

Homework 1

Readme of

Simple Java – Scanner

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1 Lex & Yacc version

```
$ lex -version
flex 2.6.4
$ bison -V
bison (GNU Bison) 3.7.5 Written by Robert Corbett and Richard Stallman.
Copyright (C) 2021 Free Software Foundation, Inc. This is free software; see the source for
copying conditions. There is NO warranty; not even for MERCHANTABILITY or FITNESS
FOR A PARTICULAR PURPOSE.
```

2 Operating System

```
$ cat /etc/os-release | sed -En 's/PRET.*"(.*)" /\1/p'

Debian GNU/Linux 11 (bullseye)
```

3 Execution manual

3.1 Build

Make

```
$ make
```

L^AT_EX

```
$ cd Readme
$ make
```

3.2 Run

```
$ make # Build it first
$ ./yacc.elf < input.java
```

4 How to implement

Regex in Lex, BNF in Yacc, and `std::unordered_set` `std::vector` in C++

5 Problems

1. Yacc 有毒。
2. It only can be written in GLR. It makes me very very confused to debug.
3. 仔細讀了一些 flex & bison (O'REILLY) 的書之後，覺得作業規格書真是誤導人，甚至，sample output 也是錯的 ... 比如說：
 - (a) class 內部可以有 fields 跟 methods，但是呢，規格書說變數宣告屬於 fields，函式屬於 methods。如果按照如此實做，會遇到 Reduce/Reduce conflict。

但是如果參考書中介紹，變數宣告與 methods 中的 function 合併成一個 non-terminal，就可以避免這個問題。

- (b) 有幾個還可以爭論的點：比如 test5 的 $z = (x + y) * 5 / 2 - y$; 到底為什麼 sample output 是 accept, 為什麼 main 可以不用 type ...
- (c) 不過因為時間不多，要說改天在說吧。

6 Outcome

```
rm -rf lib/build B073040047.tab.o lex.o my_yacc.elf lex.c
rm -f B073040047.tab.c B073040047.tab.h B073040047.output B073040047.dot B073040047.jpg
bison -g -vd -Wnone B073040047.y
gcc -c B073040047.tab.c
flex -o lex.c B073040047.l
gcc -c lex.c
gcc B073040047.tab.o lex.o lib/libsymbol_table.a -lfl -ly -lstdc++ -static -o my_yacc.elf
for i in $(seq 1 6); do ./my_yacc.elf < Testfile/test$i.java; echo; done
1: /* Test file: Perfect test file
2:  * Compute sum = 1 + 2 + ... + n
3:  */3:
4: class sigma {
5:     // "final" should have const_expr
6:     final int n = 10;
7:     int sum, index;
8:
9:     main()
10:    {
11:        index = 0;
12:        sum = 0;
13:        while (index <= n)
14:        {
15:            sum = sum + index;
16:            index = index + 1;
17:        }
18:        print(sum);
19:    }

1: /*Test file: Duplicate declare variable in the same scope*/1:
2: class Point
3: {
4:     static int counter ;
5:     int x, y ;
6:     /*Duplicate declare x*/6:
duplicate id.
7:     int x ;
8:     void clear()
9:     {
10:         x = 0 ;
11:         y = 0 ;
12:     }
13: }

1: /*Test file of Syntax error: Out of symbol. But it can go through*/1:
2: class Point {
3:     int z;
4:     syntax error, unexpected ID, expecting ';'
5:     int x y ;
6:     /*Need ',' before y*/5:
7:     float w;
8: }
9: class Test {
10:     int d;
11:     Point p = new Point()
12:     /*Need ';' at EOL*/11:
13:     syntax error, unexpected INT, expecting ';'
14:     int w,q;
15: }
```

```

1: /*Test file: Duplicate declaration in different scope and same scope*/1:
2: class Point
3: {
4:     int x, y ;
5:     int p;
6:     boolean test()
7:     {
8:         /*Another x, but in different scopes*/8:
9:         int x;
10:        /*Another x in the same scope*/10:
duplicate id.
11:        char x;
12:        {
13:            boolean w;
14:        }
15:        /*Another w in the same scope*/15:
16:        int w;
17:    }
18: }
19: class Test
20: {
21:     /*Another p, but in different scopes*/21:
22:     Point p = new Point();
23: }

```

```

1: class test5{
2:     int add(int a1, int a2){
3:         return (a1 + a2);
4:     }
5:     void main() {
6:         int x, y, z;
7:         for (int i=0;i<2;i++){
8:             if (i==0){
9: //-----ELSE WITHOUT IF
syntax error , unexpected ELSE
9:             else
10:                 i = 1;
11:             }
12:             for (x = 0; x<5;x++){
13:                 y++;
14: //-----FUNCTION CALL
14:                 x = add(x,y);
15:                 x = z(x,y);
16:             }
17:         }
18:         print("x:" + x + "y:" + y);
syntax error , unexpected MM, expecting ','
19:         z = ( x + y ) * 5 / 2 - y;
20:     }
21: }
22:
23: /* this is a comment // line// with some /* */and
24: // delimiters */24:

```

```

1: class test6{
2:     void sum(){
3: //-----NEVER USED
3:         int sumxyz = x + y + z ;
4:     }
5:     void main() {
6: //-----ARRAY
6:         int [] i= new int [1];
7:         for (i[0] = 0; i[0]<5; i[0]++)
8:             i[0]++;
9:
10: //-----NEW CLASS
10:         Point lowerLeft = new Point() ;
11:
12: //-----ERROR CONDITION
syntax error , unexpected '*'
12:         while (**/a++){
13:             print(" error!!");

```

```
14:         }
15: //-----CLASS DECLARE
15:         class Point {
16:             int x, y, z;
17:         }
18:     }
19:
20: }
```