

# 个人信息

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## 作业1、2

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由于2仅是1的一个加强版，所以这里将1和2放在一起实现

相关代码为：

```
1  %{
2  #include<stdio.h>
3  #include<stdlib.h>
4  #ifndef YYSTYPE
5  #define YYSTYPE double
6  #endif
7  int yylex();
8  extern int yyparse();
9  FILE* yyin;
10 void yyerror(const char* s);
11 %}
12
13 %token NUM
14 %token ADD
15 %token SUB
16 %token MUL
17 %token DEV
18 %token LB
19 %token RB
20
21 %left ADD SUB
22 %left MUL DEV
23 %right UMINUS
24
25 %%
26
27 lines : lines expr ';' { printf("%f\n", $2); }
28      | lines ';'
29      |
30      ;
31
32 expr  : expr ADD expr { $$ = $1 + $3; }
33      | expr SUB expr { $$ = $1 - $3; }
34      | expr MUL expr { $$ = $1 * $3; }
35      | expr DEV expr { $$ = $1 / $3; }
36      | LB expr RB { $$ = $2; }
37      | '-' expr %prec UMINUS { $$ = -$2; }
```

```

38 |     NUM
39 | ;
40
41
42 %%
43
44 // programs section
45 int isdigit(int t){
46
47     if(t=='0' || t=='1' || t=='2' || t=='3' || t=='4' || t=='5' || t=='6' || t=='7' || t=='8' || t
== '9') return 1;
47     else return 0;
48 }
49
50 int yylex()
51 {
52     int temp;
53     while(1){
54         temp = getchar();
55         if(temp==' ' || temp=='\t' || temp=='\n'){
56             //nothing to do
57         }
58         else{
59             if(isdigit(temp)==1){
60                 yylval=0;
61                 while(isdigit(temp)==1){
62                     yylval=yylval*10+temp-'0';
63                     temp=getchar();
64                 }
65                 ungetc(temp, stdin);
66                 return NUM;
67             }
68             if(temp=='+')return ADD;
69             if(temp=='-')return SUB;
70             if(temp=='*')return MUL;
71             if(temp=='/')return DEV;
72             if(temp=='(')return LB;
73             if(temp==')')return RB;
74             return temp;
75         }
76     }
77 }
78
79 int main()
80 {
81     yyin = stdin;
82     do{
83         yyparse();
84     }while(!feof(yyin));
85     return 0;
86 }
87
88 void yyerror(const char* s){
89     fprintf(stderr, "Parse error: %s\n", s);
90     exit(1);
91 }

```

实验结果：

```
byyl@byyl-virtual-machine:~/preview3/yacc$ ./test
2+672/4
;
170.000000
30-3*4;
18.000000
```

