

编译原理第一次实验测试用例：目录

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1 A 组测试用例

本组测试用例共 10 个，每个仅包含单个的词法或者语法错误。除特殊说明外，不可多报。多报、漏报错误，或者打印语法树都会导致扣分。错误编号和行号之后的说明文字不要求与给出的输出完全一致，仅供助教理解使用，不作为评分依据。

1.1 A-1

1.1.1 输入

```
1 int main() {  
2     int err[];  
3     return 0;  
4 }
```

1.1.2 输出

```
1 Error type B at Line 2: syntax error, unexpected RB, expecting INT.  
   invalid Array declaration.
```

1.1.3 说明

错误的数组声明。

1.2 A-2

1.2.1 输入

```
1 int sum(int a, int b) {  
2     int sum = a + b;  
3     return 2sum;  
4 }  
5  
6 int main() { return 0; }
```

1.2.2 输出

```
1 Error type A at Line 3: Illegal ID '2sum'.
```

1.2.3 说明

标识符不能以数字开头。(注：也可以识别为 B 类错误。)

1.3 A-3

1.3.1 输入

```
1 int main() {  
2     int n = 5;  
3     int factorial = 1;  
4     while (n > 0) {  
5         factorial *= n;  
6         n = n - 1;  
7     }  
8     return 0;  
9 }
```

1.3.2 输出

```
1 Error type B at Line 5: syntax error, unexpected ASSIGNOP.
```

1.3.3 说明

*=是不支持的运算符。

1.4 A-4

1.4.1 输入

```
1 struct Student {  
2     int id;  
3     float gpa;  
4 };  
5  
6 int main() {  
7     Student student;  
8     student.id = 1;  
9     student.gpa = 32;  
10    return 0;
```

11 }

1.4.2 输出

1 Error type B at Line 7: Syntax error near 'student'

1.4.3 说明

Student前缺少struct关键字。

1.5 A-5

1.5.1 输入

```
1 int main() {  
2     int arr[5], ;  
3     int sum = 0, i = 0;  
4     while (i < 5) {  
5         sum = sum + arr[i];  
6         i = i + 1;  
7     }  
8     return 0;  
9 }
```

1.5.2 输出

1 Error type B at Line 2: expect Dec on the right of ','; check if a
Dec is missed.

1.5.3 说明

arr[5]后多了一个逗号。

1.6 A-6

1.6.1 输入

```

1  int gcd = 0;
2
3  int main() {
4      int a = 24;
5      int b = 36;
6      while (a != b) {
7          if (a > b) {
8              a = a - b;
9          } else {
10             b = b - a;
11         }
12     }
13     gcd = a;
14     return 0;
15 }

```

1.6.2 输出

```

1  Error type B at Line 1: ERROR:variable assignment should not be done
    ahead of a Program.

```

1.6.3 说明

全局变量定义时不能初始化。

1.7 A-7

1.7.1 输入

```

1  int main() {
2      int a = 10;
3      int b = 20;
4      return max~(a, b);
5  }

```

1.7.2 输出

```

1  Error type A at Line 4: Illegal character '~'.

```

1.7.3 说明

标识符不能含有~符号。(注：也可以识别为 B 类错误。)

1.8 A-8

1.8.1 输入

```
1 int main() {  
2     int max_value = 9;  
3     while (max_value)  
4         ;  
5     return 0;  
6 }
```

1.8.2 输出

```
1 Error type B at Line 4: Syntax error near ';'.
```

1.8.3 说明

while语句循环体不能为空。

1.9 A-9

1.9.1 输入

```
1 int factorial(int) {  
2     if (n == 0) {  
3         return 1;  
4     } else {  
5         return n * factorial(n - 1);  
6     }  
7 }  
8  
9 int main() { return factorial(5); }
```

1.9.2 输出

```
1 Error type B at Line 1: syntax error, unexpected RP, expecting ID.
```

1.9.3 说明

int后缺少变量名。

1.10 A-10

1.10.1 输入

```
1 int hello_world() { return; }
2
3 int main() {
4     hello_world();
5     return 0;
6 }
```

1.10.2 输出

```
1 Error type B at Line 1: syntax error, unexpected SEMI. invalid
   expression in RETURN Code block.
```

1.10.3 说明

return语句缺少返回值。

2 B组测试用例

本组测试用例共2个，每个用例包含多处不同的错误。除特殊说明外，漏报、多报错误或者打印语法树都会导致扣分。

2.1 B-1

2.1.1 输入

```
1 int main() {
2     int n = 1b1010;
3     int fib1 = 0; int fib2 = 1, fib;
4     int i = 2;
5     if (n !n) {
6         n = n * 1;
7     } else {
```

```

8      n, n / 1;
9  }
10  while (i <= n) {
11      fib = fib1 + fib2 + ;
12      fib1 = fib2;
13      fib2 = fib;
14      i = i + 1;
15  };
16  return 0;
17 }

```

2.1.2 输出

```

1 Error type B at Line 2: Syntax error near 'b1010'
2 Error type B at Line 5: Syntax error near '!'
3 Error type B at Line 8: Syntax error near ','
4 Error type B at Line 11: Syntax error near ';'
5 Error type B at Line 15: Syntax error near ';'

```

2.1.3 说明

1. 1b1010是非法的常量。(注：识别为 A、B 类错误均可。)
2. !不是二元运算符。
3. n, n / 1;不是合法的语句。
4. fib2 +后面缺少表达式。
5. 本语言未定义空语句。

