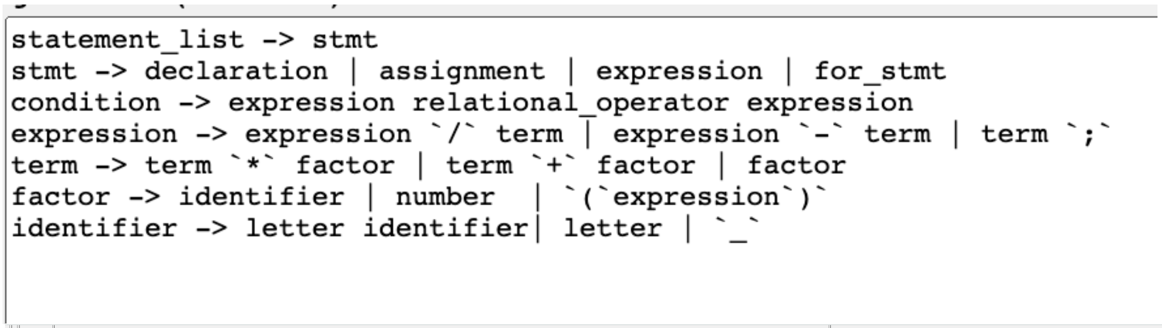
```
identifier -> [A-Za-z][A-Za-z][A-Za-z][A-Za-z][A-Za-z][A-Za-z]
[A-Za-z]?[A-Za-z]?
operator -> /^(\+|-|\*|\/|=|>|<|>=|<=|&|\||%|!|\^|\(|\))$/
program starter -> “begin”
program ender -> “end”
<program> -> begin<statement_list>end
<condition> -> <expression> <relational_operator> <expression>
<statement_list> -> <stmt> ;
<stmt> -> <declaration> | <assignment> | <expression> |
<for_stmt>
<for_stmt> -> ‘watching( <assignment> ~ <condition> ~
<expression>| <term>) <stmt>;



<expression> -> <expression> / <term> | <expression> - <term> |
<term> ;
<term> -> <term> * <factor> | <term> + <factor> | <factor>
<factor> -> <identifier> | <number>  | (<expression>)
<identifier> -> <letter><identifier>| <letter> | _
<declaration> -> <identifier> [<storage_needed>] ;
<assignment> -> <identifier> [<storage_needed>] : <expression>
<number> -> <digit> | <digit><number>
<letter> -> a..z A..Z
<digit> -> 0 .. 9
<storage_needed> -> 1 | 2 | 4 | 8
<relational_operator> -> < | > | >= | <= | == | !=
```

3)is it pairwise disjoint? no, because some tokens are also passed and applied in their rules
is there lefthand recursion? yes, because some tokens can also be applied in their rules

