

一、Lex, Yacc 版本：

```
Terry@LAPTOP-E53TOILL /home/compiler/testasking
$ lex --version
lex 2.6.4

Terry@LAPTOP-E53TOILL /home/compiler/testasking
$ bison -V
bison (GNU Bison) 3.8.2
Written by Robert Corbett and Richard Stallman.

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```

二、作業平台：Cygwin

三、執行方式：

- 透過 makefile 輸入 make all
- 輸入指令 .demo < 檔案所在的路徑及名稱

四、如何處理規格書上的問題：

- 寫出一個可以辨別 class 的文法，其裡面包含 statements，分別去處理 statements 裡的文法，像是 simple、compound、loop、conditional、return 等，並透過遞迴的方式去長，還能長到 declare，使其能夠匹配大部分文法，其中特別的是 compound 還會長出 statements，此用意為讓括號裡還能長出宣告及敘述。

五、遇到的困難：

- 起初對於 yacc 語法不太熟悉，也是摸索過一段時間才知道文法樹優先順序的重要，除了在分情況討論時需要注意是否會長出很類似的語句導致在分析語法時會有錯誤，此外，本次作業遇到的最大困難是在寫 declare 及 statements 的時候，都有寫到遞迴，而 statements 又可以長回 declare，似乎兩個搶了工作，而造成不可預期的錯誤。

六、執行結果：

- test1.java

```
Terry@LAPTOP-E53TOILL /home/compiler/B092040016_hw2
$ ./demo < 2021Yacc_Testfile/test1.java
line 1: /* Test file: Perfect test file
line 2: * Compute sum = 1 + 2 + ... + n
line 3: */
line 4: class sigma {
line 5: // "final" should have const_expr
line 6: final int n = 10 ;
line 7: int sum , index ;
line 8:
line 9: main ( )
line 10: {
line 11: index = 0 ;
line 12: sum = 0 ;
line 13: while ( index  <= n )
line 14: {
line 15: sum = sum + index ;
line 16: index = index + 1 ;
line 17: }
line 18: print ( sum ) ;
line 19: }
line 20: }
```

- test2. java

```
Terry@LAPTOP-E53TOILL /home/compiler/B092040016_hw2
$ ./demo < 2021Yacc_Testfile/test2.java
line 1: /*Test file: Duplicate declare variable in the same scope*/
line 2: class Point
line 3: {
line 4: static int counter ;
line 5: int x , y ;
line 6: /*Duplicate declare x*/
*****'x' is a duplicated identifier in the current scope.*****
line 7: int x ;
line 8: void clear ( )
line 9: {
line 10: x = 0 ;
line 11: y = 0 ;
line 12: }
line 13: }
There are not used variable:
counter
```

- test3. java

```
Terry@LAPTOP-E53TOILL /home/compiler/B092040016_hw2
$ ./demo < 2021Yacc_Testfile/test3.java
line 1: /*Test file of Syntax error: Out of symbol. But it can go through*/
line 2: class Point {
line 3: int z ;
line 4, char: 12, a syntax error at "y"
line 4: int x y ;
line 5: /*Need ',' before y*/
line 6: float w ;
line 7: }
line 8: class Test {
line 9: int d ;
line 10: Point p = new Point ( )
line 11: /*Need ';' at EOL*/
line 10, char: 26, statement without semicolon
line 12: int w , q ;
line 13: }
There are not used variable:
z
w
d
w
q
```

- test4. java

```

Terry@LAPTOP-E53TOILL /home/compiler/B092040016_hw2
$ ./demo < 2021Yacc_Testfile/test4.java
line 1: /*Test file: Duplicate declaration in different scope and same scope*/
line 2: class Point
line 3: {
line 4: int x , y ;
line 5: int p ;
line 6: boolean test ( )
line 7: {
line 8: /*Another x, but in different scopes*/
line 9: int x ;
line 10: /*Another x in the same scope*/
*****'x' is a duplicated identifier in the current scope.*****
line 11: char x ;
line 12: {
line 13: boolean w ;
line 14: }
line 15: /*Another w in the same scope*/
line 16: int w ;
line 17: }
line 18: }
line 19: class Test
line 20: {
line 21: /*Another p, but in different scopes*/
line 22: Point p = new Point ( ) ;
line 23: }
There are not used variable:
x
y
p
x
w
w

```

- test5. java

```

Terry@LAPTOP-E53TOILL /home/compiler/B092040016_hw2
$ ./demo < 2021Yacc_Testfile/test5.java
line 1: class test5 {
line 2: int add ( int a1 , int a2 ) {
line 3: return ( a1 + a2 ) ;
line 4: }
line 5: void main ( ) {
line 6: int x , y , z ;
line 7: for ( int i = 0 ; i < 2 ; i ++ ) {
line 8: if ( i == 0 ) {
line 9: //-----ELSE WITHOUT IF
*****Else without If at line 10, char 16*****
line 10: else
line 11: i = 1 ;
line 12: }
line 13: for ( x = 0 ; x < 5 ; x ++ ) {
line 14: y ++ ;
line 15: //-----FUNCTION CALL
line 16: x = add ( x , y ) ;
line 17: x = z ( x , y ) ;
line 18: }
line 19: }
line 20: print ( "x:" + x + "y:" + y ) ;
line 21: z = ( x + y ) * 5 / 2 -- - y ;
line 22: }
line 23: }
line 24:
line 25: /* this is a comment // line// with some /* */and
line 26: // delimiters */

```

- test6. java

```
Terry@LAPTOP-E53TOILL /home/compiler/B092040016_hw2
$ ./demo < 2021Yacc_Testfile/test6.java
line 1: class test6 {
line 2: void sum ( ) {
line 3: //-----NEVER USED
line 4: int sumxyz = x + y + z ;
line 5: }
line 6: void main ( ) {
line 7: //-----ARRAY
line 8: int [ ] i = new int [ 1 ] ;
line 9: for ( i [ 0 ] = 0 ; i [ 0 ] < 5 ; i [ 0 ] ++ )
line 10: i [ 0 ] ++ ;
line 11:
line 12: //-----NEW CLASS
line 13: Point lowerLeft = new Point ( ) ;
line 14:
line 15: //-----ERROR CONDITION
*****Invalid Boolean Expression at line 16,char 15*****
line 16: while ( * * / a ++ ) {
line 17: print ( "error!!" ) ;
line 18: }
line 19: //-----CLASS DECLARE
line 20: class Point {
line 21: int x , y , z ;
line 22: }
line 23: }
line 24:
line 25: }
There are not used variable:
sumxyz
x
y
z
```