2.2 B-2

2.2.1 输入

```

1 struct Point {
2     float x;
3     float y;
4 };
5

```



```

6 float distance(struct Point a, struct b) {
7     float d;
8     d = sqrt(square(a.x - b.x) + square(a.y - b.y));
9     float result = d;
10    return result;
11 }
12
13 int main(void) {
14     struct Point p;
15     p.x = 0.12.3;
16     p.y = .20;
17     return 0
18 }

```

2.2.2 输出

```

1 Error type B at Line 6: Syntax error near ')'
2 Error type B at Line 9: Syntax error near 'float'
3 Error type B at Line 13: Syntax error near 'void'
4 Error type B at Line 15: Syntax error near '3'
5 Error type B at Line 16: Syntax error near '.'
6 Error type B at Line 18: Syntax error near '}'

```

2.2.3 说明

1. struct b缺少结构名Point。
2. 变量只能在每一个语句块的开头定义。
3. main(void)不是合法的函数定义。
4. 0.12.3和.20都不是合法浮点数。(注：识别为A、B类错误均可。)
5. return 0后缺少分号。

3 C组测试用例

本组测试用例共2个，不包含任何错误，需要输出正确的语法树。除特殊说明外，应与给出的语法树完全相同。语法树打印错误酌情扣分。

3.1 C-1

3.1.1 输入

```
1 float matrixMultiply(int matrix1[3][2], int matrix2[2][3], int result
  [3][3]) {
2   int i = 0;
3   while (i < 3) {
4     int j = 0;
5     while (j < 3) {
6       int k = 0;
7       result[i][j] = 0;
8       while (k < 2) {
9         result[i][j] = result[i][j] + matrix1[i][k] * matrix2[k][j];
10        k = k + 1;
11      }
12      j = j + 1;
13    }
14    i = i + 1;
15  }
16  return -0.0;
17 }
18
19 int main() {
20   int matrix1[3][2];
21   int matrix2[2][3];
22   int result[3][3];
23   matrixMultiply(matrix1, matrix2, result);
24   return 0;
25 }
```

3.1.2 输出

```
1 Program (1)
2   ExtDefList (1)
3     ExtDef (1)
4       Specifier (1)
5         TYPE: float
```

```

6      FunDec (1)
7          ID: matrixMultiply
8      LP
9      VarList (1)
10         ParamDec (1)
11             Specifier (1)
12                 TYPE: int
13         VarDec (1)
14             VarDec (1)
15                 VarDec (1)
16                     ID: matrix1
17                     LB
18                     INT: 3
19                     RB
20             LB
21             INT: 2
22             RB
23     COMMA
24     VarList (1)
25         ParamDec (1)
26             Specifier (1)
27                 TYPE: int
28         VarDec (1)
29             VarDec (1)
30                 VarDec (1)
31                     ID: matrix2
32                     LB
33                     INT: 2
34                     RB
35             LB
36             INT: 3
37             RB
38     COMMA
39     VarList (1)
40         ParamDec (1)
41             Specifier (1)
42                 TYPE: int

```

```

43         VarDec (1)
44         VarDec (1)
45         VarDec (1)
46         ID: result
47         LB
48         INT: 3
49         RB
50         LB
51         INT: 3
52         RB
53     RP
54 CompSt (1)
55     LC
56     DefList (2)
57     Def (2)
58         Specifier (2)
59         TYPE: int
60         DecList (2)
61         Dec (2)
62             VarDec (2)
63             ID: i
64             ASSIGNOP
65             Exp (2)
66             INT: 0
67     SEMI
68 StmtList (3)
69     Stmt (3)
70         WHILE
71         LP
72         Exp (3)
73         Exp (3)
74         ID: i
75         RELOP
76         Exp (3)
77         INT: 3
78     RP
79     Stmt (3)

```

80	CompSt (3)
81	LC
82	DefList (4)
83	Def (4)
84	Specifier (4)
85	TYPE: int
86	DecList (4)
87	Dec (4)
88	VarDec (4)
89	ID: j
90	ASSIGNOP
91	Exp (4)
92	INT: 0
93	SEMI
94	StmtList (5)
95	Stmt (5)
96	WHILE
97	LP
98	Exp (5)
99	Exp (5)
100	ID: j
101	RELOP
102	Exp (5)
103	INT: 3
104	RP
105	Stmt (5)
106	CompSt (5)
107	LC
108	DefList (6)
109	Def (6)
110	Specifier (6)
111	TYPE: int
112	DecList (6)
113	Dec (6)
114	VarDec (6)
115	ID: k
116	ASSIGNOP

117	Exp (6)
118	INT: 0
119	SEMI
120	StmtList (7)
121	Stmt (7)
122	Exp (7)
123	Exp (7)
124	Exp (7)
125	Exp (7)
126	ID: result
127	LB
128	Exp (7)
129	ID: i
130	RB
131	LB
132	Exp (7)
133	ID: j
134	RB
135	ASSIGNOP
136	Exp (7)
137	INT: 0
138	SEMI
139	StmtList (8)
140	Stmt (8)
141	WHILE
142	LP
143	Exp (8)
144	Exp (8)
145	ID: k
146	RELOP
147	Exp (8)
148	INT: 2
149	RP
150	Stmt (8)
151	CompSt (8)
152	LC
153	StmtList (9)

154	Stmt (9)
155	Exp (9)
156	Exp (9)
157	Exp (9)
158	Exp (9)
159	ID: result
160	LB
161	Exp (9)
162	ID: i
163	RB
164	LB
165	Exp (9)
166	ID: j
167	RB
168	ASSIGNOP
169	Exp (9)
170	Exp (9)
171	Exp (9)
172	Exp (9)
173	ID: result
174	LB
175	Exp (9)
176	ID: i
177	RB
178	LB
179	Exp (9)
180	ID: j
181	RB
182	PLUS
183	Exp (9)
184	Exp (9)
185	Exp (9)
186	Exp (9)
187	ID: matrix1
188	LB
189	Exp (9)
190	ID: i

