Nikit Gokhe

Class : TY-Comp D1

Roll No. 324022

GR No. 21810522

# Assignment 04

# Aim:

Write a program to evaluate an arithmetic expression, built-in functions, and variables using YACC specification.

A) Evaluate an arithmetic expression:

# Source Code:

Lex File:

%{

#include<stdio.h> #include "y.tab.h" extern int yylval;

%}

%%

[0-9]+ {

yylval=atoi(yytext); return NUMBER;

}

[\t] ;

[\n] return 0;

. return yytext[0];

%%

int yywrap()

{

return 1;

}

YACC FILE:

%{

#include<stdio.h> int flag=0;

%}

%token NUMBER

%left '+' '-'

%left '\*' '/' '%'

%left '(' ')'

%%

ArithmeticExpression: E{ printf("\nResult=%d\n",$$); return 0;

}

E:E'+'E {$$=$1+$3;}

|E'-'E {$$=$1-$3;}

|E'\*'E {$$=$1\*$3;}

|E'/'E {$$=$1/$3;}

|E'%'E {$$=$1%$3;}

|'('E')' {$$=$2;}

| NUMBER {$$=$1;}

;

%%

void main()

{

printf("\nEnter Arithmetic Expression:\n"); yyparse();

if(flag==0)

printf("\nEntered arithmetic expression is Valid\n\n");

}

void yyerror()

{

printf("\nEntered arithmetic expression is Invalid\n\n"); flag=1;}

# Output:

nikit@user:~$ lex 4a.l

nikit@user:~$ yacc-d 4a.y

nikit@user:~$ gcc lex.yy.c y.tab.c

nikit@user:~$ ./a.out

Enter Arithmetic Expression:

2\*3+1

Result=7

Entered arithmetic expression is Valid

nikit@user:~$ ./a.out

Enter Arithmetic Expression:

2\*

Entered arithmetic expression is Invalid

B) Built in functions:

# Source Code:

Lex File:

%{

#include <stdio.h> #include "y.tab.h"

%}

%%

[\t ] ;

sqrt { return MATH;}

\( return OB;

[0-9]+ { yylval = atoi(yytext); return NUM;}

\) return CB;

%%

int yywrap()

{

return 1;

}

YACC File:

%{

#include <stdio.h> #include <stdlib.h> #include <math.h> #include <string.h>

void yyerror(char\*); int yylex(void);

%}

%token MATH OB CB NUM

%%

s: MATH OB NUM CB { $$ = sqrt($3); printf("Result is %d\n",$$); return 0;};

%%

void yyerror(char \*s )

{

fprintf(stderr, "ERROR: %s\n",s);

}

int main()

{

printf("Enter math function:"); yyparse();

return 0;

}

# Output:

nikit@user:~$ lex libc.l

nikit@user:~$ yacc-d libc.y

nikit@user:~$ gcc lex.yy.c y.tab.c –lm

nikit@user:~$ ./a.out

Enter math function: sqrt(9)

Result is 3

nikit@user:~$ ./a.out

Enter math function: sqrt(

ERROR: syntax error

c) Variable using YACC apecification:

# Source Code:

Lex File:

%{

#include <stdio.h> #include "y.tab.h"

%}

DIGIT [0-9]

%%

[\t ] ;

[a-zA-z]+[a-zA-z0-9\_]\* {return ID;}

{DIGIT}+ { return NUM;} "," {return COMMA;}

";" {return SC;}

\n return NL;

. ;

%%

int yywrap()

{

return 1;

}

YACC File:

%{

#include<stdio.h> void yyerror(char\*); int yylex();

%}

%token ID NUM COMMA NL SC

%%

s: type1;

type1:varlist SC NL { printf("valid Variable declaration\n"); return 0;}; varlist: ID | ID COMMA varlist ;

%%

void yyerror(char \*s )

{

fprintf(stderr, "ERROR: %s\n",s);

}

int main()

{

printf("Enter variable names:"); yyparse();

return 0;

}

# Output:

nikit@user:~$ yacc-d c.y

nikit@user:~$ gcc lex.yy.c y.tab.c

nikit@user:~$ ./a.out

Enter variable names:a;

valid Variable declaration

nikit@user:~$ ./a.out

Enter variable names:a,b;

valid Variable declaration

nikit@user:~$ ./a.out

Enter variable names:1a;

ERROR: syntax error