GOA COLLEGE OF ENGINEERING

"Bhausaheb Bandodkar Technical Education Complex"

Experiment No: 7

Syntax Analyzer-III

Aim: Write a YACC program to validate syntax of Nested for loop with assignment statements for given input.

Theory:

Syntax Analysis is a second phase of the compiler design process in which the given input string is checked for the confirmation of rules and structure of the formal grammar. It analyses the syntactical structure and checks if the given input is in the correct syntax of the programming language or not.

Syntax Analysis in Compiler Design process comes after the Lexical analysis phase. It is also 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 analyser 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.

Lex Program:

```
%{
#include <stdlib.h>
void yyerror(char *);
#include "y.tab.h"
%}

%%
"while" {
        return WHILE;
    }
"for" {
        return FOR;
    }
">" {
   return G;
    }
"<" {
   return L;
    }
">=" {
   return GE;
    }
"<=" {
   return LE;
    }
[-+*=(){};]   {
        return *yytext;
    }
```

```
[ \t\n]+ ;
[0-9]+ { return NUM;}
[a-zA-Z_][a-zA-Z0-9_]* {return ID;}
. {printf("\n\nlex err");}

%%

int yywrap(void) {
    return 1;
}
```

Yacc Program:

```
%{
int yylex(void);
void yyerror(char *);
#include<stdio.h>
%}

%token FOR WHILE ID NUM G L GE LE

%%
program:
        program STATEMENT       { printf("Valid Expression \n"); }
        |
        ;

STATEMENT:
        STARTF '(' COND ')' '{' STAT STATEMENT '}'
        |STARTW '(' CONDW ')' '{' STAT STATEMENT '}'
        |
        ;
STARTF:
        FOR
        ;
STARTW:
        WHILE
        ;
COND:
        ID ';' ID RELOP NUM ';' ID '+' '+'
        |ID ';' ID RELOP NUM ';' ID '-' '-'
        ;
```

```
CONDW:
    ID RELOP ID
    ;

RELOP:
    G
    |L
    |GE
    |LE
    ;

STAT:
    ID '=' EXP ';' ID '=' EXP ';' STAT1
    ;

STAT1:
    ID '=' EXP ';' STAT1
    |
    ;

EXP:
    ID EXPD
    ;

EXPD:
    '+' EXP EXPD
    |'-' EXP EXPD
    |'*' EXP EXPD
    |
    ;


%%

void yyerror(char *s) {
    fprintf(stderr, "%s\n", s);
    //return 0;
}

int main(void) {
    yyparse();
    return 0;
}
```

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Conclusion:

The yacc program to validate the syntax of nested for loop has been successfully executed.