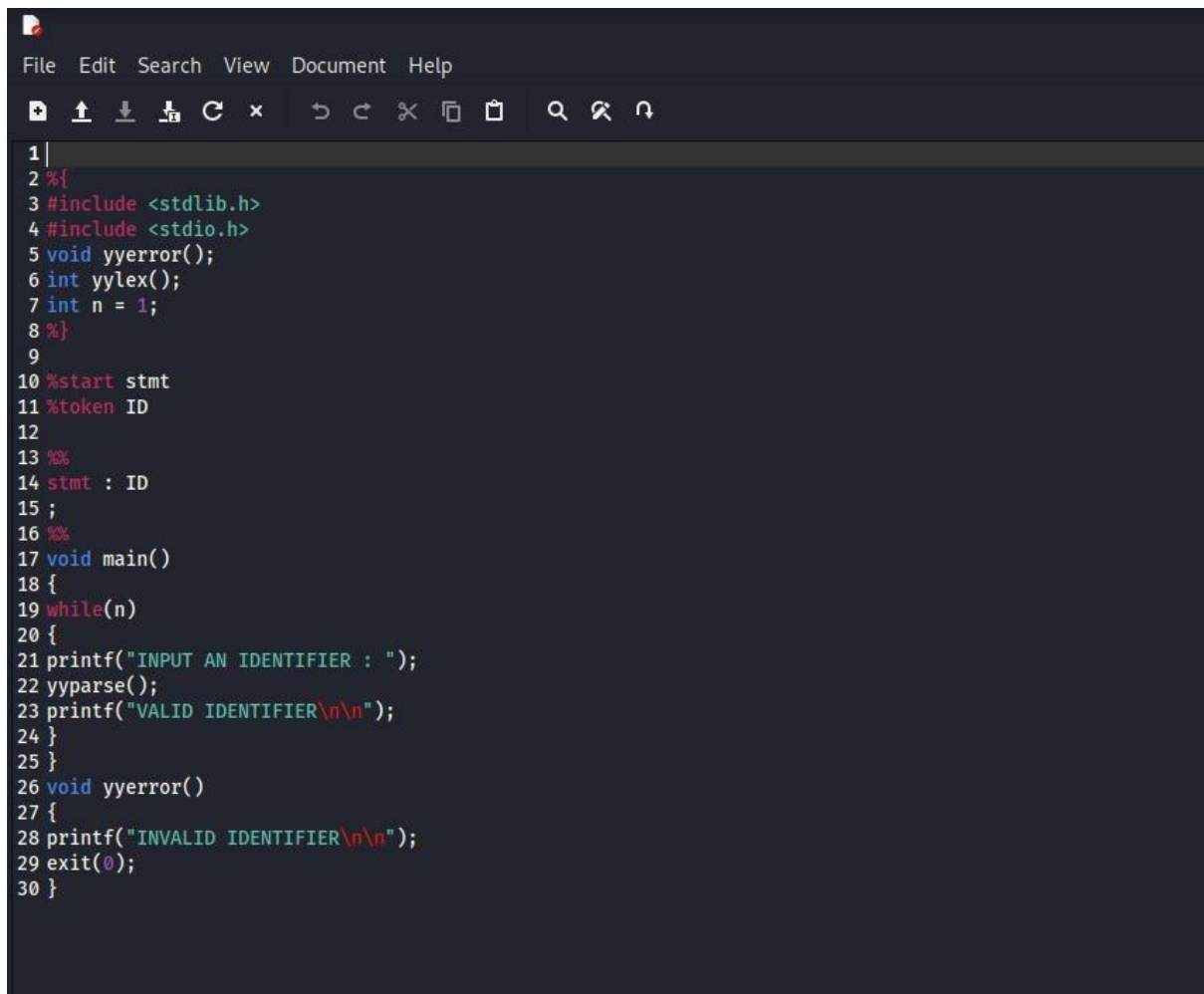


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COMPILER DESIGN LAB

1)

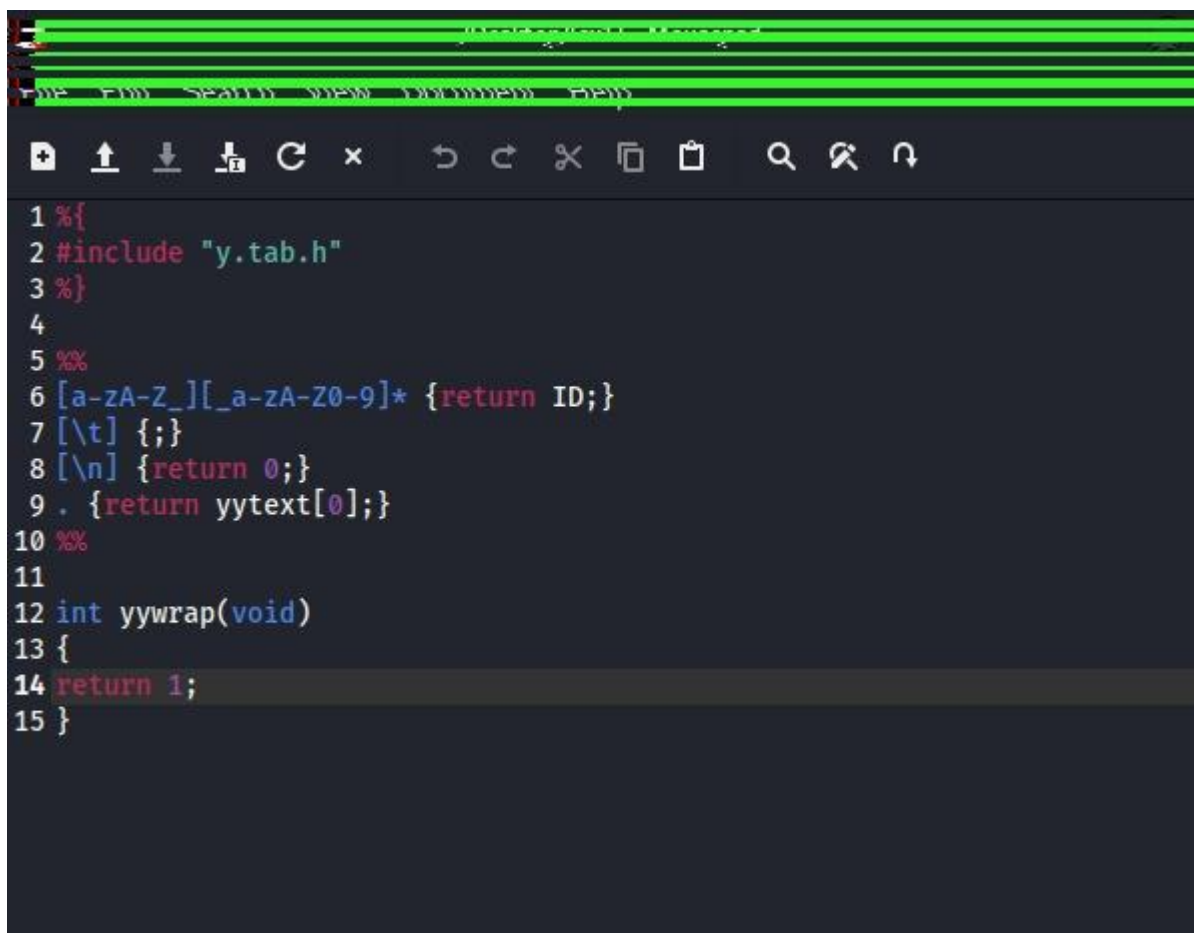
A screenshot of a code editor window with a dark theme. The editor displays a C++ program that uses the yyparse() and yyerror() functions for parsing. The code includes standard library headers, defines a yyerror() function, and implements a main() function that prompts the user for an identifier and checks its validity. The code is as follows:

```
1|
2| %
3| #include <stdlib.h>
4| #include <stdio.h>
5| void yyerror();
6| int yylex();
7| int n = 1;
8| %
9|
10| %start stmt
11| %token ID
12|
13| %%
14| stmt : ID
15| ;
16| %%
17| void main()
18| {
19| while(n)
20| {
21| printf("INPUT AN IDENTIFIER : ");
22| yyparse();
23| printf("VALID IDENTIFIER\n\n");
24| }
25| }
26| void yyerror()
27| {
28| printf("INVALID IDENTIFIER\n\n");
29| exit(0);
30| }
```

```
> mousepad lex1.y
> mousepad lex1.l
> mousepad lex1.l
> flex lex1.l
> yacc -d lex1.y
> cc lex.yy.c y.tab.c -o lex1
> ./lex1
INPUT AN IDENTIFIER : abc+bc
