

Program  $\rightarrow \{ \text{TopLevel} \}$   
 TopLevel  $\rightarrow \text{Function} \mid \text{Statement}$   
 Statement  $\rightarrow \text{Scope} \mid \text{If} \mid \text{For} \mid \text{While} \mid \text{DoWhile} \mid \text{Break} \mid \text{Continue} \mid \text{Return} \mid \text{Expression } ' ; '$   
 Scope  $\rightarrow ' \{ \text{Statement} \} '$   
 Break  $\rightarrow \text{'break' } ' ; '$   
 Continue  $\rightarrow \text{'continue' } ' ; '$   
 Return  $\rightarrow \text{'return' } [ \text{Expression} ] ' ; '$   
 If  $\rightarrow \text{'if' } ' ( \text{Expression } ' ) ' \text{Scope ElseIfList ElseOpt}$   
 ElseIfList  $\rightarrow \{ \text{'else' } \text{'if' } ' ( \text{Expression } ' ) ' \text{Scope} \}$   
 ElseOpt  $\rightarrow \text{'else' } \text{Scope} \mid \varepsilon$   
 Type  $\rightarrow \text{'int' } \mid \text{'char' } \mid \text{'double' } \mid \text{'string'}$   
 For  $\rightarrow \text{'for' } ' ( \text{ForInit } ' ; ' \text{Expression } ' ; ' \text{Expression } ' ) ' \text{Scope}$   
 ForInit  $\rightarrow \text{Type VarList}$   
 VarList  $\rightarrow \text{VarDecl } \{ ' , ' \text{VarDecl} \}$   
 VarDecl  $\rightarrow \text{Identifier VarDeclSuffix}$   
 VarDeclSuffix  $\rightarrow \text{'='} \text{Expression ArraySuffix} \mid \text{ArraySuffix} \mid \varepsilon$   
 ArraySuffix  $\rightarrow \text{'[ } \text{Expression } ' ] ' \mid \varepsilon$   
 Identifier  $\rightarrow \text{Letter } \{ \text{Letter} \mid \text{Digit} \mid \text{'_'} \}$   
 Letter  $\rightarrow \text{'Q' } \mid \text{'W' } \mid \text{'E' } \mid \text{'R' } \mid \text{'T' } \mid \text{'Y' } \mid \text{'U' } \mid \text{'I' } \mid \text{'O' } \mid \text{'P'}$   
      $\mid \text{'A' } \mid \text{'S' } \mid \text{'D' } \mid \text{'F' } \mid \text{'G' } \mid \text{'H' } \mid \text{'J' } \mid \text{'K' } \mid \text{'L'}$   
      $\mid \text{'Z' } \mid \text{'X' } \mid \text{'C' } \mid \text{'V' } \mid \text{'B' } \mid \text{'N' } \mid \text{'M'}$   
      $\mid \text{'q' } \mid \text{'w' } \mid \text{'e' } \mid \text{'r' } \mid \text{'t' } \mid \text{'y' } \mid \text{'u' } \mid \text{'i' } \mid \text{'o' } \mid \text{'p'}$   
      $\mid \text{'a' } \mid \text{'s' } \mid \text{'d' } \mid \text{'f' } \mid \text{'g' } \mid \text{'h' } \mid \text{'j' } \mid \text{'k' } \mid \text{'l'}$   
      $\mid \text{'z' } \mid \text{'x' } \mid \text{'c' } \mid \text{'v' } \mid \text{'b' } \mid \text{'n' } \mid \text{'m'}$   
 Digit  $\rightarrow \text{'0' } \mid \text{'1' } \mid \text{'2' } \mid \text{'3' } \mid \text{'4' } \mid \text{'5' } \mid \text{'6' } \mid \text{'7' } \mid \text{'8' } \mid \text{'9'}$   
 Number  $\rightarrow \text{Digit } \{ \text{Digit} \}$   
 String  $\rightarrow \text{'\" } \{ \text{Letter} \mid \text{Digit} \} \text{'\"}$   
 While  $\rightarrow \text{'while' } ' ( \text{Expression } ' ) ' \text{Scope}$   
 DoWhile  $\rightarrow \text{'do' } \text{Scope } \text{'while' } ' ( \text{Expression } ' ) ' ' ; '$   
 Function  $\rightarrow \text{'fn' } \text{Type Identifier } ' ( \text{FunctionArgsOpt } ' ) ' \text{Scope}$   
 FunctionArgsOpt  $\rightarrow \text{FunctionArgs} \mid \varepsilon$   
 FunctionArgs  $\rightarrow \text{Type Identifier ArrOpt } \{ ' , ' \text{Type Identifier ArrOpt} \}$   
 ArrOpt  $\rightarrow \text{'[ } ' ' ] ' \mid \varepsilon$   
 Expression  $\rightarrow \text{ExprComma}$   
 ExprComma  $\rightarrow \text{AssignmentExpr } \{ ' , ' \text{AssignmentExpr} \}$   
 AssignmentExpr  $\rightarrow \text{Identifier AssignOrExpr} \mid \text{NonIdExpr}$   
 AssignOrExpr  $\rightarrow \text{'='} \text{AssignmentExpr} \mid \text{ExprAfterPrimaryId}$   
 ExprAfterPrimaryId  $\rightarrow \text{PrimaryIdTail EqualityTail}$   
 NonIdExpr  $\rightarrow \text{PrimaryNonId EqualityTail}$   
 EqualityTail  $\rightarrow ( \text{'=='} \mid \text{'!='} ) \text{RelExpr EqualityTail} \mid \varepsilon$   
 RelExpr  $\rightarrow \text{AddExpr } \{ ( \text{'<'} \mid \text{'<='} \mid \text{'>'} \mid \text{'>='} ) \text{AddExpr} \}$   
 AddExpr  $\rightarrow \text{MulExpr } \{ ( \text{'+'} \mid \text{'-'} ) \text{MulExpr} \}$   
 MulExpr  $\rightarrow \text{UnaryExpr } \{ ( \text{'*'} \mid \text{'/'} \mid \text{'\%'} ) \text{UnaryExpr} \}$   
 UnaryExpr  $\rightarrow ( \text{'+'} \mid \text{'-'} \mid \text{'!'} ) \text{UnaryExpr} \mid \text{Primary}$   
 Primary  $\rightarrow \text{PrimaryId} \mid \text{PrimaryNonId}$   
 PrimaryId  $\rightarrow \text{Identifier PrimaryIdTail}$   
 PrimaryIdTail  $\rightarrow \text{'( } \text{CallArgsOpt } ' ) ' \mid \text{'[ } \text{Expression } ' ] ' \mid \varepsilon$   
 PrimaryNonId  $\rightarrow \text{Number} \mid \text{String} \mid \text{'( } \text{Expression } ' ) '$   
 CallArgsOpt  $\rightarrow \text{CallArgs} \mid \varepsilon$   
 CallArgs  $\rightarrow \text{Expression } \{ ' , ' \text{Expression} \}$