

1 Literals

$\langle \text{literal} \rangle ::= \langle \text{integer-literal} \rangle \mid \langle \text{string-literal} \rangle \mid \langle \text{bool-literal} \rangle$

$\langle \text{integer-literal} \rangle ::= [-], \langle \text{digit} \rangle, \{ \langle \text{digit} \rangle \}$

$\langle \text{digit} \rangle ::= 0 \mid \dots \mid 9$

$\langle \text{string-literal} \rangle ::= ", \{ \langle \text{ASCII-character} \rangle \}, "$

$\langle \text{bool-literal} \rangle ::= \text{true} \mid \text{false}$

2 Types

$\langle \text{type} \rangle ::= \langle \text{simple-type} \rangle \mid \langle \text{function-type} \rangle$

$\langle \text{simple-type} \rangle ::= \text{Int} \mid \text{Bool} \mid \text{String}$

$\langle \text{function-type} \rangle ::= \langle \text{function-type-no-arguments} \rangle \mid \langle \text{function-type-with-arguments} \rangle$

$\langle \text{function-type-no-arguments} \rangle ::= \text{Void} \rightarrow \langle \text{function-arg-type} \rangle$

$\langle \text{function-type-with-arguments} \rangle ::= \langle \text{function-arg-type} \rangle \{ \rightarrow \langle \text{function-arg-type} \rangle \} \rightarrow \langle \text{function-arg-type} \rangle$

$\langle \text{function-arg-type} \rangle ::= \langle \text{simple-type} \rangle \mid \langle \text{function-arg-function-type} \rangle$

$\langle \text{function-arg-function-type} \rangle ::= (\langle \text{function-type} \rangle)$

3 Expressions

$\langle \text{expression} \rangle ::= \langle \text{expression-0} \rangle \{ :: \langle \text{expression-0} \rangle \}$

$\langle \text{expression-0} \rangle ::= \langle \text{expression-1} \rangle \mid \langle \text{logical-expression} \rangle$

$\langle \text{logical-expression} \rangle ::= \langle \text{logical-expression-1} \rangle \{ \mid \mid \langle \text{logical-expression-1} \rangle \}$

$\langle \text{logical-expression-1} \rangle ::= \langle \text{logical-expression-2} \rangle \{ \&\& \langle \text{logical-expression-2} \rangle \}$

$\langle \text{logical-expression-2} \rangle ::= \langle \text{expression-1} \rangle \langle \text{logical-operator} \rangle \langle \text{expression-1} \rangle$

$\langle \text{logical-operator} \rangle ::= < \mid > \mid <= \mid >= \mid == \mid !=$

$\langle \text{expression-1} \rangle ::= \langle \text{expression-2} \rangle \{ (+ \mid -) \langle \text{expression-2} \rangle \}$

$\langle \text{expression-2} \rangle ::= \langle \text{term} \rangle \{ (* \mid / \mid \%) \langle \text{term} \rangle \}$

$\langle \text{term} \rangle ::= \langle \text{literal} \rangle \mid \langle \text{identifier} \rangle \mid \langle \text{call-expression} \rangle \mid \langle \text{parentheses-expression} \rangle \mid \langle \text{lambda-expression} \rangle$

$\langle \text{call-expression} \rangle ::= \langle \text{term} \rangle ([\langle \text{expressions-list} \rangle])$

$\langle \text{expressions-list} \rangle ::= \langle \text{expression} \rangle [, \langle \text{expressions-list} \rangle]$

$\langle \text{parentheses-expression} \rangle ::= (\langle \text{expression} \rangle)$

$\langle \text{lambda-expression} \rangle ::= \text{lambda} \langle \text{arguments-list} \rangle \rightarrow \langle \text{function-arg-type} \rangle \langle \text{code-block} \rangle$

4 Statements

$\langle \text{statement} \rangle ::= ((\langle \text{declaration} \rangle \mid \langle \text{print-statement} \rangle \mid \langle \text{assign-statement} \rangle \mid \langle \text{postfix-statement} \rangle) \mid \langle \text{flow-statement} \rangle \mid \langle \text{statements-list} \rangle)$

$\langle \text{statements-list} \rangle ::= \langle \text{statement} \rangle [\langle \text{statements-list} \rangle]$

$\langle \text{print-statement} \rangle ::= \text{print } \langle \text{expressions-list} \rangle$

$\langle \text{assign-statement} \rangle ::= \langle \text{identifier} \rangle \langle \text{assign-operator} \rangle \langle \text{expression} \rangle$

$\langle \text{assign-operator} \rangle ::= = \mid -= \mid += \mid *= \mid /= \mid \%=$

$\langle \text{postfix-statement} \rangle ::= \langle \text{identifier} \rangle (++) \mid (--)$

$\langle \text{flow-statement} \rangle ::= \langle \text{if-statement} \rangle \mid \langle \text{while-statement} \rangle \mid \langle \text{for-statement} \rangle \mid \langle \text{return-statement} \rangle$

$\langle \text{if-statement} \rangle ::= \text{if } \langle \text{expression} \rangle \langle \text{code-block} \rangle [\text{else } \langle \text{code-block} \rangle]$

$\langle \text{while-statement} \rangle ::= \text{while } \langle \text{expression} \rangle \langle \text{code-block} \rangle$

$\langle \text{for-statement} \rangle ::= \text{for } \langle \text{identifier} \rangle \text{ in } \langle \text{range} \rangle \langle \text{code-block} \rangle$

$\langle \text{range} \rangle ::= \langle \text{expression} \rangle (\dots \mid \dots <) \langle \text{expression} \rangle$

$\langle \text{return-statement} \rangle ::= \text{return } \langle \text{expression} \rangle$

$\langle \text{code-block} \rangle ::= \{ [\langle \text{statements-list} \rangle] \}$

5 Declarations

$\langle \text{simple-declaration} \rangle ::= \langle \text{variable-declaration} \rangle \mid \langle \text{constant-declaration} \rangle \mid \langle \text{function-declaration} \rangle$

$\langle \text{constant-declaration} \rangle ::= \text{let } (\langle \text{identifier} \rangle \mid \langle \text{typed-identifier} \rangle) = \langle \text{expression} \rangle$

$\langle \text{variable-declaration} \rangle ::= \text{var } (\langle \text{identifier} \rangle \mid \langle \text{typed-identifier} \rangle) = \langle \text{expression} \rangle$

$\langle \text{function-declaration} \rangle ::= \text{func } \langle \text{identifier} \rangle \langle \text{arguments-list} \rangle \rightarrow \langle \text{function-arg-type} \rangle \langle \text{code-block} \rangle$

$\langle \text{arguments-list} \rangle ::= ([\langle \text{typed-identifiers-list} \rangle])$

$\langle \text{typed-identifiers-list} \rangle ::= \langle \text{typed-identifier} \rangle [, \langle \text{typed-identifiers-list} \rangle]$

$\langle \text{typed-identifier} \rangle ::= \langle \text{identifier} \rangle : \langle \text{type} \rangle$

$\langle \text{identifier} \rangle ::= (\langle \text{letter} \rangle \mid _), \{ \langle \text{letter} \rangle \mid \langle \text{digit} \rangle \mid _ \}$

$\langle \text{letter} \rangle ::= \text{a} \mid \dots \mid \text{z} \mid \text{A} \mid \dots \mid \text{Z}$

6 Program

$\langle \text{Program} \rangle ::= \text{main: } \langle \text{code-block} \rangle [\langle \text{functions-list} \rangle]$

$\langle \text{functions-list} \rangle ::= \langle \text{function-declaration} \rangle [\langle \text{functions-list} \rangle]$