191	RB
192	LB
193	Exp (9)
194	ID: k
195	RB
196	STAR
197	Exp (9)
198	Exp (9)
199	Exp (9)
200	ID: matrix2
201	LB
202	Exp (9)
203	ID: k
204	RB
205	LB
206	Exp (9)
207	ID: j
208	RB
209	SEMI
210	StmtList (10)
211	Stmt (10)
212	Exp (10)
213	Exp (10)
214	ID: k
215	ASSIGNOP
216	Exp (10)
217	Exp (10)
218	ID: k
219	PLUS
220	Exp (10)
221	INT: 1
222	SEMI
223	RC
224	StmtList (12)
225	Stmt (12)
226	Exp (12)
227	Exp (12)


```

228             ID: j
229             ASSIGNOP
230             Exp (12)
231             Exp (12)
232             ID: j
233             PLUS
234             Exp (12)
235             INT: 1
236             SEMI
237             RC
238             StmtList (14)
239             Stmt (14)
240             Exp (14)
241             Exp (14)
242             ID: i
243             ASSIGNOP
244             Exp (14)
245             Exp (14)
246             ID: i
247             PLUS
248             Exp (14)
249             INT: 1
250             SEMI
251             RC
252             StmtList (16)
253             Stmt (16)
254             RETURN
255             Exp (16)
256             MINUS
257             Exp (16)
258             FLOAT: 0.000000
259             SEMI
260             RC
261             ExtDefList (19)
262             ExtDef (19)
263             Specifier (19)
264             TYPE: int

```

```

265     FunDec (19)
266         ID: main
267         LP
268         RP
269     CompSt (19)
270         LC
271     DefList (20)
272         Def (20)
273             Specifier (20)
274                 TYPE: int
275             DecList (20)
276                 Dec (20)
277                     VarDec (20)
278                         VarDec (20)
279                             VarDec (20)
280                                 ID: matrix1
281                                 LB
282                                 INT: 3
283                                 RB
284                                 LB
285                                 INT: 2
286                                 RB
287         SEMI
288     DefList (21)
289         Def (21)
290             Specifier (21)
291                 TYPE: int
292             DecList (21)
293                 Dec (21)
294                     VarDec (21)
295                         VarDec (21)
296                             VarDec (21)
297                                 ID: matrix2
298                                 LB
299                                 INT: 2
300                                 RB
301                                 LB

```

```

302             INT: 3
303             RB
304         SEMI
305     DefList (22)
306         Def (22)
307             Specifier (22)
308                 TYPE: int
309             DecList (22)
310                 Dec (22)
311                     VarDec (22)
312                         VarDec (22)
313                             VarDec (22)
314                                 ID: result
315                                 LB
316                                 INT: 3
317                                 RB
318                                 LB
319                                 INT: 3
320                                 RB
321         SEMI
322     StmtList (23)
323         Stmt (23)
324             Exp (23)
325                 ID: matrixMultiply
326                 LP
327                 Args (23)
328                     Exp (23)
329                         ID: matrix1
330                 COMMA
331                 Args (23)
332                     Exp (23)
333                         ID: matrix2
334                 COMMA
335                 Args (23)
336                     Exp (23)
337                         ID: result
338             RP

```

```

339          SEMI
340          StmtList (24)
341          Stmt (24)
342          RETURN
343          Exp (24)
344          INT: 0
345          SEMI
346      RC

```

3.2 C-2

3.2.1 输入

```

1  int minDistance(int dist[6], int visited[6]) {
2      int min = 2147483647, min_index, v = 0;
3      while (v < 6) {
4          if (!visited[v] && dist[v] <= min) {
5              min = dist[v];
6              min_index = v;
7          }
8          v = v + 1;
9      }
10     return min_index;
11 }
12
13 int dijkstra(int graph[6][6], int src) {
14     int dist[6];
15     int visited[6];
16     int i = 0;
17     int count = 0;
18
19     while (i < 6) {
20         dist[i] = 2147483647;
21         visited[i] = 0;
22         i = i + 1;
23     }
24
25     dist[src] = 0;

```

```

26
27 while (count < 6 - 1) {
28     int v = 0, u = minDistance(dist, visited);
29     visited[u] = 1;
30
31     while (v < 6) {
32         if (!visited[v] && graph[u][v] && dist[u] != 2147483647 &&
33             dist[u] + graph[u][v] < dist[v]) {
34             dist[v] = dist[u] + graph[u][v];
35         }
36         v = v + 1;
37     }
38     count = count + 1;
39 }
40 return 0;
41 }
42
43 int main() {
44     int graph[6][6];
45     dijkstra(graph, 0);
46     return 0;
47 }

```

3.2.2 输出

```

1 Program (1)
2   ExtDefList (1)
3     ExtDef (1)
4       Specifier (1)
5         TYPE: int
6       FunDec (1)
7         ID: minDistance
8         LP
9         VarList (1)
10          ParamDec (1)
11            Specifier (1)
12              TYPE: int

