

Program:

**Program**  $\rightarrow$  **Function Program** |  $\varepsilon$

Function:

**Function**  $\rightarrow$  "function" "identifier" ";" "beginparams" **Declaration\_loop** "endparams"  
"beginlocals" **Declaration\_loop** "endlocals" "beginbody" **Statement\_loop** "endbody"  
**Declaration\_loop**  $\rightarrow$  **Declaration** ";" **Declaration\_loop** |  $\varepsilon$   
**Statement\_loop**  $\rightarrow$  **Statement** ";" **Statement\_loop** |  $\varepsilon$

Declaration:

**Declaration**  $\rightarrow$  **Identifier\_loop** ":" **Declaration\_branch**  
**Identifier\_loop**  $\rightarrow$  "identifier" | "identifier" ";" **Identifier\_loop**  
**Declaration\_branch**  $\rightarrow$  "integer" | "array" "[" "number" "]" "of" "integer" | "array" "["  
"number" "]" "[" "number" "]" "of" "integer"

Statement:

**Statement**  $\rightarrow$  **Statement1** | **Statement2** | **Statement3** | **Statement4** | **Statement5** |  
**Statement6** | **Statement7** | **Statement8** | **Statement9**  
**Statement1**  $\rightarrow$  **Var** ":" **Expression**  
**Statement2**  $\rightarrow$  "if" **Bool-Expr** "then" **Statement\_loop** "endif" | "if" **Bool-Expr** "then"  
**Statement\_loop** "else" **Statement\_loop** "endif"  
**Statement3**  $\rightarrow$  "while" **Bool-Expr** "beginloop" **Statement\_loop** "endloop"  
**Statement4**  $\rightarrow$  "do" "beginloop" **Statement\_loop** "endloop" "while" **Bool-Expr**  
**Statement5**  $\rightarrow$  "for" **Var** ":" "number" ";" **Bool-Expr** ";" **Var** ":" **Expression**  
"beginloop" **Statement\_loop** "endloop"  
**Statement6**  $\rightarrow$  "read" **Var\_loop**  
**Statement7**  $\rightarrow$  "write" **Var\_loop**  
**Statement8**  $\rightarrow$  "continue"  
**Statement9**  $\rightarrow$  "return" **Expression**  
**Var\_loop**  $\rightarrow$  **Var** | **Var** ";" **Var\_loop**

Bool-Expr:

**Bool-Expr**  $\rightarrow$  **Relation-And-Expr** | **Bool-Expr** "or" **Relation-And-Expr**

Relation-And-Expr:

**Relation-And-Expr**  $\rightarrow$  **Relation-Expr** | **Relation-And-Expr** "and" **Relation-Expr**

Relation-Expr:

**Relation-Expr**  $\rightarrow$  **Relation-Expr\_branch** | "not" **Relation-Expr\_branch**  
**Relation-Expr\_branch**  $\rightarrow$  **Expression Comp Expression** | "true" | "false" | "("  
**Bool-Expr** ")"

Comp:

**Comp**  $\rightarrow$  "=" | "<" | ">" | "<=" | ">="

Expression:

**Expression**  $\rightarrow$  **Expression** “+” **Multiplicative-Expr** | **Expression** “-”  
**Multiplicative-Expr** | **Multiplicative-Expr**

Multiplicative-Expr:

**Multiplicative-Expr**  $\rightarrow$  **Multiplicative-Expr** “\*” **Term** | **Multiplicative-Expr** “/”  
**Term** | **Multiplicative-Expr** “%” **Term** | **Term**

Term:

**Term**  $\rightarrow$  “-” **Term\_branch** | **Term\_branch** | **TermIdentifier**  
**Term\_branch**  $\rightarrow$  **Var** | “number” | “(” **Expression** “)”  
**TermIdentifier**  $\rightarrow$  “identifier” “(” **TermExpression\_loop** “)” | “identifier” “(” “)”  
**TermExpression\_loop**  $\rightarrow$  **Expression** | **Expression** “,” **TermExpression\_loop**

Var:

**Var**  $\rightarrow$  “identifier” | “identifier” “[” **Expression** “]” | “identifier” “[” **Expression** “]” “[”  
**Expression** “]”