⟨*program*⟩ → ⟨*roots*⟩

⟨*roots*⟩ → ε
| ⟨*root*⟩ ⟨*roots*⟩

⟨*root*⟩ → ⟨*dcl*⟩;
| ⟨*assign*⟩;
| ⟨*function*⟩
| ⟨*COMMENT*⟩

⟨*dcl*⟩ → ⟨*type*⟩ ⟨*assign*⟩

⟨*type*⟩ → ⟨*constant*⟩ ⟨*primitivetype*⟩

⟨*constant*⟩ → const
| ε

⟨*primitivetype*⟩ → bool
| double
| int
| char
| container
| string

⟨*id*⟩ → ⟨*LETTER*⟩

⟨*assign*⟩ → ⟨*callid*⟩ ⟨*assignend*⟩

⟨*assignend*⟩ → `<--` ⟨*expr*⟩
| ε

⟨*expr*⟩ → ⟨*term*⟩ ⟨*exprend*⟩

⟨*term*⟩ → ⟨*comp*⟩ ⟨*termend*⟩

⟨*comp*⟩ → ⟨*addsub*⟩ ⟨*compend*⟩

⟨*addsub*⟩ → ⟨*muldiv*⟩ ⟨*addsubend*⟩

⟨*muldiv*⟩ → ⟨*factor*⟩ ⟨*muldivend*⟩

⟨*factor*⟩ → (⟨*expr*⟩)
| !(⟨*expr*⟩)
| ⟨*callid*⟩
| ⟨*numeric*⟩
| A ⟨*DIGIT*⟩
| ⟨*string*⟩
| ⟨*functioncall*⟩
| ⟨*cast*⟩
| LOW
| HIGH
| true
| false

⟨*callid*⟩ → ⟨*id*⟩ ⟨*arrayidend*⟩

⟨*arrayidend*⟩ → ⟨*arraycall*⟩ [⟨*expr*⟩]
| *ε*

⟨*arraycall*⟩ → [⟨*expr*⟩] ⟨*arraycall*⟩
| [ ] ⟨*arraycall*⟩
| *ε*

⟨*numeric*⟩ → ⟨*plusminusorempty*⟩ ⟨*DIGIT*⟩ ⟨*numericend*⟩

⟨*addsubend*⟩ → ⟨*plusminus*⟩ ⟨*addsub*⟩
| *ε*

⟨*muldivend*⟩ → ⟨*timesdivide*⟩ ⟨*muldiv*⟩
| *ε*

⟨*timesdivide*⟩ → *
| /

⟨*plusminusorempty*⟩ → *ε*
| ⟨*plusminus*⟩

⟨*plusminus*⟩ → -
| +

⟨*numericend*⟩ → *ε*
| . ⟨*DIGIT*⟩

⟨*string*⟩ → ⟨*STRINGTOKEN*⟩

⟨*functioncall*⟩ → call ⟨*id*⟩ (⟨*callexpr*⟩)

⟨*callexpr*⟩ → ⟨*subcallexpr*⟩
| *ε*

⟨*subcallexpr*⟩ → ⟨*expr*⟩ ⟨*subcallexprend*⟩

⟨*subcallexprend*⟩ → , ⟨*subcallexpr*⟩
| *ε*

⟨*cast*⟩ → ⟨*type*⟩ (⟨*expr*⟩)

⟨*compend*⟩ → ⟨*comparisonoperator*⟩ ⟨*comp*⟩
| *ε*

⟨*comparisonoperator*⟩ → >
| <
| <=
| >=
| !=
| =

⟨*termend*⟩ → ⟨*termsymbol*⟩ ⟨*term*⟩
| ε

⟨*termsymbol*⟩ → AND

⟨*exprend*⟩ → ⟨*exprsymbol*⟩ ⟨*expr*⟩
| ε

⟨*exprsymbol*⟩ → OR

⟨*function*⟩ → function ⟨*id*⟩ return ⟨*functionmid*⟩

⟨*functionmid*⟩ → ⟨*type*⟩ ⟨*functionend*⟩ ⟨*expr*⟩; end
| nothing ⟨*functionend*⟩ nothing; end

⟨*functionend*⟩ → using (⟨*params*⟩) begin ⟨*stmts*⟩ return

⟨*params*⟩ → ⟨*subparams*⟩
| ε

⟨*subparams*⟩ → ⟨*type*⟩ ⟨*callid*⟩ ⟨*subparamsend*⟩

⟨*subparamsend*⟩ → , ⟨*subparams*⟩
| ε

⟨*stmts*⟩ → ε
| ⟨*stmt*⟩ ⟨*stmts*⟩

⟨*stmt*⟩ → ⟨*assign*⟩;
| ⟨*nontermif*⟩
| ⟨*nontermwhile*⟩
| ⟨*from*⟩
| ⟨*dcl*⟩;
| ⟨*functioncall*⟩;
| ⟨*nontermswitch*⟩
| ⟨*COMMENT*⟩

⟨*nontermif*⟩ → if(⟨*expr*⟩) ⟨*block*⟩ ⟨*endif*⟩

⟨*endif*⟩ → else ⟨*nontermelse*⟩
| ε

⟨*nontermelse*⟩ → ⟨*nontermif*⟩
| ⟨*block*⟩

⟨*nontermwhile*⟩ → while(⟨*expr*⟩) ⟨*block*⟩

⟨*from*⟩ → from ⟨*assign*⟩ to ⟨*expr*⟩ step ⟨*plusminusorempty*⟩ ⟨*DIGIT*⟩ ⟨*block*⟩

⟨*block*⟩ → begin ⟨*stmts*⟩ end

⟨*nontermswitch*⟩ → switch (⟨*expr*⟩) begin ⟨*cases*⟩ end

⟨*cases*⟩ → case ⟨*expr*⟩: ⟨*stmts*⟩ ⟨*endcase*⟩

⟨*endcase*⟩ → ⟨*cases*⟩
| break; ⟨*breakend*⟩
| default: ⟨*stmts*⟩ break;

⟨*breakend*⟩ → ⟨*cases*⟩
| default: ⟨*stmts*⟩ break;
| ε

⟨*STRINGTOKEN*⟩ → " .*? "

⟨*LETTER*⟩ → [a - zA - Z] $^{+}$

⟨*DIGIT*⟩ → [0 - 9] $^{+}$

⟨*NOTZERODIGIT*⟩ → [1-9][0-9] *

⟨*COMMENT*⟩ → /* .*? */