```

```

13         VarDec (1)
14         VarDec (1)
15         ID: dist
16         LB
17         INT: 6
18         RB
19     COMMA
20     VarList (1)
21         ParamDec (1)
22             Specifier (1)
23                 TYPE: int
24             VarDec (1)
25                 VarDec (1)
26                     ID: visited
27                     LB
28                     INT: 6
29                     RB
30     RP
31     CompSt (1)
32         LC
33         DefList (2)
34             Def (2)
35                 Specifier (2)
36                     TYPE: int
37             DecList (2)
38                 Dec (2)
39                     VarDec (2)
40                         ID: min
41                     ASSIGNOP
42                     Exp (2)
43                         INT: 2147483647
44             COMMA
45             DecList (2)
46                 Dec (2)
47                     VarDec (2)
48                         ID: min_index
49             COMMA

```

```

50         DecList (2)
51         Dec (2)
52         VarDec (2)
53         ID: v
54         ASSIGNOP
55         Exp (2)
56         INT: 0
57     SEMI
58 StmtList (3)
59     Stmt (3)
60     WHILE
61     LP
62     Exp (3)
63     Exp (3)
64     ID: v
65     RELOP
66     Exp (3)
67     INT: 6
68     RP
69     Stmt (3)
70     CompSt (3)
71     LC
72     StmtList (4)
73     Stmt (4)
74     IF
75     LP
76     Exp (4)
77     Exp (4)
78     NOT
79     Exp (4)
80     Exp (4)
81     ID: visited
82     LB
83     Exp (4)
84     ID: v
85     RB
86     AND

```

87	Exp (4)
88	Exp (4)
89	Exp (4)
90	ID: dist
91	LB
92	Exp (4)
93	ID: v
94	RB
95	RELOP
96	Exp (4)
97	ID: min
98	RP
99	Stmt (4)
100	CompSt (4)
101	LC
102	StmtList (5)
103	Stmt (5)
104	Exp (5)
105	Exp (5)
106	ID: min
107	ASSIGNOP
108	Exp (5)
109	Exp (5)
110	ID: dist
111	LB
112	Exp (5)
113	ID: v
114	RB
115	SEMI
116	StmtList (6)
117	Stmt (6)
118	Exp (6)
119	Exp (6)
120	ID: min_index
121	ASSIGNOP
122	Exp (6)
123	ID: v


```

124                                     SEMI
125                                     RC
126                               StmtList (8)
127                               Stmt (8)
128                               Exp (8)
129                               Exp (8)
130                               ID: v
131                               ASSIGNOP
132                               Exp (8)
133                               Exp (8)
134                               ID: v
135                               PLUS
136                               Exp (8)
137                               INT: 1
138                               SEMI
139                               RC
140                               StmtList (10)
141                               Stmt (10)
142                               RETURN
143                               Exp (10)
144                               ID: min_index
145                               SEMI
146                               RC
147                               ExtDefList (13)
148                               ExtDef (13)
149                               Specifier (13)
150                               TYPE: int
151                               FunDec (13)
152                               ID: dijkstra
153                               LP
154                               VarList (13)
155                               ParamDec (13)
156                               Specifier (13)
157                               TYPE: int
158                               VarDec (13)
159                               VarDec (13)
160                               VarDec (13)

```

```

161             ID: graph
162             LB
163             INT: 6
164             RB
165             LB
166             INT: 6
167             RB
168         COMMA
169         VarList (13)
170             ParamDec (13)
171                 Specifier (13)
172                     TYPE: int
173                 VarDec (13)
174                     ID: src
175         RP
176     CompSt (13)
177         LC
178         DefList (14)
179             Def (14)
180                 Specifier (14)
181                     TYPE: int
182                 DecList (14)
183                     Dec (14)
184                         VarDec (14)
185                             VarDec (14)
186                                 ID: dist
187                                 LB
188                                 INT: 6
189                                 RB
190                 SEMI
191             DefList (15)
192                 Def (15)
193                     Specifier (15)
194                         TYPE: int
195                     DecList (15)
196                         Dec (15)
197                             VarDec (15)

```

```

198             VarDec (15)
199             ID: visited
200             LB
201             INT: 6
202             RB
203         SEMI
204     DefList (16)
205     Def (16)
206     Specifier (16)
207     TYPE: int
208     DecList (16)
209     Dec (16)
210     VarDec (16)
211     ID: i
212     ASSIGNOP
213     Exp (16)
214     INT: 0
215     SEMI
216     DefList (17)
217     Def (17)
218     Specifier (17)
219     TYPE: int
220     DecList (17)
221     Dec (17)
222     VarDec (17)
223     ID: count
224     ASSIGNOP
225     Exp (17)
226     INT: 0
227     SEMI
228     StmtList (19)
229     Stmt (19)
230     WHILE
231     LP
232     Exp (19)
233     Exp (19)
234     ID: i

```

235	RELOP
236	Exp (19)
237	INT: 6
238	RP
239	Stmt (19)
240	CompSt (19)
241	LC
242	StmtList (20)
243	Stmt (20)
244	Exp (20)
245	Exp (20)
246	Exp (20)
247	ID: dist
248	LB
249	Exp (20)
250	ID: i
251	RB
252	ASSIGNOP
253	Exp (20)
254	INT: 2147483647
255	SEMI
256	StmtList (21)
257	Stmt (21)
258	Exp (21)
259	Exp (21)
260	Exp (21)
261	ID: visited
262	LB
263	Exp (21)
264	ID: i
265	RB
266	ASSIGNOP
267	Exp (21)
268	INT: 0
269	SEMI
270	StmtList (22)
271	Stmt (22)

```

272             Exp (22)
273             Exp (22)
274             ID: i
275             ASSIGNOP
276             Exp (22)
277             Exp (22)
278             ID: i
279             PLUS
280             Exp (22)
281             INT: 1
282             SEMI
283             RC
284 StmtList (25)
285     Stmt (25)
286     Exp (25)
287     Exp (25)
288     Exp (25)
289     ID: dist
290     LB
291     Exp (25)
292     ID: src
293     RB
294     ASSIGNOP
295     Exp (25)
296     INT: 0
297     SEMI
298 StmtList (27)
299     Stmt (27)
300     WHILE
301     LP
302     Exp (27)
303     Exp (27)
304     ID: count
305     RELOP
306     Exp (27)
307     Exp (27)
308     INT: 6

