

# PE 2

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Class - 6H

Lexer.l

CD > PE-2 > lex.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 > parser.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 > parser.y
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 >  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\$** 