.
The y.tab.h file must be included in the declarations section of the LEX program. This makes the token declarations accessible to the LEX program. We will see an example in the next section.

2. Explain YACC tool.

YACC (yet another compiler-compiler) is an LALR(1) (LookAhead, Left-to-right, Rightmost derivation producer with 1 lookahead token) parser generator. YACC was originally designed for being complemented by Lex.

Input File:

YACC input file is divided in three parts.

```
/* definitions */
 ....

%%
/* rules */
....
%%

/* auxiliary routines */
....
```