```

```

309         MINUS
310         Exp (27)
311         INT: 1
312     RP
313     Stmt (27)
314     CompSt (27)
315     LC
316     DefList (28)
317     Def (28)
318     Specifier (28)
319     TYPE: int
320     DecList (28)
321     Dec (28)
322     VarDec (28)
323     ID: v
324     ASSIGNOP
325     Exp (28)
326     INT: 0
327     COMMA
328     DecList (28)
329     Dec (28)
330     VarDec (28)
331     ID: u
332     ASSIGNOP
333     Exp (28)
334     ID: minDistance
335     LP
336     Args (28)
337     Exp (28)
338     ID: dist
339     COMMA
340     Args (28)
341     Exp (28)
342     ID: visited
343     RP
344     SEMI
345     StmtList (29)

```

346	Stmt (29)
347	Exp (29)
348	Exp (29)
349	Exp (29)
350	ID: visited
351	LB
352	Exp (29)
353	ID: u
354	RB
355	ASSIGNOP
356	Exp (29)
357	INT: 1
358	SEMI
359	StmtList (31)
360	Stmt (31)
361	WHILE
362	LP
363	Exp (31)
364	Exp (31)
365	ID: v
366	RELOP
367	Exp (31)
368	INT: 6
369	RP
370	Stmt (31)
371	CompSt (31)
372	LC
373	StmtList (32)
374	Stmt (32)
375	IF
376	LP
377	Exp (32)
378	Exp (32)
379	Exp (32)
380	Exp (32)
381	NOT
382	Exp (32)

383	Exp (32)
384	ID: visited
385	LB
386	Exp (32)
387	ID: v
388	RB
389	AND
390	Exp (32)
391	Exp (32)
392	Exp (32)
393	ID: graph
394	LB
395	Exp (32)
396	ID: u
397	RB
398	LB
399	Exp (32)
400	ID: v
401	RB
402	AND
403	Exp (32)
404	Exp (32)
405	Exp (32)
406	ID: dist
407	LB
408	Exp (32)
409	ID: u
410	RB
411	RELOP
412	Exp (32)
413	INT: 2147483647
414	AND
415	Exp (33)
416	Exp (33)
417	Exp (33)
418	Exp (33)
419	ID: dist

420	LB
421	Exp (33)
422	ID: u
423	RB
424	PLUS
425	Exp (33)
426	Exp (33)
427	Exp (33)
428	ID: graph
429	LB
430	Exp (33)
431	ID: u
432	RB
433	LB
434	Exp (33)
435	ID: v
436	RB
437	RELOP
438	Exp (33)
439	Exp (33)
440	ID: dist
441	LB
442	Exp (33)
443	ID: v
444	RB
445	RP
446	Stmt (33)
447	CompSt (33)
448	LC
449	StmtList (34)
450	Stmt (34)
451	Exp (34)
452	Exp (34)
453	Exp (34)
454	ID: dist
455	LB
456	Exp (34)

457	ID: v
458	RB
459	ASSIGNOP
460	Exp (34)
461	Exp (34)
462	Exp (34)
463	ID: dist
464	LB
465	Exp (34)
466	ID: u
467	RB
468	PLUS
469	Exp (34)
470	Exp (34)
471	Exp (34)
472	ID: graph
473	LB
474	Exp (34)
475	ID: u
476	RB
477	LB
478	Exp (34)
479	ID: v
480	RB
481	SEMI
482	RC
483	StmtList (36)
484	Stmt (36)
485	Exp (36)
486	Exp (36)
487	ID: v
488	ASSIGNOP
489	Exp (36)
490	Exp (36)
491	ID: v
492	PLUS
493	Exp (36)

```

494                                     INT: 1
495                                     SEMI
496                                     RC
497                               StmtList (38)
498                               Stmt (38)
499                               Exp (38)
500                               Exp (38)
501                               ID: count
502                               ASSIGNOP
503                               Exp (38)
504                               Exp (38)
505                               ID: count
506                               PLUS
507                               Exp (38)
508                               INT: 1
509                               SEMI
510                               RC
511                               StmtList (40)
512                               Stmt (40)
513                               RETURN
514                               Exp (40)
515                               INT: 0
516                               SEMI
517                               RC
518      ExtDefList (43)
519      ExtDef (43)
520      Specifier (43)
521      TYPE: int
522      FunDec (43)
523      ID: main
524      LP
525      RP
526      CompSt (43)
527      LC
528      DefList (44)
529      Def (44)
530      Specifier (44)

```

```

531         TYPE: int
532     DecList (44)
533         Dec (44)
534             VarDec (44)
535                 VarDec (44)
536                     VarDec (44)
537                         ID: graph
538                             LB
539                                 INT: 6
540                                     RB
541                                         LB
542                                             INT: 6
543                                                 RB
544     SEMI
545 StmtList (45)
546     Stmt (45)
547     Exp (45)
548         ID: dijkstra
549         LP
550         Args (45)
551             Exp (45)
552                 ID: graph
553                 COMMA
554                 Args (45)
555                     Exp (45)
556                         INT: 0
557         RP
558     SEMI
559 StmtList (46)
560     Stmt (46)
561     RETURN
562     Exp (46)
563         INT: 0
564     SEMI
565 RC

