

PE 2

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Class - 6H

Lexer.l

```
CD > PE-2 >  lexer.l
 2  #include "parser.tab.h"
 3  #include <stdio.h>
 4  #include <stdlib.h>
 5
 6  int line_no = 1;
 7  %}
 8
 9  %%
10
11  int          { return INT; }
12  float         { return FLOAT; }
13  char          { return CHAR; }
14  double         { return DOUBLE; }
15
16  if            { return IF; }
17  else           { return ELSE; }
18  do             { return DO; }
19  while          { return WHILE; }
20
21  "=="          { return EQ; }
22  "!="          { return NE; }
23  ">="          { return GE; }
24  "<="          { return LE; }
25  ">"           { return GT; }
26  "<"           { return LT; }
27
28  "+"            { return '+'; }
29  "-"            { return '-'; }
30  "*"            { return '*'; }
31  "/"            { return '/'; }
32  "="            { return '='; }
33  ";"            { return ';' ; }
34  ","            { return ',' ; }
35  "("            { return '('; }
36  ")"           { return ')'; }
37  "{"           { return '{'; }
38  "}"           { return '}'; }
39
40  [0-9]+        { return NUM; }
41  [a-zA-Z_][a-zA-Z0-9_]*   { return ID; }
42
43  [ \t\r]+        ;
44  \n              { line_no++; }
45
46  .              { return yytext[0]; }
47
48  %%
49
50  int yywrap(void)
51  [
52      return 1;
53 ]
```

Parser.y

```
CD > PE-2 > g parse.y
1  %{
2  #include <stdio.h>
3  #include <stdlib.h>
4
5  extern int yylex();
6  extern int line_no;
7  extern char *yytext;
8
9  void yyerror(const char *s);
10 %
11
12 /* Tokens */
13 %token INT FLOAT CHAR DOUBLE
14 %token IF ELSE DO WHILE
15 %token ID NUM
16 %token EQ NE GE LE GT LT
17
18 /* Operator precedence */
19 %left '+' '-'
20 %left '*' '/'
21 %left GT LT GE LE EQ NE
22 %right '='
23
24 /* Fix dangling else */
25 %nonassoc LOWER_THAN_ELSE
26 %nonassoc ELSE
27
28 %%
29
30 program:
31   | program statement
32   | /* empty */
33   ;
34
35 statement:
36   | declaration
37   | expression_stmt
38   | selection_stmt
39   | iteration_stmt
40   | compound_stmt
41   ;
42
43 declaration:
44   | type declarator_list ';'
45   ;
46
47 type:
48   | INT
49   | FLOAT
50   | CHAR
51   | DOUBLE
52   ;
53
54 declarator_list:
55   | ID
56   | declarator_list ',' ID
57   ;
58
59 expression_stmt:
60   | expression ';'
61   ;
62
63 selection_stmt:
64   | IF '(' expression ')' statement %prec LOWER_THAN_ELSE
65   | IF '(' expression ')' statement ELSE statement
66   ;
67
68 iteration_stmt:
69   | DO statement WHILE '(' expression ')' ';'
```

```
CD > PE-2 > E parsery
58
59 expression_stmt:
60     expression ';'
61     ;
62
63 selection_stmt:
64     | IF '(' expression ')' statement %prec LOWER_THAN_ELSE
65     | IF '(' expression ')' statement ELSE statement
66     ;
67
68 iteration_stmt:
69     DO statement WHILE '(' expression ')' ;'
70     ;
71
72 compound_stmt:
73     '{' program '}'
74     ;
75
76 expression:
77     | ID '=' expression
78     | expression '+' expression
79     | expression '-' expression
80     | expression '*' expression
81     | expression '/' expression
82     | expression GT expression
83     | expression LT expression
84     | expression GE expression
85     | expression LE expression
86     | expression EQ expression
87     | expression NE expression
88     | '(' expression ')'
89     | ID
90     | NUM
91     ;
92
93 %%
94
95 void yyerror(const char *s) {
96     printf("Syntax error at line %d, token '%s': %s\n", line_no, yytext, s);
97 }
98
99 int main() {
100     if (yyparse() == 0)
101         printf("Syntax valid.\n");
102     return 0;
103 }
```

Valid input

```
CD > PE-2 > C input.c
1 int a, b;
2 float x;
3
4 {
5     a = 10;
6     b = a + 5;
7
8     if (a > b) {
9         x = 3;
10    } else {
11        do {
12            a = a - 1;
13        } while (a > 0);
14    }
15 }
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

- pes2ug23cs485@pes2ug23cs485:~/sem6/CD/PE-2\$./parser < input.c
Syntax valid.
- pes2ug23cs485@pes2ug23cs485:~/sem6/CD/PE-2\$ █

Invalid input

```
CD > PE-2 > C input2.c
```

```
1 int a b;
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

- pes2ug23cs485@pes2ug23cs485:~/sem6/CD/PE-2\$./parser < input2.c
Syntax error at line 1, token 'b': syntax error
- pes2ug23cs485@pes2ug23cs485:~/sem6/CD/PE-2\$ █