实验 4

在递归下降语法分析的同时完成语义分析，递归下降翻译器的设计参考 6.4.3。

本实验包括两部分内容，按以下步骤完成：

1. 计算算术表达式数值

   测试：6/2+5*8-6

2. 输出赋值语句的三地址代码

   说明：

   文法符号 X 的属性 X.place：存放 X 值的变量的名字；

   函数 emit( )：将生成的三地址语句发送到输出文件中。

   测试： a=6/b+5*c-d;

   输出： T1=6/b
   T2=5*c
   T3=T1+T2
   T4=T3-d
   a=T4

消除左递归文法	三地址代码	计算数值
stmts ⟶ *stmt rest0*		
rest0 ⟶ *stmt* $rest0_1$		
rest0 ⟶ **ε**		
stmt⟶*loc*=*expr* ;	emit(loc.place'=' expr.place)	
stmt⟶**if(***bool***)** $stmt_1$ **else** $stmt_2$		
stmt⟶ **while(***bool***)** $stmt_1$		
loc⟶**id** *resta*	{resta.inArray=id.place} {loc.place=resta.place}	
resta ⟶ [*elist*]		
resta ⟶ ε	{resta.place=resta.inArray}	
elist ⟶ *expr* *rest1*		
rest1 ⟶ , *expr* $rest1_1$		
rest1 ⟶ ε		

bool ⟶ *equality*		
equality ⟶ *rel rest4*		
rest4 ⟶ == *rel* $rest4_1$		
rest4 ⟶ != *rel* $rest4_1$		
rest4 ⟶ **ε**		
rel ⟶ *expr rop_expr*		
rop_expr ⟶ <*expr*		
rop_expr ⟶ <=*expr*		
rop_expr ⟶ >*expr*		
rop_expr ⟶ >=*expr*		
rop_expr ⟶ **ε**		
expr ⟶ *term* *rest5*	{rest5.in=term.place} {expr.place=rest5.place}	{rest5.in = term.val} {expr.val = rest5.val; print(expr.val)}
rest5⟶ **+***term* $rest5_1$	{$rest5_1$.in=newtemp(); emit($rest5_1$.in '=' rest5.in '+' term.place)} {rest5.place =$rest5_1$ .place}	{$rest5_1$.in=rest5.in + term.val} {rest5.val = $rest5_1$.val}
rest5⟶ **-***term* $rest5_1$	{$rest5_1$.in=newtemp(); emit($rest5_1$.in '=' rest5.in '-' term.place)} {rest5.place =$rest5_1$ .place}	{$rest5_1$.in=rest5.in - term.val} {rest5.val = $rest5_1$.val}
rest5⟶ **ε**	{rest5.place = rest5.in}	{rest5.val = rest5.in}
term⟶ *unary* *rest6*	{rest6.in = unary.place} {term.place = rest6.place}	{rest6.in = unary.val} {term.val = rest6.val}
rest6⟶ ***unary** $rest6_1$	{$rest6_1$.in=newtemp(); emit($rest6_1$.in '=' rest6.in '*'unary.place)} {rest6.place = $rest6_1$ .place}	{$rest6_1$.in=rest6.in * unary.val} {rest6.val = $rest6_1$.val}
rest6⟶ **/***unary* $rest6_1$	{$rest6_1$.in=newtemp(); emit($rest6_1$.in '=' rest6.place '/'unary.place)} {rest6.place = $rest6_1$ .place}	{$rest6_1$.in=rest6.in/unary.val} {rest6.val = $rest6_1$.val}
rest6⟶ **ε**	{rest6.place = rest6.in}	{rest6.val = rest6.in}
unary⟶ *factor*	{unary.place = factor.place}	{unary.val = factor.val}
factor⟶ **(***expr***)**	{unary.place = expr.place}	{factor.val = expr.val}
factor⟶*loc*	{factor.place = loc.place}	{factor.val = loc.val}
factor⟶**num**	{factor.place = num.value}	{factor.val = num.val}