Removal of Left Recursion

1 *program* → **program id** (*identifier_ list*) ; *declarations subprogram_ declarations compound_ statement* .
2.1.1 *identifier_ list* → **id** *identifier_ list′*
2.2.1 *identifier_ list′* → , **id** *identifier_ list′*
2.2.2 *identifier_ list′* → ϵ
3.1.1 *declarations* → **var id :** *type* ; *declarations*
3.2.1 *declarations* → ϵ
4.1 *type* → *standard_ type*
4.2 *type* → **array [num .. num] of** *standard_ type*
5.1 *standard_ type* → **integer**
5.2 *standard_ type* → **real**
6.1.1 *subprogram_ declarations* → *subprogram_ declaration* ; *subprogram_ declarations*
6.2.1 *subprogram_ declarations* → ϵ
7 *subprogram_ declaration* → *subprogram_ head declarations subprogram_ declarations compound_ statement*
8 *subprogram_ head* → **function id** *arguments* **:** *standard_ type* ;
9.1 *arguments* → (*parameter_ list*)
9.2 *arguments* → ϵ
10.1.1 *parameter_ list* → **id :** *type parameter_ list′*
10.2.1 *parameter_ list′* → ; **id :** *type parameter_ list′*
10.2.2 *parameter_ list′* → *epsilon*
11 *compound_ statement* → **begin** *optional_ statements* **end**
12.1 *optional_ statements* → *statement_ list*
12.2 *optional_ statements* → ϵ
13.1.1 *statement_ list* → *statement statement_ list′*
13.2.1 *statement_ list′* → ; *statement statement_ list′*
13.2.2 *statement_ list′* → ϵ
14.1 *statement* → *variable* **assignop** *expression*
14.2 *statement* → *compound_ statement*
14.3 *statement* → **if** *expression* **then** *statement*
14.4 *statement* → **if** *expression* **then** *statement* **else** *statement*
14.5 *statement* → **while** *expression* **do** *statement*
15.1 *variable* → **id**
15.2 *variable* → **id [** *expression* **]**
16.1.1 *expression_ list* → *expression expression_ list′*
16.2.1 *expression_ list′* → , *expression expression_ list′*
16.2.2 *expression_ list′* → ϵ
17.1 *expression* → *simple_ expression*
17.2 *expression* → *simple_ expression* **relop** *simple_ expression*
18.1.1 *simple_ expression* → *term simple_ expression′*
18.2.1 *simple_ expression* → *sign term simple_ expression′*
18.3.1 *simple_ expression′* → **addop** *term simple_ expression′*
18.3.2 *simple_ expression′* → *epsilon*
19.1.1 *term* → *factor term′*
19.2.1 *term′* → **mulop** *factor term′*
19.2.2 *term′* → ϵ
20.1 *factor* → **id**
20.2 *factor* → **id [** *expression* **]**
20.3 *factor* → **id** (*expression_ list*)
20.4 *factor* → **num**
20.5 *factor* → (*expression*)
20.6 *factor* → **not** *factor*
21.1 *sign* → +
21.2 *sign* → -