INVALID IDENTIFIER

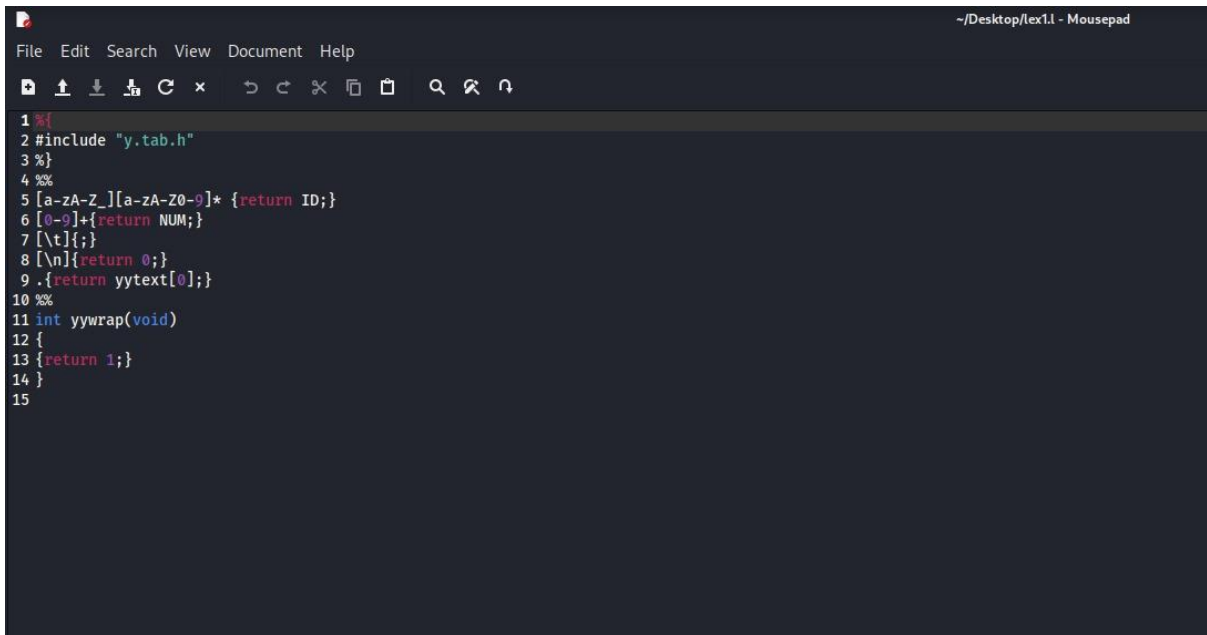
> ./lex1
INPUT AN IDENTIFIER : aa
VALID IDENTIFIER

INPUT AN IDENTIFIER : a+b
INVALID IDENTIFIER
```

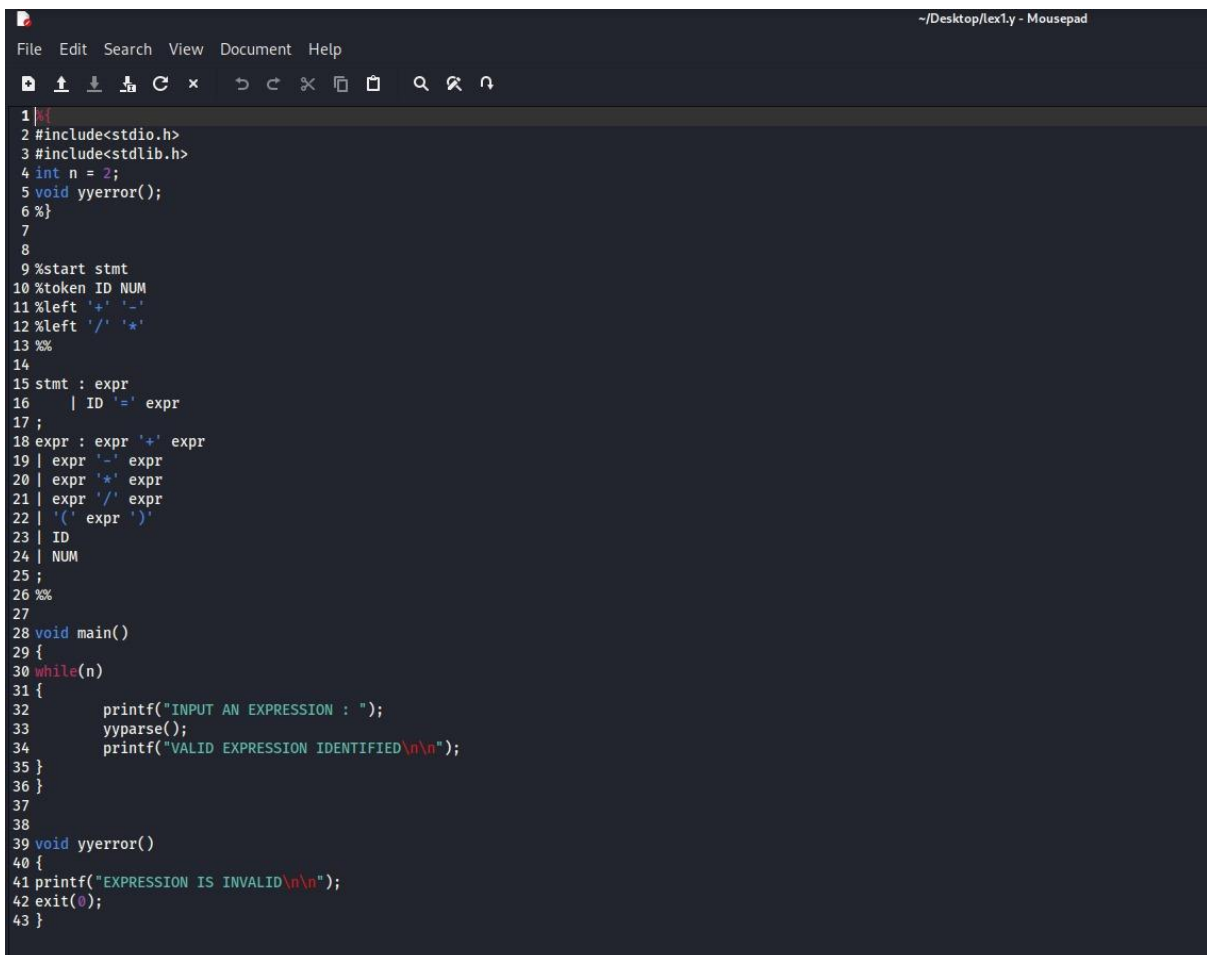
A screenshot of a code editor window titled "lex.yy.c - Mousepad". The editor has a menu bar with "File", "Edit", "Search", "View", "Window", and "Help". Below the menu bar is a toolbar with icons for file operations (new, open, save, print, etc.) and editing (undo, redo, cut, copy, paste, find, etc.). The main text area contains a Lex specification file with the following content:

```
1 %{
2 #include "y.tab.h"
3 %}
4
5 %%
6 [a-zA-Z][_a-zA-Z0-9]* {return ID;}
7 [\t] {;}
8 [\n] {return 0;}
9 . {return yytext[0];}
10 %%
11
12 int yywrap(void)
13 {
14 return 1;
15 }
```

2)



```
~/Desktop/lex1.l - Mousepad
File Edit Search View Document Help
1 %{
2 #include "y.tab.h"
3 %}
4 %%
5 [a-zA-Z_][a-zA-Z0-9]* {return ID;}
6 [0-9]+{return NUM;}
7 [\t]{};
8 [\n]{return 0;}
9 .{return yytext[0];}
10 %%
11 int yywrap(void)
12 {
13     return 1;
14 }
15
```



```
