

**M.FAYEKA MASOODHA**

**REG.NO:2019103518**

**COMPILER DESIGN LAB 9**

1. Write a yacc program to implement Boolean operators.

**Q1.I**

```
%option noyywrap
```

```
%{
```

```
#include<stdio.h>
```

```
#include "y.tab.h"
```

```
extern int yylval;
```

```
%}
```

```
%%
```

```
[0-9]+ {
```

```
    yylval=atoi(yytext);
```

```
    return NUMBER;
```

```
}
```

```
"&&" {return AND;}
```

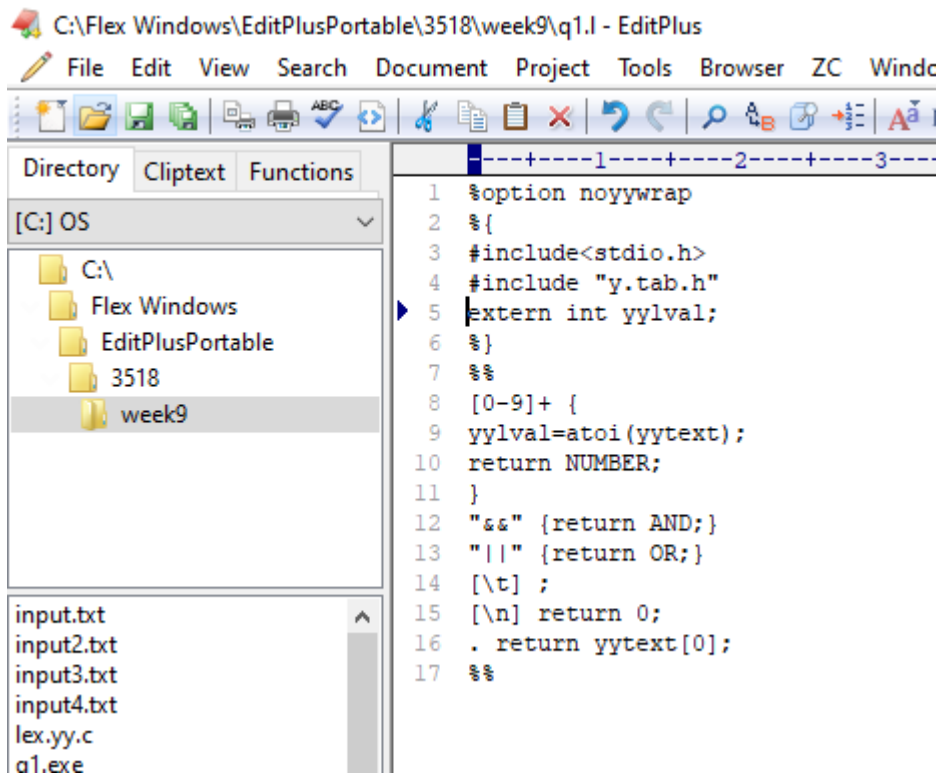
```
"||" {return OR;}
```

```
[\t] ;
```

```
[\n] return 0;
```

```
. return yytext[0];
```

```
%%
```



## Q1.y

```
%{
#include<stdio.h>

int yylex();

int flag=0;

int yyerror();

%}

%token NUMBER AND OR

%left '!' AND OR

%%

booleanExpression: E{
printf("Result: %d\\n", $$);
return 0;
};

E :E AND E {$$=$1&&$3;}
```

```
| E OR E {$$=$1| |$3;}
| '!E {$$=!$2;}
| NUMBER {$$=$1;}
;
%%

void main()
{
printf("Enter the Boolean Expression:");
yyparse();
if(flag==0)
printf("\nValid Boolean Expression\n");
}

int yyerror()
{
printf("\nInvalid Boolean Expression\n");
flag=1;
return 1;
}
```

