Compiler Project

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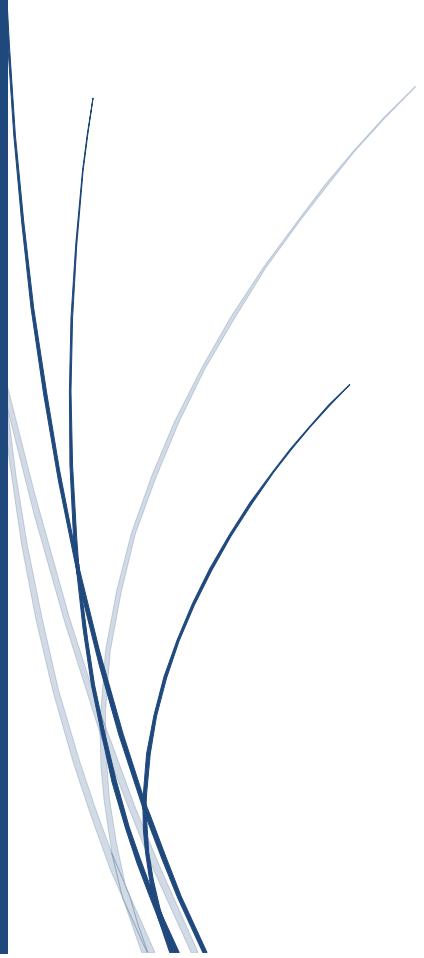

Context-Free Grammar (CFG) for the Tiny Programming Language

Terminals

Terminals = {
  main, int, float, string, write, read, return, if, then, elseif, else, end, repeat, until,
  &&, ||, <, >, =, <>, +, -, *, /, endl, (,), {, }, :, ;, :=, Identifier, Number, String
}

Production Rules

Program

Program → FunctionStatements MainFunction

Main Function

MainFunction → Datatype main ( ) FunctionBody

Function Statements

FunctionStatements → FunctionStatement FunctionStatements'
FunctionStatements' → FunctionStatement FunctionStatements' | ε

Function Statement

FunctionStatement → FunctionDeclaration FunctionBody

Function Declaration

FunctionDeclaration → Datatype Identifier (ParameterList)

Function Body

FunctionBody → { Statements ReturnStatement }

Parameter List

ParameterList → Parameter Parameters'
Parameters' → , Parameter Parameters' | ε

Parameter

Parameter → Datatype Identifier

Statements

Statements → Statement Statements'
Statements' → Statement Statements' | ε

Statement

Statement → DeclarationStatement | AssignmentStatement | WriteStatement | ReadStatement | IfStatement | RepeatStatement

Repeat Statement

RepeatStatement → repeat Statements until ConditionStatement

If Statement

IfStatement → if ConditionStatement then Statements ElseClause end
ElseClause → ElseIfStatement | ElseStatement | ε
ElseIfStatement → elseif ConditionStatement then Statements ElseIfStatement'
ElseIfStatement' → ElseIfStatement | ElseStatement | ε
ElseStatement → else Statements

Write Statement

WriteStatement → write (WriteContent) ;
WriteContent → Expression | endl

Read Statement

ReadStatement → read Identifier ;

Return Statement

ReturnStatement → return Expression ;

Assignment Statement

AssignmentStatement → Identifier := Expression ;

Declaration Statement

DeclarationStatement → Datatype DeclarationList ;
DeclarationList → Declaration Declarations'
Declarations' → , Declaration Declarations' | ε
Declaration → AssignmentStatement | Identifier

Condition Statement

ConditionStatement → Condition Conditions'
Conditions' → BooleanOperator Condition Conditions' | ε
Condition → Identifier ConditionOperator Term

Operators

BooleanOperator → && | ||
ConditionOperator → < | > | = | <>

Expression

Expression → String | Equation
Equation → EquationTerm EquationDash
EquationDash → AddOperator EquationTerm EquationDash | ε
EquationTerm → Factor EquationTermDash
EquationTermDash → MulOperator Factor EquationTermDash | ε
Factor → (Equation) | Term
Term → Number | Identifier | FunctionCall

Function Call

FunctionCall → Identifier (ArgumentList)

Argument List

ArgumentList → Arguments | ε
Arguments → Identifier Arguments'
Arguments' → , Identifier Arguments' | ε

Datatype

Datatype → int | float | string

Operators

AddOperator → + | -
MulOperator → * | /