

## 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

$$\begin{aligned}
 [\text{Program}] &\rightarrow [\text{Statement}]^* \\
 [\text{Statement}] &\rightarrow \begin{cases} \text{please} \\ \text{PLEASE} \\ \text{exit}([\text{Expr}]); \\ \text{print}([\text{Expr}], * [\text{Expr}]^*); \\ \text{println}([\text{Expr}], * [\text{Expr}]^*); \\ \text{set ID} = [\text{Expr}]; \\ \text{set array\_id} = [\text{List}]; \\ \text{reset ID} = [\text{Expr}]; \\ \text{if}([\text{Expr}])[\text{Scope}][\text{AfterIf}] \\ \text{while}([\text{Expr}])[\text{Scope}] \\ [\text{Scope}] \end{cases} \\
 [\text{Scope}] &\rightarrow \{[\text{Stmt}]^*\} \\
 [\text{AfterIf}] &\rightarrow \begin{cases} \text{elsif}([\text{Expr}])[\text{Scope}][\text{AfterIf}] \\ \text{else}([\text{Expr}])[\text{Scope}] \\ \epsilon \end{cases} \\
 [\text{Expr}] &\rightarrow \begin{cases} [\text{Term}] \\ [\text{BinaryExpr}] \end{cases} \\
 [\text{Term}] &\rightarrow \begin{cases} \text{int\_lit} \\ \text{ID} \\ ([\text{Expr}]) \\ \text{'char'} \end{cases} \\
 [\text{ID}] &\rightarrow \begin{cases} \text{id\_lit} \\ \text{array\_id} \\ [\text{ListLocation}] \end{cases}
 \end{aligned}$$

$$\begin{aligned}
[\text{ListLocation}] &\rightarrow \text{id\_lit} [ \text{Expr} ] \\
[\text{List}] &\rightarrow \begin{cases} \{ [\text{Expr}], [\text{Expr}], \dots \} \\ [ [\text{Expr}] ] \\ [ [\text{Expr}], [\text{Expr}] ] \\ \text{"char*"} \\ \text{str}([\text{Expr}]) \end{cases} \\
[\text{BinaryExpr}] &\rightarrow \begin{cases} [\text{Expr}] \times [\text{Expr}] & \textit{precedence} = 2 \\ [\text{Expr}] \div [\text{Expr}] & \textit{precedence} = 2 \\ [\text{Expr}] \% [\text{Expr}] & \textit{precedence} = 2 \\ [\text{Expr}] + [\text{Expr}] & \textit{precedence} = 1 \\ [\text{Expr}] - [\text{Expr}] & \textit{precedence} = 1 \\ [Expr] \leq [Expr] & \textit{precedence} = 0 \\ [Expr] \geq [Expr] & \textit{precedence} = 0 \\ [Expr] > [Expr] & \textit{precedence} = 0 \\ [Expr] < [Expr] & \textit{precedence} = 0 \\ [Expr] == [Expr] & \textit{precedence} = 0 \\ [Expr] != [Expr] & \textit{precedence} = 0 \end{cases}
\end{aligned}$$

## Terminals

$$\begin{aligned}
\text{int\_lit} &\rightarrow [0-9]^* \\
\text{char} &\rightarrow (\text{int})[0-9\text{a-zA-Z}]^1 \\
\text{id\_lit} &\rightarrow [\text{a-zA-Z}][0-9\text{a-zA-Z}]^*
\end{aligned}$$