## 作业3

相关代码如下：

```
1  %{
2  #include<stdio.h>
3  #include<stdlib.h>
4  #include<string.h>
5  #ifndef YYSTYPE
6  #define YYSTYPE char*
7  #endif
8  char idStr[50];
9  char numStr[50];
10 int yylex();
11 extern int yyparse();
12 FILE* yyin;
13 void yyerror(const char* s);
14 %}
15
16 %token NUM
17 %token ID
18 %token ADD
19 %token SUB
20 %token MUL
21 %token DEV
22 %token LB
23 %token RB
24
25 %left ADD SUB
26 %left MUL DEV
27 %right UMINUS
28
29 %%
30
31 lines : lines expr ';' { printf("%s\n", $2);}
32      | lines ';'
33      |
34      ;
35
36 expr : expr ADD expr { $$ = (char
37      * )malloc(50*sizeof(char));strcpy($$, $1);strcat($$, $3);strcat($$, "+ "); }
37      | expr SUB expr { $$ = (char
38      * )malloc(50*sizeof(char));strcpy($$, $1);strcat($$, $3);strcat($$, "- "); }
38      | expr MUL expr { $$ = (char
39      * )malloc(50*sizeof(char));strcpy($$, $1);strcat($$, $3);strcat($$, "* "); }
```

```

39 |     expr DEV expr { $$ = (char
*)malloc(50*sizeof(char));strcpy($$, $1);strcat($$, $3);strcat($$, "/ "); }
40 |     UMINUS expr %prec UMINUS { $$ = (char
*)malloc(50*sizeof(char));strcpy($$, "-"); strcat($$, $2); }
41 |     LB expr RB { $$ = (char *)malloc(50*sizeof(char));strcpy($$, $2); }
42 |     NUM { $$ = (char *)malloc(50*sizeof(char));strcpy($$, $1);strcat($$, "
");}
43 |     ID { $$ = (char *)malloc(50*sizeof(char));strcpy($$, $1);strcat($$, "
");}
44 |     ;
45 |
46 |
47 | %%
48 |
49 | // programs section
50 | int isdigit(int t){
51 |
52 |     if(t=='0' || t=='1' || t=='2' || t=='3' || t=='4' || t=='5' || t=='6' || t=='7' || t=='8' ||
t=='9')return 1;
53 |     else return 0;
54 | }
55 |
56 | int isletter(int t){
57 |     if((t>='a' && t<='z') || (t>='A' && t<='Z'))return 1;
58 |     else return 0;
59 | }
60 |
61 | int isUMINUS = 1;
62 | int yylex()
63 | {
64 |     int temp;
65 |     while(1){
66 |         temp = getchar();
67 |         if(temp==' ' || temp=='\t' || temp=='\n'){
68 |             //nothing to do
69 |         }
70 |         else if(isdigit(temp)==1){
71 |             int indexTemp=0;
72 |             while(isdigit(temp)==1){
73 |                 numStr[indexTemp]=temp;
74 |                 temp=getchar();
75 |                 indexTemp++;
76 |             }
77 |             numStr[indexTemp]='\0';
78 |             yylval=numStr;
79 |             if(temp == '-')
80 |                 isUMINUS = 0;
81 |             ungetc(temp, stdin);
82 |             return NUM;
83 |         }
84 |         else if(isletter(temp)==1 || (temp=='_')){
85 |             int indexTemp=0;
86 |             while(isletter(temp)==1 || (temp=='_') || (isdigit(temp)==1)){
87 |                 idStr[indexTemp]=temp;
88 |                 temp=getchar();
89 |                 indexTemp++;
90 |             }

```

```

91         idStr[indexTemp]='\0';
92         yylval=idStr;
93         if(temp == '-')
94             isUMINUS = 0;
95         ungetc(temp, stdin);
96         return ID;
97     }
98     else if(temp=='+')return ADD;
99     else if(temp=='-'){
100         if(isUMINUS==1){
101             isUMINUS = 1;
102             return UMINUS;
103         }
104         else {
105             isUMINUS = 1;
106             return SUB;
107         }
108     }
109     else if(temp=='*')return MUL;
110     else if(temp=='/')return DEV;
111     else if(temp=='(')return LB;
112     else if(temp==')')return RB;
113     else return temp;
114 }
115 }
116
117 int main()
118 {
119     yyin = stdin;
120     do{
121         yyparse();
122     }while(!feof(yyin));
123     return 0;
124 }
125
126 void yyerror(const char* s){
127     fprintf(stderr, "Parse error: %s\n", s);
128     exit(1);
129 }

```

实验结果:

```

byyl@byyl-virtual-machine:~/preview3/middlew2behind$ ./mtest
2+A_a2b*(1234-_haha);
2 A_a2b 1234 _haha - * +
-5+2;
-5 2 +
5--2;
5 -2 -