C:\Flex Windows\EditPlusPortable\3518\week9\q1.y - EditPlus

File Edit View Search Document Project Tools Browser ZC Window Help

Directory Cliptext Functions

[C:] OS

- C:\
- Flex Windows
- EditPlusPortable
- 3518
- week9

input.txt  
input2.txt  
input3.txt  
input4.txt  
lex.yy.c  
q1.exe  
q1.l  
q1.l.bak  
q1.y  
q1.y.bak  
q2.l  
q2.l.bak  
q21.exe  
q21.y  
q21.y.bak  
q22.exe  
q22.y  
q22.y.bak  
q3.exe  
q3.l

```
1  %{
2  #include<stdio.h>
3  int yylex();
4  int flag=0;
5  int yyerror();|
6  %}
7  %token NUMBER AND OR
8  %left '!' AND OR
9  %%
10 booleanExpression: E{
11 printf("Result: %d\n", $$);
12 return 0;
13 };
14 E :E AND E {$$=$1&&$3;}
15 |E OR E {$$=$1||$3;}
16 |'!'E {$$=!$2;}
17 |NUMBER {$$=$1;}
18 ;
19 %%
20 void main()
21 {
22 printf("Enter the Boolean Expression:");
23 yyparse();
24 if(flag==0)
25 printf("\nValid Boolean Expression\n");
26 }
27 int yyerror()
28 {
29 printf("\nInvalid Boolean Expression\n");
30 flag=1;
31 return 1;
32 }
```

```
Command Prompt

C:\Flex Windows\EditPlusPortable\3518\week9>lex q1.1

C:\Flex Windows\EditPlusPortable\3518\week9>yacc -dy q1.y

C:\Flex Windows\EditPlusPortable\3518\week9>gcc lex.yy.c y.tab.c -o q1

C:\Flex Windows\EditPlusPortable\3518\week9>q1.exe
Enter the Boolean Expression:3&&1
Result: 1

Valid Boolean Expression

C:\Flex Windows\EditPlusPortable\3518\week9>q1.exe
Enter the Boolean Expression:3||2
Result: 1

Valid Boolean Expression

C:\Flex Windows\EditPlusPortable\3518\week9>q1.exe
Enter the Boolean Expression:!5
Result: 0

Valid Boolean Expression

C:\Flex Windows\EditPlusPortable\3518\week9>_
```

2. Write a yacc program to validate the prefix and postfix expression.

### Q2.1

```
%{
#include "y.tab.h"
%}

%%

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

[t];

\n return 0;
```

```
. {return yytext[0];}
```

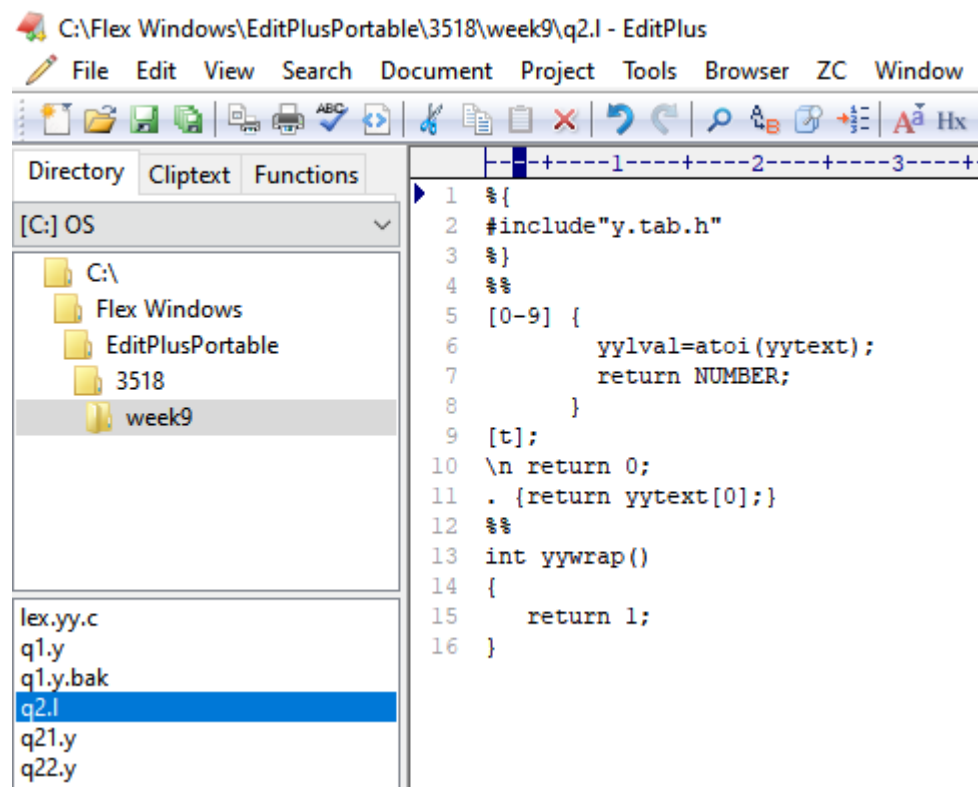
```
%%
```

```
int yywrap()
```

```
{
```

```
    return 1;
```

```
}
```



