

**Program:**

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

**Function:**

Function  $\rightarrow$  “function” “identifier” “;” “beginparams” Dec “endparams” “beginlocals” Dec “endlocals” “beginbody” Statements “endbody”

Dec  $\rightarrow$  Declaration “;” Dec |  $\varepsilon$

**Declaration:**

Declaration  $\rightarrow$  A

A  $\rightarrow$  “identifier” B

B  $\rightarrow$  “identifier” “,” A | “:” C

C  $\rightarrow$  “integer” | “array” “[“ “number” “]” “of” “integer”

**Statement:**

Statement  $\rightarrow$  A|B|C|D|E|F|G|H

A  $\rightarrow$  Var “:=” Expression

B  $\rightarrow$  “if” Bool-Exp “then” Statement “endif” | “if” Bool-Exp “then” Statement “else” Statement “endif”

C  $\rightarrow$  “while” Bool-Exp “beginloop” Statement “endloop”

D  $\rightarrow$  “do” “beginloop” Statement “endloop” “while” Bool-Exp

E  $\rightarrow$  “read” Var E’

E’  $\rightarrow$  “,” Var E’ |  $\varepsilon$

F  $\rightarrow$  “write” Var E’

G  $\rightarrow$  “continue”

H  $\rightarrow$  “return” Expression

**Bool-Expr:**

Bool-Expr  $\rightarrow$  A

A  $\rightarrow$  Relation-Expr B

B  $\rightarrow$  Relation-Expr “or” B |  $\varepsilon$

**Relation-And-Expr:**

Relation-And-Expr  $\rightarrow$  A

A  $\rightarrow$  Relation-Expr B

B  $\rightarrow$  Relation-Expr “and” A |  $\varepsilon$

**Relation-Expr:**

Relation-Expr  $\rightarrow$  A | “not” A

A  $\rightarrow$  B | C | D | E

$B \rightarrow \text{Expression Comp Expression}$

$C \rightarrow \text{"true"}$

$D \rightarrow \text{"false"}$

$E \rightarrow \text{"(" Bool-Expr ")"}$

**Comp:**

$\text{Comp} \rightarrow A$

$A \rightarrow \text{"=="} \mid \text{"<>"} \mid \text{"<"} \mid \text{">"} \mid \text{"<="} \mid \text{">="}$

**Expression:**

$\text{Expression} \rightarrow A$

$A \rightarrow \text{Multiplicative-Expression } B$

$B \rightarrow \text{"+" Multiplicative-Expression } B \mid \text{"-"} \text{ Multiplicative-Expression } B \mid \epsilon$

**Multiplicative-Expr:**

$\text{Multiplicative-Expr} \rightarrow A$

$A \rightarrow \text{Term} \mid \text{Term } B$

$B \rightarrow \text{"*"} \text{ Term } B \mid \text{" /"} \text{ Term } B \mid \text{" \%"} \text{ Term } B \mid \epsilon$

**Term:**

$\text{Term} \rightarrow AB \mid C$

$A \rightarrow \text{"-"} \mid \epsilon$

$B \rightarrow \text{Var} \mid \text{number} \mid \text{"(" Expression ")"}$

$C \rightarrow \text{"identifier"} \mid \text{"(" } D \text{"}"}$

$D \rightarrow \text{Expression} \mid \text{Expression " , " } D \mid \epsilon$

**Var:**

$\text{Var} \rightarrow A \mid B$

$A \rightarrow \text{"identifier"}$

$B \rightarrow \text{"identifier"} \mid \text{"[" Expression "]"}$