~/Desktop/lex1.y - Mousepad
File Edit Search View Document Help
1 %{
2 #include<stdio.h>
3 #include<stdlib.h>
4 int n = 2;
5 void yyerror();
6 %}
7
8
9 %start stmt
10 %token ID NUM
11 %left '+' '-'
12 %left '/' '*'
13 %%
14
15 stmt : expr
16       | ID '=' expr
17 ;
18 expr : expr '+' expr
19       | expr '-' expr
20       | expr '*' expr
21       | expr '/' expr
22       | '(' expr ')'
23       | ID
24       | NUM
25 ;
26 %%
27
28 void main()
29 {
30     while(n)
31     {
32         printf("INPUT AN EXPRESSION : ");
33         yyparse();
34         printf("VALID EXPRESSION IDENTIFIED\n\n");
35     }
36 }
37
38
39 void yyerror()
40 {
41     printf("EXPRESSION IS INVALID\n\n");
42     exit(0);
43 }
```

```

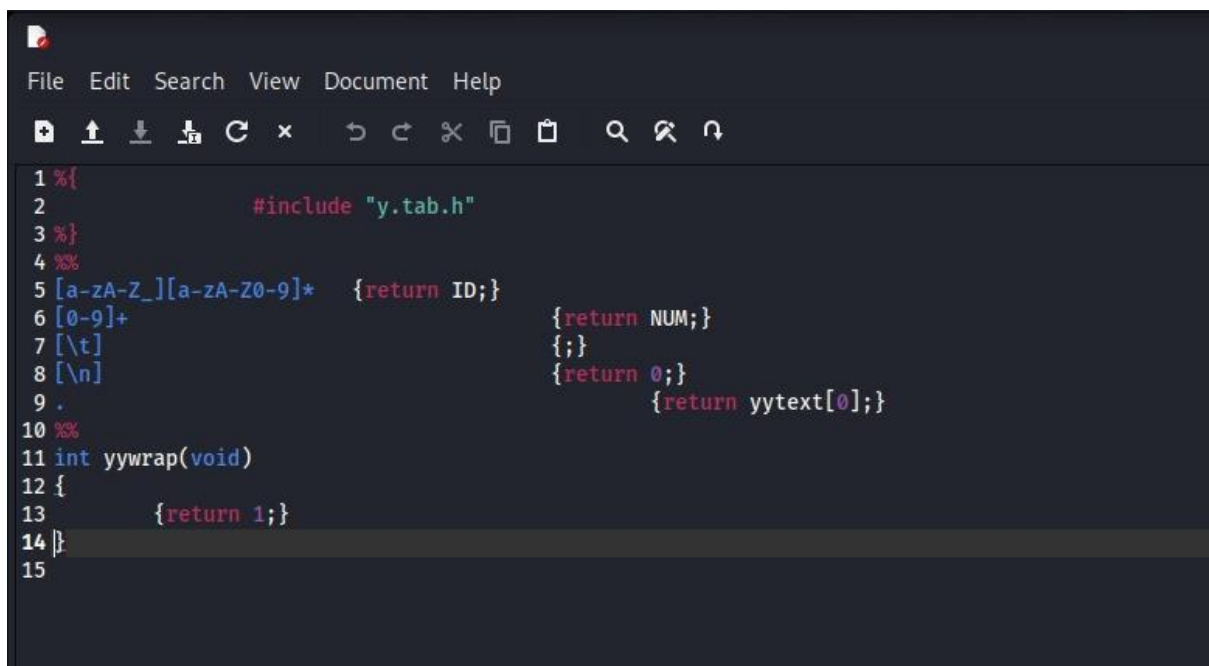
> mousepad lex1.l
> mousepad lex1.y
> lex lex1.l
> yacc -d lex1.y
lex1.y:7.1-10: error: invalid directive: '%startstmt'
  7 | %startstmt
    | ^~~~~~
lex1.y:15.1-4: error: unexpected identifier:
 15 | expr : expr '+' expr
    | ^~~~
lex1.y:23.3-40.0: error: unexpected epilogue
 23 | %%
    | ^
> mousepad lex1.y
^C
> yacc -d lex1.y