## Q21.y - validating prefix expression

```
%{
```

```
#include<stdio.h>
```

```
int yyerror(char *s);
```

```
int yylex();
```

```
int c=0;
```

```
%}
```

```
%token NUMBER
```

```
%left '+' '-'
```

```
%left '*' '/'
```

```
%nonassoc UMINUS
```

```
%%
```

```
state : exp { c++;}
```

```
;
```

```
exp : NUMBER
```

```
  | '+' exp exp {}
```

```
  | '-' exp exp {}
```

```
  | '*' exp exp {}
```

```
  | '/' exp exp {}
```

```
;
```

```
%%
```

```
int yyerror(char * str)
```

```
{
```

```
  printf("\nInvalid Expression");
```

```
  c=0;
```

```
  return 1;
```

```
}
```

```
int main()
```

```
{
```

```
  printf("\nEnter the Expression : ");
```

```
  yyparse();
```

```
  if(c>0)
```

```

printf("THIS IS A VALID PREFIX EXPRESSION\n");
return(0);
}

```

C:\Flex Windows\EditPlusPortable\3518\week9\q21.y - EditPlus

File Edit View Search Document Project Tools Browser ZC Window Help

Directory Cliptext Functions

[C:] OS

C:\  
Flex Windows  
EditPlusPortable  
3518  
week9

input.txt  
input2.txt  
input3.txt  
input4.txt  
lex.yy.c  
q1.exe  
q1.l  
q1.l.bak  
q1.y  
q1.y.bak  
q2.l  
q2.l.bak  
q21.exe  
q21.y  
q21.y.bak  
q22.exe  
q22.y  
q22.y.bak  
q3.exe  
q3.l  
q3.l.bak  
q3.y  
q3.y.bak

```

1  %{
2  #include<stdio.h>
3  int yyerror(char *s);
4  int yylex();
5  int c=0;
6  %}
7  %token NUMBER
8  %left '+' '-'
9  %left '*' '/'
10 %nonassoc UMINUS
11 %%
12 state : exp { c++;}
13 ;
14 exp : NUMBER
15 | '+' exp exp {}
16 | '-' exp exp {}
17 | '*' exp exp {}
18 | '/' exp exp {}
19 ;
20
21 %%
22 int yyerror(char * str)
23 {
24     printf("\nInvalid Expression");
25     c=0;
26     return 1;
27 }
28 int main()
29 {
30     printf("\nEnter the Expression : ");
31     yyparse();
32     if(c>0)
33     printf("THIS IS A VALID PREFIX EXPRESSION\n");
34     return(0);
35 }