```

4 D 组测试用例

本组测试用例共 3 个，针对不同分组进行测试。对应分组的同学需要输出语法树，提示错误则不得分；其他分组的同学只需要在对应位置提示错误即可，如果打印了语法树，则将视为违规，将会倒扣分。

4.1 D-1

4.1.1 输入

```
1 int main() {
2     int oct1 = 0123;
3     int hex1 = 0xAdA0f12;
4     int hex2 = 0xf1b3;
5     int oct2 = 0007;
6
7     int hex4 = hex1 + hex2;
8     oct2 = !(-oct1);
9
10    return 0;
11 }
```

4.1.2 输出

```
1 Program (1)
2   ExtDefList (1)
3     ExtDef (1)
4       Specifier (1)
5         TYPE: int
6       FunDec (1)
7         ID: main
8         LP
9         RP
10      CompSt (1)
11        LC
12      DefList (2)
13        Def (2)
14          Specifier (2)
15            TYPE: int
```

```

16         DecList (2)
17         Dec (2)
18         VarDec (2)
19         ID: oct1
20         ASSIGNOP
21         Exp (2)
22         INT: 83
23     SEMI
24 DefList (3)
25     Def (3)
26         Specifier (3)
27         TYPE: int
28         DecList (3)
29         Dec (3)
30         VarDec (3)
31         ID: hex1
32         ASSIGNOP
33         Exp (3)
34         INT: 182062866
35     SEMI
36 DefList (4)
37     Def (4)
38         Specifier (4)
39         TYPE: int
40         DecList (4)
41         Dec (4)
42         VarDec (4)
43         ID: hex2
44         ASSIGNOP
45         Exp (4)
46         INT: 61875
47     SEMI
48 DefList (5)
49     Def (5)
50         Specifier (5)
51         TYPE: int
52         DecList (5)

```

```

53         Dec (5)
54         VarDec (5)
55         ID: oct2
56         ASSIGNOP
57         Exp (5)
58         INT: 7
59     SEMI
60 DefList (7)
61     Def (7)
62         Specifier (7)
63         TYPE: int
64         DecList (7)
65             Dec (7)
66                 VarDec (7)
67                     ID: hex4
68                     ASSIGNOP
69                     Exp (7)
70                         Exp (7)
71                             ID: hex1
72                             PLUS
73                             Exp (7)
74                                 ID: hex2
75     SEMI
76 StmtList (8)
77     Stmt (8)
78         Exp (8)
79             Exp (8)
80                 ID: oct2
81             ASSIGNOP
82             Exp (8)
83                 NOT
84                 Exp (8)
85                     LP
86                     Exp (8)
87                         MINUS
88                         Exp (8)
89                             ID: oct1

```

```

90          RP
91      SEMI
92  StmtList (10)
93      Stmt (10)
94      RETURN
95      Exp (10)
96      INT: 0
97      SEMI
98  RC

```

4.1.3 说明

1.1 分组的同学需要输出正确的语法树，八进制和十六进制数必须正确转换。

其它分组的同学要提示相应的错误，示例如下。（注：识别为 A、B 类错误均可。）

```

1 Error type A at Line 2: Illegal INT number '0123'.
2 Error type A at Line 3: Illegal ID '0xAdA0f12'.
3 Error type A at Line 4: Illegal ID '0Xf1b3'.
4 Error type A at Line 5: Illegal INT number '0007'.

```

4.2 D-2

4.2.1 输入

```

1 int main() {
2     float num1 = 0.23e-4;
3     float num2 = -9.99E6;
4 }

```

4.2.2 输出

```

1 Program (1)
2   ExtDefList (1)
3     ExtDef (1)
4       Specifier (1)
5         TYPE: int
6       FunDec (1)
7         ID: main
8         LP

```



```

9      RP
10     CompSt (1)
11     LC
12     DefList (2)
13     Def (2)
14     Specifier (2)
15     TYPE: float
16     DecList (2)
17     Dec (2)
18     VarDec (2)
19     ID: num1
20     ASSIGNOP
21     Exp (2)
22     FLOAT: 0.000023
23     SEMI
24     DefList (3)
25     Def (3)
26     Specifier (3)
27     TYPE: float
28     DecList (3)
29     Dec (3)
30     VarDec (3)
31     ID: num2
32     ASSIGNOP
33     Exp (3)
34     MINUS
35     Exp (3)
36     FLOAT: 9990000.000000
37     SEMI
38     RC

```

4.2.3 说明

1.2 分组的同学需要输出正确的语法树，注意科学计数法浮点数的正确转换。其它分组的同学要提示相应的错误，识别为 A、B 类错误均可。

4.3 D-3

4.3.1 输入

```
1  /* This is a test program. */
2
3  int main() {
4      // This is a comment line.
5      int x = 5; // let x be 5
6
7      return /* return value */ 0;
8  }
```

4.3.2 输出

```
1  Program (3)
2      ExtDefList (3)
3          ExtDef (3)
4              Specifier (3)
5                  TYPE: int
6              FunDec (3)
7                  ID: main
8                  LP
9                  RP
10             CompSt (3)
11                 LC
12                 DefList (5)
13                     Def (5)
14                         Specifier (5)
15                             TYPE: int
16                         Declist (5)
17                             Dec (5)
18                                 VarDec (5)
19                                     ID: x
20                                     ASSIGNOP
21                                     Exp (5)
22                                         INT: 5
23                                     SEMI
```

```

24         StmtList (7)
25         Stmt (7)
26         RETURN
27         Exp (7)
28         INT: 0
29         SEMI
30     RC