> cc lex.yy.c y.tab.c -o lex1
y.tab.c: In function 'yyparse':
y.tab.c:1032:16: warning: implicit declaration of function 'yylex' [-Wimplicit-function-declaration]
1032 |         yychar = yylex ();
      |                  ^~~~~
> ./lex1
INPUT AN EXPRESSION : a+b
VALID EXPRESSION IDENTIFIED

INPUT AN EXPRESSION : a-b
VALID EXPRESSION IDENTIFIED

INPUT AN EXPRESSION : ##
EXPRESSION IS INVALID

```

3)



```

1 %{
2     #include "y.tab.h"
3 %}
4 %%
5 [a-zA-Z_][a-zA-Z0-9]* {return ID;}
6 [0-9]+ {return NUM;}
7 [\t] {;}
8 [\n] {return 0;}
9 . {return yytext[0];}
10 %%
11 int yywrap(void)
12 {
13     {return 1;}
14 }
15

```

```
~/Desktop/lex1
File Edit Search View Document Help
1 %{
2 #include<stdio.h>
3 #include<stdlib.h>
4 #include<ctype.h>
5 void yyerror();
6 int sym[52];
7 int value(char c);
8 void update(char s,int val);
9 %}
10
11 %union{int n; char id;}
12 %start stmt
13 %token print end
14 %token <n> num
15 %token <id> identifier
16 %type <n>stmt exp term
17 %type <idnt> assign
18 %right '='
19 %left '+' '-'
20 %left '*' '/'
21 %%
22
23 stmt : assign ';'{};
