Syntax

- Variable *shadowing* is **not** allowed. Having a variable with the same name in an inner scope is invalid, unless the variable is first declared in the inner scope.

- You must terminate a statement with a semicolon, *unless* that statement **ends** with a scope.

- Single line comments are denoted by '//' and Multi-line comments are denoted with '/* */'

- You must say **please** or **PLEASE** enough to satisfy the compiler.

Producers

$$[Program] \rightarrow [Statement]^*$$

$$[Statement] \rightarrow \begin{cases} \text{please} \\ \text{PLEASE} \\ \text{exit}([Expr]); \\ \text{print}([Expr],^* [Expr]^*); \\ \text{printn}([Expr],^* [Expr]^*); \\ \text{set } [ID] = [Expr]; \\ \text{set } [ListID] = [List]; \\ \text{reset } [ID] = [Expr]; \\ \text{if}([Expr])[Scope][AfterIf] \\ \text{while}([Expr])[Scope] \\ [Scope] \end{cases}$$

$$[Scope] \rightarrow \{[Stmt]^*\}$$

$$[AfterIf] \rightarrow \begin{cases} \text{elsif}([Expr])[Scope][AfterIf] \\ \text{else}([Expr])[Scope] \\ \epsilon \end{cases}$$

$$[Expr] \rightarrow \begin{cases} [Term] \\ [BinaryExpr] \end{cases}$$

$$[Term] \rightarrow \begin{cases} \text{int\_lit} \\ \text{ID} \\ ([Expr]) \\ \text{len }([List]) \\ \text{'char'} \end{cases}$$

$$[ID] \rightarrow \begin{cases} \text{id\_lit} \\ [ListLocation] \end{cases}$$

$$[\text{ListLocation}] \rightarrow \text{id\_lit}[\ [\text{Expr}]\ ]$$

$$[\text{ListID}] \rightarrow \text{id\_lit}$$

$$[\text{List}] \rightarrow \begin{cases} [\text{ListInit}] \\ [\text{ListNotInit}] \end{cases}$$

$$[\text{ListInit}] \rightarrow \begin{cases} \{[\text{Expr}], [\text{Expr}], \cdots\} \\ \text{"char*"} \end{cases}$$

$$[\text{ListNotInit}] \rightarrow \begin{cases} [\ [\text{Expr}]\ ] \\ [\ [\text{Expr}], [\text{Expr}]\ ] \\ [\ [\text{Expr}]..[\text{Expr}]\ ] \\ \text{str}([\text{Expr}]) \end{cases}$$

$$[\text{BinaryExpr}] \rightarrow \begin{cases} [\text{Expr}] \times [\text{Expr}] & precedence = 2 \\ [\text{Expr}] \div [\text{Expr}] & precedence = 2 \\ [\text{Expr}] \% [\text{Expr}] & precedence = 2 \\ [\text{Expr}] + [\text{Expr}] & precedence = 1 \\ [\text{Expr}] - [\text{Expr}] & precedence = 1 \\ [Expr] \leq [Expr] & precedence = 0 \\ [Expr] \geq [Expr] & precedence = 0 \\ [Expr] > [Expr] & precedence = 0 \\ [Expr] < [Expr] & precedence = 0 \\ [Expr] == [Expr] & precedence = 0 \\ [Expr] \mathrel{!=} [Expr] & precedence = 0 \end{cases}$$

Terminals

$$\text{int\_lit} \rightarrow [0\text{-}9]^*$$

$$\text{char} \rightarrow (\text{int})[0\text{-}9a\text{-}zA\text{-}Z]^1$$

$$\text{id\_lit} \rightarrow [a\text{-}zA\text{-}Z][0\text{-}9a\text{-}zA\text{-}Z]^*$$