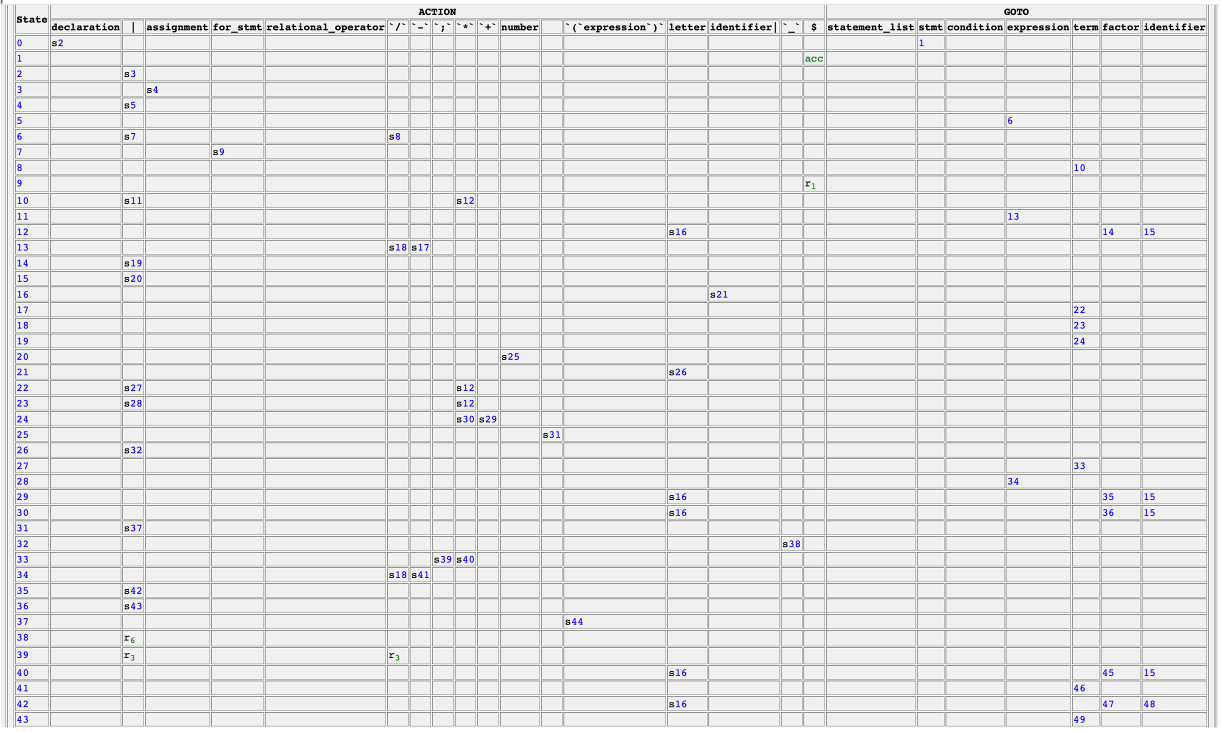
4)non-terminals are used in different rules and statements, but the same rule can’t be made twice with different rules

g) 4 test files

h)



```
statement_list -> stmt
stmt -> declaration | assignment | expression | for_stmt
condition -> expression relational_operator expression
expression -> expression `/` term | expression `-` term | term `;`
term -> term `*` factor | term `+` factor | factor
factor -> identifier | number  | `(`expression`)`
identifier -> letter identifier| letter | `_`
```



State	ACTION																	GOTO						
	declaration	|	assignment	for_stmt	relational_operator	`/`	`-`	`;`	`*`	`+`	number		`(`expression`)`	letter	identifier|	`_`	$	statement_list	stmt	condition	expression	term	factor	identifier
0	s2																		1					
1																	acc							
2		s3																						
3			s4																					
4		s5																						
5																					6			
6		s7				s8																		
7				s9																				
8																						10		
9																	r_1							
10		s11							s12															
11																					13			
12														s16									14	15
13						s18	s17																	
14		s19																						
15		s20																						
16															s21									
17																						22		
18																						23		
19																						24		
20											s25													
21														s26										
22		s27							s12															
23		s28							s12															
24									s30	s29														
25												s31												
26		s32																						
27																						33		
28																					34			
29														s16									35	15
30														s16									36	15
31		s37																						
32																s38								
33								s39	s40															
34						s18	s41																	
35		s42																						
36		s43																						
37													s44											
38		r_6																						
39		r_3				r_3																		
40														s16									45	15
41																						46		
42														s16									47	48
43																						49		

44		r_5																						
45		s50																						
46		s51							s12															
47		r_4							r_4															
48		s52																						
49									s30	s53														
50																						54		
51																						55		
52											s56													
53														s16									57	15
54									s30	s58														
55								s59	s40															
56												s60												
57		s61																						
58														s16									62	15
59						r_3	r_3																	
60		s63																						
61														s16									64	65
62		s66																						
63													s67											
64									r_4	r_4														
65		s68																						
66														s16									69	70
67		r_5							r_5															
68											s71													
69								r_4	r_4															
70		s72																						
71												s73												
72											s74													
73		s75																						
74												s76												
75													s77											
76		s78																						
77									r_5	r_5														
78													s79											
79								r_5	r_5															