24       | end ';'{}{exit(EXIT_SUCCESS);}
25       | print exp ';'{}{printf("\nValue is : %d\n",$2);}
26       | stmt assign ';'{};
27       | stmt print exp ';'{}{printf("\nValue is : %d\n",$3);}
28       | stmt end ';'{}{exit(EXIT_SUCCESS);}
29
30 assign : identifier '=' exp {update($1,$3);}
31 ;
32
33 exp   : term                {$$ = $1;}
34       | '(' exp ')'         {$$ = $2;}
35       | exp '=' exp         {$$ = $3;}
36       | exp '+' exp         {$$ = $1+$3;}
37       | exp '-' exp         {$$ = $1-$3;}
38       | exp '*' exp         {$$ = $1*$3;}
39       | exp '/' exp         {$$ = $1/$3;}
40 ;
41
42 term : identifier          {$$ = value($1);}
43       | num                {$$ = $1;}
44 ;
45
```

```
1 %{
2     #include <stdio.h>
3     #include "y.tab.h"
4 %}
5 %option noyywrap
6
7 %%
8 "print"    {return print;}
9 "exit"     {return end;}
10 [a-zA-Z]   {yyval.id = yytext[0]; return identifier;}
11 [0-9]+     {yyval.n = atoi(yytext); return num;}
12 [\t\n]    ;
13 [-=+;/;()] {return yytext[0];}
14 "*"       {return yytext[0];}