```



```
Command Prompt
Invalid Expression
C:\Flex Windows\EditPlusPortable\3518\week9>lex q2.1

C:\Flex Windows\EditPlusPortable\3518\week9>yacc -dy q21.y

C:\Flex Windows\EditPlusPortable\3518\week9>gcc lex.yy.c y.tab.c -o q21

C:\Flex Windows\EditPlusPortable\3518\week9>q21.exe

Enter the Expression : */23-21
THIS IS A VALID PREFIX EXPRESSION

C:\Flex Windows\EditPlusPortable\3518\week9>q21.exe

Enter the Expression : -+87/43
THIS IS A VALID PREFIX EXPRESSION

C:\Flex Windows\EditPlusPortable\3518\week9>q21.exe

Enter the Expression : 2-3-2+

Invalid Expression
C:\Flex Windows\EditPlusPortable\3518\week9>q21.exe

Enter the Expression : 23-98

Invalid Expression
C:\Flex Windows\EditPlusPortable\3518\week9>
```

## Q22.y - validating postfix expression

```
%{
#include<stdio.h>

int yylex();
int yyerror(char *str);

int c=0;
%}

%token NUMBER

%left '+' '-'

%left '*' '/'

%nonassoc UMINUS

%%
```

```
state : exp { c++; }
```

```
;
```

```
exp : NUMBER
```

```
| exp exp '+' {}
```

```
| exp exp '-' {}
```

```
| exp exp '*' {}
```

```
| exp exp '/' {}
```

```
;
```

```
%%
```

```
int yyerror(char * str)
```

```
{
```

```
printf("\nInvalid Expression");
```

```
    c=0;
```

```
    return 1;
```

```
}
```

```
int main()
```

```
{
```

```
printf("\nEnter the Expression : ");
```

