

Target Language Syntax

CS 4300—Fall, 2007

program	::= variable_definitions function_definitions
function_definitions	::= function_head block ::= function_definitions function_head block
identifier_list	::= ID ::= ID [INT_LITERAL] ::= identifier_list , ID ::= identifier_list , ID [INT_LITERAL]
variable_definitions	::= ϵ ::= variable_definitions type identifier_list ;
type	::= INT ::= FLOAT
function_head	::= type ID arguments
arguments	::= (parameter_list)
parameter_list	::= ϵ ::= parameters
parameters	::= type ID ::= type ID [] ::= parameters , type ID ::= parameters , type ID []
block	::= { variable_definitions statements }
statements	::= ϵ ::= statements statement
statement	::= expression ; ::= compound_statement ::= RETURN expression ; ::= IF (bool_expression) statement ELSE statement ::= WHILE (bool_expression) statement ::= input_statement ; ::= output_statement ;
input_statement	::= CIN ::= input_statement STREAMIN variable
output_statement	::= COUT ::= output_statement STREAMOUT expression ::= output_statement STREAMOUT STR_LITERAL ::= output_statement STREAMOUT ENDL
compound_statement	::= { statements }

variable	::= ID ::= ID [expression]
expression_list	::= ϵ ::= expressions
expressions	::= expression ::= expressions , expression
expression	::= variable = expression ::= variable INCOP expression ::= simple_expression
simple_expression	::= term ::= ADDOP term ::= simple_expression ADDOP term
term	::= factor ::= term MULOP factor
factor	::= ID ::= ID (expression_list) ::= literal ::= (expression) ::= ID [expression]
literal	::= INT_LITERAL ::= FLT_LITERAL
bool_expression	::= bool_term ::= bool_expression OR bool_term
bool_term	::= bool_factor ::= bool_term AND bool_factor
bool_factor	::= ! bool_factor ::= (bool_expression) ::= simple_expression RELOP simple_expression

Where:

Entries in **boldface** are tokens

ADDOP is one of + -

INCOP is one of += -=

RELOP is one of < > <= >= == !=

OR stands for the lexeme ||

AND stands for the lexeme &&

FLT_LITERAL is a float constant without a sign (at least 1 digit before & after decimal pt.; possible exponent)

INT_LITERAL is an integer constant without a sign

STR_LITERAL is a string enclosed in quotes ("), not longer than 1 line

MULOP is one of * / %

STREAMIN is >> **STREAMOUT** is <<

ID follows the usual rules for C++ identifiers, and may be any length

CIN, COUT, ELSE, ENDL, FLOAT, IF, INT, RETURN, and WHILE are the keywords with those spellings

() [] { } ; , ! and = are single-character tokens representing themselves

Additional lexical conventions:

Comments may be entered using either /* ... */ or //, as in real C++

Any line beginning with # (like, for instance, #include <iostream>) is also considered a comment