```

## 思考题

相关代码如下:

```
1  %{
2  #include<stdio.h>
3  #include<stdlib.h>
4  #include<string.h>
5  struct symbol {
6      char* name;
7      double value;
8  };
9  struct symbol sample[10];
10
11  int isUMINUS = 1;
12  int index_of_symbol = 0;
13
14  #ifndef YYSTYPE
15  #define YYSTYPE struct symbol
16  #endif
17
18
19  char idStr[50];
20  int yylex();
21  extern int yyparse();
22  FILE* yyin;
23  void yyerror(const char* s);
24  %}
25
26
27  %token NUM
28  %token NAME
29  %token ADD
30  %token SUB
31  %token MUL
32  %token DEV
33  %token LB
34  %token RB
35  %token EQUAL
36
37  %left ADD SUB
38  %left MUL DEV
39  %right UMINUS
40
41  %%
42
43  lines : lines expr ';' { printf("%f\n", $2.value); }
44       | lines ';'
45       |
46       ;
47
48  expr : expr ADD expr { $$value = $1.value + $3.value; }
49       | expr SUB expr { $$value = $1.value - $3.value; }
50       | expr MUL expr { $$value = $1.value * $3.value; }
51       | expr DEV expr { $$value = $1.value / $3.value; }
52       | LB expr RB { $$ = $2; }
53       | UMINUS expr %prec UMINUS { $.name = $2.name; $.value = -$2.value; }
54       | NUM { $$ = $1; }
```

```

55 |     NAME { $$ = $1; }
56 |     NAME EQUAL expr { sample[index_of_symbol].name =
(char*)malloc(50*sizeof(char));strcpy(sample[index_of_symbol].name,
$1.name);sample[index_of_symbol].value =
$3.value;index_of_symbol+=1;$$ .value = sample[index_of_symbol].value; }
57 ;
58
59
60 %%
61
62 // programs section
63 int isdigit(int t){
64     if(t>='0' && t<='9')return 1;
65     else return 0;
66 }
67
68 int isletter(int t){
69     if((t>='a' && t<='z') || (t>='A' && t<='Z'))return 1;
70     else return 0;
71 }
72
73 int yylex()
74 {
75     int temp;
76     while(1){
77         temp = getchar();
78         if(temp==' '||temp=='\t'||temp=='\n'){
79             //nothing to do
80         }
81         else if(isdigit(temp)==1){
82             yylval.value = 0;
83             yylval.name = "";
84             while(isdigit(temp)==1){
85                 yylval.value = yylval.value*10 + temp - '0';
86                 temp=getchar();
87             }
88             isUMINUS = 0;
89             ungetc(temp, stdin);
90             return NUM;
91         }
92         else if(isletter(temp)==1||(temp=='_')){
93             int indexTemp = 0;
94             while(isletter(temp)==1||(temp=='_')||(isdigit(temp)==1)){
95                 idStr[indexTemp]=temp;
96                 temp=getchar();
97                 indexTemp++;
98             }
99             idStr[indexTemp]='\0';
100             yylval.name = idStr;
101             for(int i=0;i<index_of_symbol;i++){
102                 if(!strcmp(sample[i].name, yylval.name)) {
103                     yylval.value = sample[i].value;
104                     break;
105                 }
106             }
107             isUMINUS = 0;
108             ungetc(temp, stdin);
109             return NAME;

```

```

110     }
111     else if(temp=='+')return ADD;
112     else if(temp=='-'){
113         if(isUMINUS == 1) return UMINUS;
114         else {
115             isUMINUS = 1;
116             return SUB;
117         }
118     }
119     else if(temp=='*')return MUL;
120     else if(temp=='/')return DEV;
121     else if(temp=='(')return LB;
122     else if(temp==')')return RB;
123     else if(temp=='=')return EQUAL;
124     else return temp;
125 }
126 }
127
128 int main()
129 {
130     yyin = stdin;
131     do{
132         yyparse();
133     }while(!feof(yyin));
134     return 0;
135 }
136
137 void yyerror(const char* s){
138     fprintf(stderr, "Parse error: %s\n", s);
139     exit(1);
140 }

```

实验结果:

```

byyl@byyl-virtual-machine:~/preview3/symbol$ ./symbol_test
jack = 4;
0.000000
bob = 2;
0.000000
bob;
2.000000
jack;
4.000000

```