

Removed prefixes!

Revised Loops!

Prog → func-cycle

func-cycle → ε

| func-cycle FUNC IDEN SEMICOLON BEGINPARAMS  
| decl-cycle ENDPARAMS BEGINLOCALS decl-cycle  
| ENDOLOCALS BEGINBODY stmt-cycle ENDBODY

decl-cycle → ε

| decl-cycle decl SEMICOLON → l\_recursion

decl → iden-cycle COLON arr-cycle INTEGER \*

iden-cycle → IDEN

| iden-cycle COMMA IDEN \*

arr-cycle → ε

| ARRAY L-BRACK NUM R-BRACK inner-arr OF

inner-arr → ε

| L-BRACK NUM R-BRACK

stmt-cycle → stmt SEMICOLON

| stmt-cycle stmt SEMICOLON

stmt-cycle → stmt SEMICOLON  
| stmt-cycle stmt SEMICOLON

assign-cycle → var ASSIGN exp

if-cycle → IF bool-exp THEN stmt-cycle stmt  
SEMICOLON else-cycle ENDIF

else-cycle → {  
| ELSE stmt-cycle stmt SEMICOLON

while-cycle → WHILE bool-exp BEGINLOOP stmt-cycle stmt  
SEMICOLON ENDOOP

do-cycle → DO BEGINLOOP stmt-cycle stmt SEMICOLON  
ENDLOOP WHILE bool-exp

for-cycle → FOR var ASSIGN NUM SEMICOLON bool-exp  
SEMICOLON var ASSIGN exp BEGINLOOP stmt-cycle stmt  
SEMICOLON ENDOOP

read-cycle → READ var-cycle

write-cycle → WRITE var-cycle

continue-cycle → CONTINUE

return-cycle → RETURN exp

var-cycle → var  
| var-cycle COMMA var

stmt → assign-cycle

- | if-cycle
- | while-cycle
- | do-cycle
- | for-cycle
- | read-cycle
- | write-cycle
- | continue-cycle
- | return-cycle

bool-exp  $\rightarrow$  rel-and-exp

- | bool-exp OR rel-and-exp

rel-and-exp  $\rightarrow$  rel-exp

- | rel-and-exp AND rel-exp

rel-exp  $\rightarrow$  rel-exp-base

- | SUB rel-exp-base

rel-exp-base  $\rightarrow$  exp comp exp

- | TRUE
- | FALSE
- | L\_PAREN bool-exp R\_PAREN

comp  $\rightarrow$  EQ

- | NEQ
- | LT

| GT  
| LTE  
| GTE

exp → mult-exp

| exp mult-cycle mult-exp

mult-cycle → ADD

| SUB

mult-exp → term

| mult-exp term-cycle term

term-cycle → MULT

| DIV

| MOD

term → term-base

| SUB term-base

| IDEN L-PAREN param-cycle R-PAREN

term\_base  $\rightarrow$  var  
| NUM  
| L\_PAREN exp R\_PAREN

param\_cycle  $\rightarrow$   $\epsilon$   
| exp\_cycle

exp\_cycle  $\rightarrow$  exp  
| exp\_cycle COMMA exp

var  $\rightarrow$  IDEN var\_cycle

var\_cycle  $\rightarrow$   $\epsilon$   
| L\_BRACK exp R\_BRACK inner\_var

inner\_var  $\rightarrow$   $\epsilon$   
| L\_BRACK exp R\_BRACK