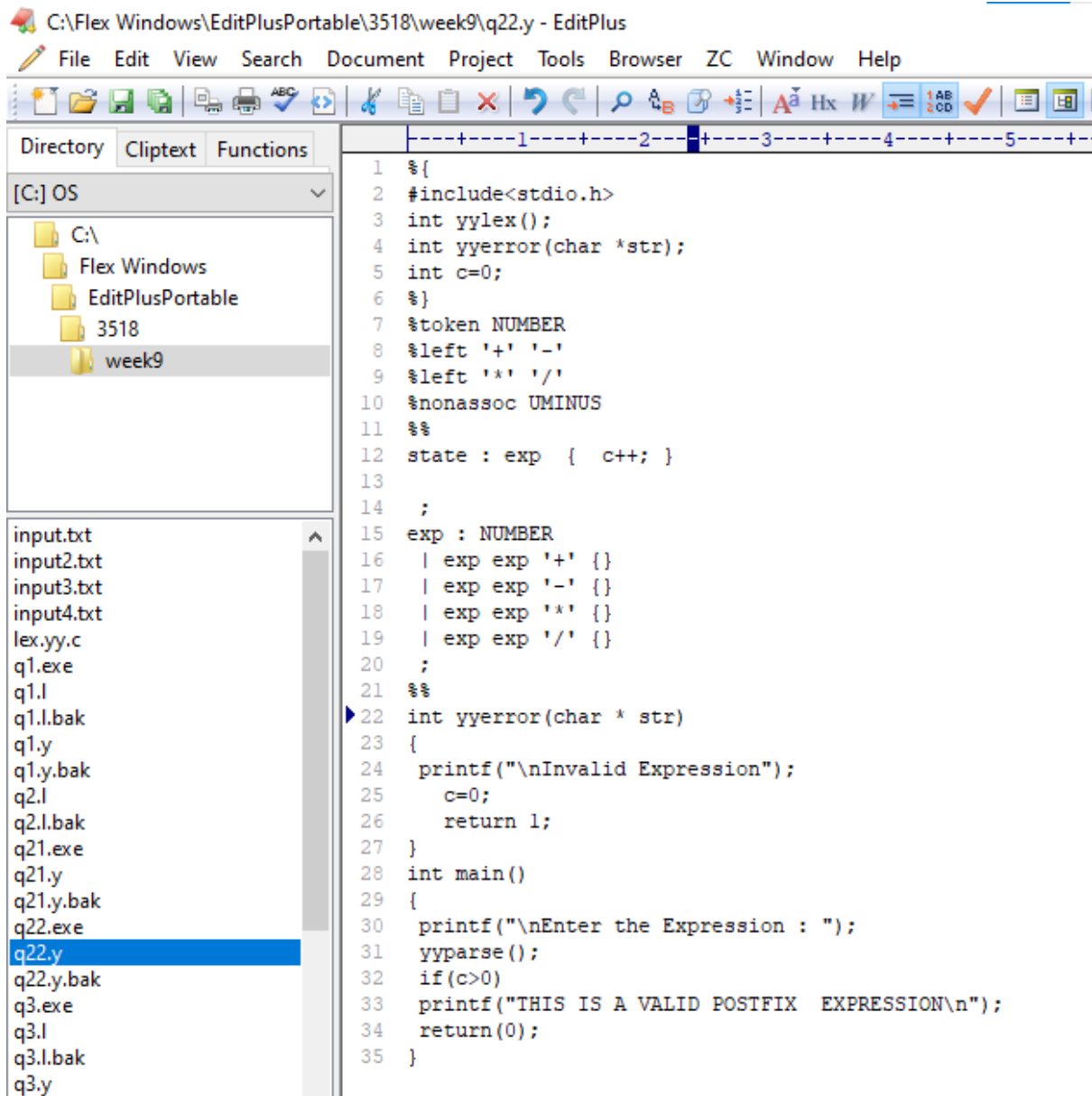
```
yyvsparse();
```

```
if(c>0)
```

```
printf("THIS IS A VALID POSTFIX EXPRESSION\n");
```

```
return(0);
```

```
}
```



```
Command Prompt
C:\Flex Windows\EditPlusPortable\3518\week9>lex q2.1
C:\Flex Windows\EditPlusPortable\3518\week9>yacc -dy q22.y
C:\Flex Windows\EditPlusPortable\3518\week9>gcc lex.yy.c y.tab.c -o q22
C:\Flex Windows\EditPlusPortable\3518\week9>q22.exe
Enter the Expression : 98+87-/
THIS IS A VALID POSTFIX EXPRESSION
C:\Flex Windows\EditPlusPortable\3518\week9>q22.exe
Enter the Expression : 23+1-*
Invalid Expression
C:\Flex Windows\EditPlusPortable\3518\week9>q22.exe
Enter the Expression : 21-45/+
THIS IS A VALID POSTFIX EXPRESSION
C:\Flex Windows\EditPlusPortable\3518\week9>q22.exe
Enter the Expression : 2-1/3
Invalid Expression
C:\Flex Windows\EditPlusPortable\3518\week9>
```

3. Write a yacc program to validate the given for construct.

**Q3.1:**

%option noyywrap

%{

#include<stdio.h>

#include "y.tab.h"

%}

alpha [A-Za-z]

digit [0-9]

%%

[\t \n]

printf[^;]\* return PRINTF;

"int"|"float"|"char" return DTYPE;

for return FOR;

{digit}+ return NUM;

{alpha}({alpha}|{digit})\* return ID;

"<=" return LE;

">=" return GE;

"==" return EQ;

"!=" return NE;

"|" return OR;

"&&" return AND;

. return yytext[0];

