Homework 1
Readme of
Simple Java − Scanner

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Contents

1   Lex & Yacc version

```
$ lex –version
flex 2.6.4
$ bison -V
bison (GNU Bison) 3.5.1 Written by Robert Corbett and Richard Stallman.
Copyright (C) 2020 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'

Pop!_OS 20.04 LTS
```

3   Execution manual

3.1   Build

Make
```
$ make
```

LaTeX
```
$ 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
5:    final int n = 10;
6:    int sum, index;
7:
8:    main()
9:    {
10:      index = 0;
11:      sum = 0;
12:      while (index <= n)
13:      {
14:        sum = sum + index;
15:        index = index + 1;
16:      }
17:      print(sum);
18:    }
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 errer: Out of symbol.  But it can go through*/1:
2: class Point {
3:      int z;
syntax error, unexpected ID, expecting ';'
4:      int x y ;
5:      /*Need  ',' before y*/5:
6:      float w;
7: }
8: class Test {
9:      int d;
10:     Point p = new Point()
11:      /*Need ';' at EOL*/11:
syntax error, unexpected INT, expecting ';'
12:      int w,q;
13: }
```

```
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: }
```