```

4.3.3 说明

1.3 分组的同学需要输出正确的语法树，不能提示有语法错误；其它分组的同学只要提示相应的错误（不输出语法树）即可。（注：识别为 A、B 类错误均可。）

5 E 组测试用例

本组测试用例共 6 个，针对不同分组进行测试。其中：

- E1-x 针对 1.1 分组的同学。
- E2-x 针对 1.2 分组的同学。
- E3-x 针对 1.3 分组的同学。

5.1 E1-1

5.1.1 输入

```

1  int foo(int a, int b) {
2      int bar = 01234 * a || b;
3      return bar + 0xdead;
4  }
5
6  int main() {
7      int octal_num = 012;
8      int hex_num = 0x1A;
9      int sum = octal_num + hex_num;
10     hex_num = foo(octal_num, sum);
11
12     return 0;
13 }

```

5.1.2 输出

```
1 Program (1)
2   ExtDefList (1)
3     ExtDef (1)
4       Specifier (1)
5         TYPE: int
6       FunDec (1)
7         ID: foo
8         LP
9         VarList (1)
10          ParamDec (1)
11            Specifier (1)
12              TYPE: int
13            VarDec (1)
14              ID: a
15          COMMA
16          VarList (1)
17            ParamDec (1)
18              Specifier (1)
19                TYPE: int
20            VarDec (1)
21              ID: b
22          RP
23        CompSt (1)
24          LC
25          DefList (2)
26            Def (2)
27              Specifier (2)
28                TYPE: int
29            DecList (2)
30              Dec (2)
31                VarDec (2)
32                  ID: bar
33                ASSIGNOP
34              Exp (2)
35                Exp (2)
36                  Exp (2)
```

```

37             INT: 668
38             STAR
39             Exp (2)
40             ID: a
41             OR
42             Exp (2)
43             ID: b
44             SEMI
45 StmtList (3)
46     Stmt (3)
47         RETURN
48         Exp (3)
49             Exp (3)
50                 ID: bar
51             PLUS
52             Exp (3)
53                 INT: 57005
54             SEMI
55     RC
56 ExtDefList (6)
57     ExtDef (6)
58         Specifier (6)
59             TYPE: int
60     FunDec (6)
61         ID: main
62         LP
63         RP
64     CompSt (6)
65         LC
66         DefList (7)
67             Def (7)
68                 Specifier (7)
69                     TYPE: int
70                 DeclList (7)
71                     Dec (7)
72                     VarDec (7)
73                         ID: octal_num

```

```

74         ASSIGNOP
75         Exp (7)
76         INT: 10
77     SEMI
78     DefList (8)
79     Def (8)
80         Specifier (8)
81         TYPE: int
82         DecList (8)
83         Dec (8)
84         VarDec (8)
85         ID: hex_num
86         ASSIGNOP
87         Exp (8)
88         INT: 26
89     SEMI
90     DefList (9)
91     Def (9)
92         Specifier (9)
93         TYPE: int
94         DecList (9)
95         Dec (9)
96         VarDec (9)
97         ID: sum
98         ASSIGNOP
99         Exp (9)
100        Exp (9)
101        ID: octal_num
102        PLUS
103        Exp (9)
104        ID: hex_num
105    SEMI
106    StmtList (10)
107    Stmt (10)
108        Exp (10)
109        Exp (10)
110        ID: hex_num

```

```

111          ASSIGNOP
112          Exp (10)
113          ID: foo
114          LP
115          Args (10)
116          Exp (10)
117          ID: octal_num
118          COMMA
119          Args (10)
120          Exp (10)
121          ID: sum
122          RP
123          SEMI
124          StmtList (12)
125          Stmt (12)
126          RETURN
127          Exp (12)
128          INT: 0
129          SEMI
130          RC

```

5.2 E1-2

5.2.1 输入

```

1 int main() {
2     int x = 0123456789;
3     int y = 0XABCdefGHI;
4     float result = sqrt(pow(x, 2) + pow(y, 2)) / (x + y) - pow(x * y,
5         2);
6     return 0;
7 }

```

5.2.2 输出

```

1 Error type B at Line 2: Syntax error near '89'
2 Error type B at Line 3: Syntax error near 'GHI'

```

5.2.3 说明

识别为 A、B 类错误均可。

5.3 E2-1

5.3.1 输入

```
1 int main() {
2     float PI = 0314159.e-5;
3     float radius = 6.250e1;
4     float volume = (4.0 / 3.0) * PI * radius * radius * radius;
5
6     float length = 2.5e-03 / 3.54 + -(-123.0E-3);
7     float width = 1.88E2 + 100 * .57e-1;
8     float perimeter = 2 * (length + width);
9     float area = length * width;
10
11     return 0;
12 }
```

5.3.2 输出

```
1 Program (1)
2   ExtDefList (1)
3     ExtDef (1)
4       Specifier (1)
5         TYPE: int
6       FunDec (1)
7         ID: main
8         LP
9         RP
10      CompSt (1)
11        LC
12      DefList (2)
13        Def (2)
14          Specifier (2)
15            TYPE: float
16          DecList (2)
```



```

17         Dec (2)
18         VarDec (2)
19         ID: PI
20         ASSIGNOP
21         Exp (2)
22         FLOAT: 3.141590
23     SEMI
24 DefList (3)
25     Def (3)
26         Specifier (3)
27         TYPE: float
28         DecList (3)
29             Dec (3)
30             VarDec (3)
31             ID: radius
32             ASSIGNOP
33             Exp (3)
34             FLOAT: 62.500000
35     SEMI
36 DefList (4)
37     Def (4)
38         Specifier (4)
39         TYPE: float
40         DecList (4)
41             Dec (4)
42             VarDec (4)
43             ID: volume
44             ASSIGNOP
45             Exp (4)
46                 Exp (4)
47                     Exp (4)
48                         Exp (4)
49                             Exp (4)
50                                 LP
51                                     Exp (4)
52                                         Exp (4)
53                                             FLOAT: 4.000000