15 .         {ECHO; yyerror();}
16 %%
17
```

```
> mousepad lex1.y
> mousepad lex1.l
^C
> flex lex1.l
> yacc -d lex1.y
> cc lex.yy.c y.tab.c -o lex1
In file included from lex1.l:3:
lex1.l: In function 'yylex':
y.tab.h:67:17: error: called object is not a function or function pointer
67 | #define YYerror 256
   | ~~~~~
lex1.l:15:14: note: in expansion of macro 'YYerror'
15 | .
   | ~~~~~
y.tab.c: In function 'yyparse':
y.tab.c:1064:16: warning: implicit declaration of function 'yylex' [-Wimplicit-function-declaration]
1064 |     yychar = yylex ();
      |             ~~~~~
> mousepad lex1.l
> flex lex1.l
> yacc -d lex1.y
> cc lex.yy.c y.tab.c -o lex1
lex1.l: In function 'yylex':
lex1.l:15:13: warning: implicit declaration of function 'yyerror'; did you mean 'YYerror'? [-Wimplicit-function-declaration]
15 | .
   | ~~~~~
   | YYerror
y.tab.c: In function 'yyparse':
y.tab.c:1064:16: warning: implicit declaration of function 'yylex' [-Wimplicit-function-declaration]
1064 |     yychar = yylex ();
      |             ~~~~~
> ./lex1
a+b
> ./lex1
3+5
Q ~./Desktop GR P master ?14 >
```