⟨*program*⟩ → ⟨*roots*⟩

⟨*roots*⟩ → ⟨*root*⟩
| ⟨*root*⟩ ⟨*roots*⟩

⟨*root*⟩ → ⟨*dcl*⟩;
| ⟨*function*⟩
| ⟨*comment*⟩

⟨*dcl*⟩ → ⟨*type*⟩ ⟨*id*⟩
| ⟨*type*⟩ ⟨*assign*⟩

⟨*type*⟩ → ⟨*primitivetype*⟩
| ⟨*arraytype*⟩

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

⟨*arraytype*⟩ → ⟨*type*⟩ [ ]
| string

⟨*assign*⟩ → ⟨*callid*⟩ <-- ⟨*expr*⟩

⟨*callid*⟩ → ⟨*id*⟩
| ⟨*callid*⟩[⟨*digits*⟩]

⟨*id*⟩ → ⟨*letter*⟩
| ⟨*id*⟩ ⟨*letter*⟩
| ⟨*id*⟩ ⟨*digit*⟩

⟨*letter*⟩ → [a - zA - Z]

⟨*digits*⟩ → ⟨*digit*⟩
| ⟨*digit*⟩ ⟨*digits*⟩

⟨*digit*⟩ → [0 - 9]

⟨*function*⟩ → function ⟨*id*⟩ return ⟨*type*⟩ using (⟨*params*⟩) begin ⟨*stmts*⟩ return ⟨*expr*⟩;
end
| function ⟨*id*⟩ return nothing using (⟨*params*⟩) begin ⟨*stmts*⟩ return nothing; end

⟨*params*⟩ → ⟨*subparams*⟩
| ε

⟨*subparams*⟩ → ⟨*type*⟩ ⟨*id*⟩, ⟨*subparams*⟩
| ⟨*type*⟩ ⟨*id*⟩

⟨*stmts*⟩ → ⟨*stmt*⟩
| ⟨*stmt*⟩ ⟨*stmts*⟩

⟨*stmt*⟩ → ⟨*assign*⟩;
| ⟨*if*⟩
| ⟨*while*⟩
| ⟨*from*⟩
| ε
| ⟨*dcl*⟩;
| ⟨*functioncall*⟩;
| ⟨*switch*⟩
| ⟨*comment*⟩

⟨*if*⟩ → if(⟨*logexpr*⟩) begin ⟨*stmts*⟩ ⟨*endif*⟩

⟨*endif*⟩ → end else ⟨*if*⟩
| end else begin ⟨*stmts*⟩ end
| end

⟨*logexpr*⟩ → ⟨*logexpr*⟩ OR ⟨*andcomp*⟩
| ⟨*andcomp*⟩

⟨*andcomp*⟩ → ⟨*andcomp*⟩ AND ⟨*comp*⟩
| ⟨*comp*⟩

⟨*comp*⟩ → ⟨*booleanoperand*⟩ ⟨*comparisonoperator*⟩ ⟨*booleanoperand*⟩

⟨*booleanoperand*⟩ → true
| false
| ⟨*expr*⟩
| ⟨*boolean*⟩

⟨*boolean*⟩ → !(⟨*logexpr*⟩)
| (⟨*logexpr*⟩)

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

⟨*while*⟩ → while(⟨*logexpr*⟩) begin ⟨*stmts*⟩ end

⟨*from*⟩ → from ⟨*expr*⟩ to ⟨*logexpr*⟩ step ⟨*assign*⟩ begin ⟨*stmts*⟩ end

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

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

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

⟨*expr*⟩ → ⟨*expr*⟩+⟨*term*⟩
| ⟨*expr*⟩-⟨*term*⟩
| ⟨*term*⟩

⟨*term*⟩ → ⟨*term*⟩ * ⟨*factor*⟩
| ⟨*term*⟩ / ⟨*factor*⟩
| ⟨*factor*⟩

⟨*factor*⟩ → (⟨*expr*⟩)
| ⟨*callid*⟩
| ⟨*plusminus*⟩⟨*digit*⟩
| ⟨*plusminus*⟩⟨*nummeric*⟩
| "⟨*string*⟩"
| ⟨*functioncall*⟩
| ⟨*cast*⟩
| LOW
| HIGH

⟨*plusminus*⟩ → ε
| -

⟨*nummeric*⟩ → ⟨*digit*⟩
| ⟨*digit*⟩⟨*nummeric*⟩
| .⟨*digitonly*⟩

⟨*digitonly*⟩ → ⟨*digit*⟩
| ⟨*digit*⟩ ⟨*digitonly*⟩

⟨*string*⟩ → ⟨*letter*⟩
| ⟨*digit*⟩
| ⟨*symbol*⟩
| ⟨*symbol*⟩ ⟨*string*⟩
| ⟨*digit*⟩ ⟨*string*⟩
| ⟨*letter*⟩ ⟨*string*⟩
| ε

⟨*symbol*⟩ → !
| %
| ^
| &
| *
| (
|)
| _
| +
| |
| ~
| -
| =
| `
| {
| }

| [
|]
| :
| ;
| ?
| ,
| .
| /
| ' '

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

⟨*callexpr*⟩ → ⟨*expr*⟩
| ⟨*expr*⟩, ⟨*callexpr*⟩

⟨*comment*⟩ → /* ⟨*string*⟩ */

⟨*cast*⟩ → ⟨*type*⟩ (⟨*expr*⟩)