```

```

54          DIV
55          Exp (4)
56          FLOAT: 3.000000
57          RP
58          STAR
59          Exp (4)
60          ID: PI
61          STAR
62          Exp (4)
63          ID: radius
64          STAR
65          Exp (4)
66          ID: radius
67          STAR
68          Exp (4)
69          ID: radius
70          SEMI
71      DefList (6)
72          Def (6)
73              Specifier (6)
74                  TYPE: float
75          DecList (6)
76              Dec (6)
77                  VarDec (6)
78                      ID: length
79          ASSIGNOP
80          Exp (6)
81              Exp (6)
82                  Exp (6)
83                      FLOAT: 0.002500
84          DIV
85          Exp (6)
86              FLOAT: 3.540000
87          PLUS
88          Exp (6)
89          MINUS
90          Exp (6)

```

```

91             LP
92             Exp (6)
93             MINUS
94             Exp (6)
95             FLOAT: 0.123000
96             RP
97         SEMI
98     DefList (7)
99         Def (7)
100             Specifier (7)
101                 TYPE: float
102             DecList (7)
103                 Dec (7)
104                     VarDec (7)
105                         ID: width
106                     ASSIGNOP
107                     Exp (7)
108                         Exp (7)
109                             FLOAT: 188.000000
110                         PLUS
111                         Exp (7)
112                             Exp (7)
113                                 INT: 100
114                             STAR
115                             Exp (7)
116                                 FLOAT: 0.057000
117         SEMI
118     DefList (8)
119         Def (8)
120             Specifier (8)
121                 TYPE: float
122             DecList (8)
123                 Dec (8)
124                     VarDec (8)
125                         ID: perimeter
126                     ASSIGNOP
127                     Exp (8)

```

```

128             Exp (8)
129             INT: 2
130             STAR
131             Exp (8)
132             LP
133             Exp (8)
134             Exp (8)
135             ID: length
136             PLUS
137             Exp (8)
138             ID: width
139             RP
140             SEMI
141         DefList (9)
142         Def (9)
143         Specifier (9)
144         TYPE: float
145         DecList (9)
146         Dec (9)
147         VarDec (9)
148         ID: area
149         ASSIGNOP
150         Exp (9)
151         Exp (9)
152         ID: length
153         STAR
154         Exp (9)
155         ID: width
156     SEMI
157 StmtList (11)
158     Stmt (11)
159     RETURN
160     Exp (11)
161     INT: 0
162     SEMI
163 RC

```

5.4 E2-2

5.4.1 输入

```
1 int main() {
2     float length = 9.8e1.;
3     float width = 6e5;
4
5     return 0;
6 }
```

5.4.2 输出

```
1 Error type B at Line 2: Syntax error near ';'
2 Error type B at Line 3: Syntax error near 'e5'
```

5.4.3 说明

识别为 A、B 类错误均可。

5.5 E3-1

5.5.1 输入

```
1 /* 这是一个复杂的注释示例。
2     它包含一些特殊符号，例如 / 和 **。这些符号容易造成
3     词法分析器 (lexer) 错误。 */
4 /*./\ /\ /\
5 \\ \(((**\./\ \(*)))*/
6 /*****这是一个合法的注释*(**\/*\**\)*
7 //*****\ \ \ \ \./\ \ \ \..\/*
8
9 int main() {
10     int x = 10; // 这是一个简单的注释。
11     int y = 20; /* 这是另一个注释，它包含
12                    多行内容。 */
13
14     // /* 以下是一个嵌套注释的示例：
15     //     /* 这是嵌套注释的内部注释。
```

```

16 //          注意这里的特殊符号。*/
17 // */
18 /*注释也可以放在行首*/ return /*注释也可以放在语句
19 中*/ 0;
20 }

```

5.5.2 输出

```

1 Program (9)
2   ExtDefList (9)
3     ExtDef (9)
4       Specifier (9)
5         TYPE: int
6       FunDec (9)
7         ID: main
8         LP
9         RP
10      CompSt (9)
11        LC
12        DefList (10)
13          Def (10)
14            Specifier (10)
15              TYPE: int
16            DecList (10)
17              Dec (10)
18                VarDec (10)
19                  ID: x
20                  ASSIGNOP
21                  Exp (10)
22                    INT: 10
23          SEMI
24        DefList (11)
25          Def (11)
26            Specifier (11)
27              TYPE: int
28            DecList (11)
29              Dec (11)

```

```

30             VarDec (11)
31             ID: y
32             ASSIGNOP
33             Exp (11)
34             INT: 20
35             SEMI
36     StmtList (18)
37     Stmt (18)
38     RETURN
39     Exp (19)
40     INT: 0
41     SEMI
42 RC

```

5.6 E3-2

5.6.1 输入

```

1 int main() {
2
3     /* 以下是一个非法嵌套注释的示例：
4         /* 这是嵌套注释的内部注释。
5         注意这里的特殊符号。 */
6     */ return 0;
7 }

```

5.6.2 输出

```

1 Error type B at Line 6: unexpected right comment '*/'.

```

6 结束语

若对本文档有任何疑议，可写邮件与周意可助教联系，注意同时抄送给许畅老师。