%%

C:\Flex Windows\EditPlusPortable\3518\week9\q3.l - EditPlus

File Edit View Search Document Project Tools Browser ZC Window Help

Directory Cliptext Functions

[C:] OS

C:\  
Flex Windows  
EditPlusPortable  
3518  
week9

input.txt  
input2.txt  
input3.txt  
input4.txt  
lex.yy.c  
q1.exe  
q1.l  
q1.l.bak  
q1.y  
q1.y.bak  
q2.l

```
1 %option noyywrap
2 %{
3 #include<stdio.h>
4 #include "y.tab.h"
5 %}
6 alpha [A-Za-z]
7 digit [0-9]
8 %%
9 [\t \n]
10 printf[^;]* return PRINTF;
11 "int"|"float"|"char" return DTYPE;
12 for return FOR;
13 {digit}+ return NUM;
14 {alpha}({alpha}|{digit})* return ID;
15 "<=" return LE;
16 ">=" return GE;
17 "==" return EQ;
18 "!=" return NE;
19 "|" return OR;
20 "&&" return AND;
21 . return yytext[0];
22 %}
```

Q3.y

```

%{
#include <stdio.h>
#include <stdlib.h>
int yylex();
int yyerror();

%}

%token ID NUM FOR LE GE EQ NE OR AND DTYPE PRINTF
%right "="
%left OR AND
%left '>' '<' LE GE EQ NE DTYPE PRINTF
%left '+' '-'
%left '*' '/'
%right UMINUS
%right '!'
%%

S : ST {printf("For construct is valid\n"); return 0;}
ST : FOR '(' DTYPE E ';' E2 ';' E ')' DEF
;
DEF : '{' BODY '}'
| E ';'
| ;
BODY : BODY BODY
| E1 ';'
|

```

;

E : ID '=' E

| E '+' E

| E '-' E

| E '\*' E

| E '/' E

| E '+' '+'

| E '-' '-'

| ID

| NUM

;

E1 : ID '=' E3

| PRINTF

;

E3 : E3 '+' E3

| E3 '-' E3

| E3 '\*' E3

| E3 '/' E3

| E3 '+' '+'

| E3 '-' '-'

| E3 LE E3

| E3 GE E3

| E3 EQ E3

| E3 NE E3

| E3 OR E3

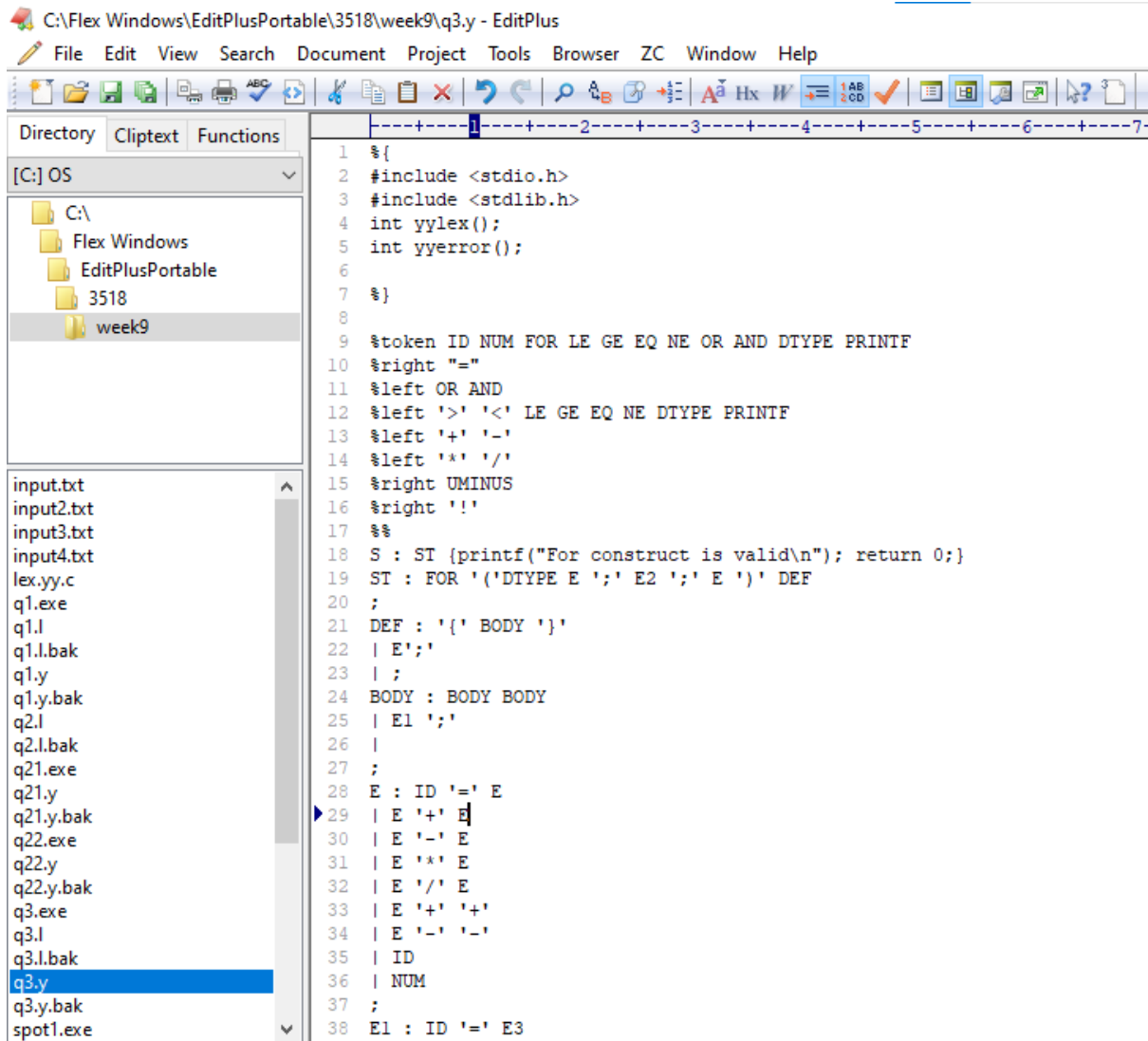
| E3 AND E3

```

| ID
| NUM
;
E2 : E'<'E
    | E'>'E
    | E LE E
    | E GE E
    | E EQ E
    | E NE E
    | E OR E
    | E AND E
;
%%
int main()
{
printf("Enter the expression:\n");
yyparse();
return 0;
}
int yyerror()
{
printf("For construct is invalid\n");
}

```





C:\Flex Windows\EditPlusPortable\3518\week9\q3.y - EditPlus

File Edit View Search Document Project Tools Browser ZC Window Help

Directory Cliptext Functions

[C:] OS

C:\  
Flex Windows  
EditPlusPortable  
3518  
week9

input.txt  
input2.txt  
input3.txt  
input4.txt  
lex.yy.c  
q1.exe  
q1.l  
q1.l.bak  
q1.y  
q1.y.bak  
q2.l  
q2.l.bak  
q21.exe  
q21.y  
q21.y.bak  
q22.exe  
q22.y  
q22.y.bak  
q3.exe  
q3.l  
q3.l.bak

```
36 | NUM
37 | ;
38 | E1 : ID '=' E3
39 | PRINTF
40 | ;
41 | E3 : E3 '+' E3
42 | E3 '-' E3
43 | E3 '*' E3
44 | E3 '/' E3
45 | E3 '+' '+'
46 | E3 '-' '-'
47 | E3 LE E3
48 | E3 GE E3
49 | E3 EQ E3
50 | E3 NE E3
51 | E3 OR E3
52 | E3 AND E3
53 | ID
54 | NUM
55 | ;
56 | E2 : E'<'E
57 | E'>'E
58 | E LE E
59 | E GE E
60 | E EQ E
61 | E NE E
62 | E OR E
63 | E AND E
64 | ;
65 | %%
66 | int main()
67 | {
68 | printf("Enter the expression:\n");
69 | yyparse();
70 | return 0;
```

