A blue and white logo

AI-generated content may be incorrect.

compiler phase 2



Kareem Ahmed Talat 23P0225 Abdulrahman Wael 23P0155 Saif Amjad 23P0145 Islam Nashaat 23p0077 Marwan Wagih 23P0247 Ahmed Hossam 23P0109

Tiny language CFG’S

## 1. Function\_Call

Function\_Call → id ( ArgumentList )  
ArgumentList → Arguments | ε  
Arguments → Argument Arguments'  
Arguments' → , Argument Arguments' | ε  
Argument → id | num

## 2. Term

Term → id | num | Function\_Call

## 3. Arithmatic\_Operator

Arithmatic\_Operator → + | - | \* | /

## 4. Equation (Unambiguous)

Equation → EqTerm Equation'  
Equation' → addop EqTerm Equation' | ε  
EqTerm → Factor EqTerm'  
EqTerm' → mulop Factor EqTerm' | ε  
Factor → ( Equation ) | Term  
addop → + | -  
mulop → \* | /

## 5. Expression

Expression → String | Term | Equation

## 6. Assignment\_Statement

Assignment\_Statement → id := Expression

## 7. Datatype

Datatype → "int" | "float" | "string"

## 8. Declaration\_Statement

Declaration\_Statement → Datatype IdentifierList ;  
IdentifierList → IdentifierAssignment IdentifierList'  
IdentifierList' → , IdentifierAssignment IdentifierList' | ε  
IdentifierAssignment → id Declaration\_Init  
Declaration\_Init → := Expression | ε

## 9. Write\_Statement

Write\_Statement → "write" (Expression | "endl") ;

## 10. Read\_Statement

Read\_Statement → "read" id ;

## 11. Return\_Statement

Return\_Statement → "return" Expression ;

## 12-13. Condition and Condition\_Operator

Condition → id Condition\_Operator Term  
Condition\_Operator → < | > | = | <>

## 14-15. Condition\_Statement (Unambiguous)

Condition\_Statement → Boolean\_Or  
Boolean\_Or → Boolean\_And Boolean\_Or'  
Boolean\_Or' → || Boolean\_And Boolean\_Or' | ε  
Boolean\_And → Condition Boolean\_And'  
Boolean\_And' → && Condition Boolean\_And' | ε

## 16-17. If\_Statement (Unambiguous)

If\_Statement → "if" Condition\_Statement "then" Statements

If\_Tail  
If\_Tail → Else\_If\_List Optional\_Else "end"  
Else\_If\_List → Else\_If\_Statement Else\_If\_List | ε  
Else\_If\_Statement → "elseif" Condition\_Statement "then" Statements  
Optional\_Else → Else\_Statement | ε  
Else\_Statement → "else" Statements  
Statements → Statement Statements | ε  
Statement → Write\_Statement | Read\_Statement | Assignment\_Statement | Declaration\_Statement | Return\_Statement | If\_Statement | Repeat\_Statement | Comment\_Statement

## 18. Repeat\_Statement

Repeat\_Statement → "repeat" Statements "until" Condition\_Statement

## 19. Function\_Name

Function\_Name → id

## 20. Parameter

Parameter → Datatype id

## 21. FunctionDecl

FunctionDecl → Datatype Function\_Name ( ParameterList )  
ParameterList → Parameters | ε  
Parameters → Parameter Parameters'  
Parameters' → , Parameter Parameters' | ε

## 22. Function Body

Function\_Body → { Statements Return\_Statement }  
Statements → Statement Statements | ε  
Statement → Write\_Statement | Read\_Statement | If\_Statement | Repeat\_Statement | Declaration\_Statement

## 23. Function Statement

Function\_Statement → FunctionDecl Function\_Body

## 24. Main\_Function

Main\_Function → Datatype "main" ( ) Function\_Body

## 25. Program

Program → FunctionStatements Main\_Function  
FunctionStatements → FunctionStatements`  
FunctionStatements` → Function\_Statement FunctionStatements` | ε

Terminals in the Tiny Language

* **Numbers:** Any sequence of digits or a floating point (e.g. 123, 0.45, 78.9)
* **Strings:** Text wrapped in double quotes (e.g. "Hello", "2nd + 3rd")
* **Identifiers:** Start with a letter, followed by letters or digits (e.g. x, counter1, val2)
* **Reserved Keywords:**

int, float, string, read, write, repeat, until, if, elseif, else, then, return, endl

* **Operators:** +, -, \*, /, :=, <, >, =, <>, &&, ||
* **Delimiters:** (), {}, ;, ,
* **Comment Start/End:** /\* ... \*/
* **Function\_Call Syntax:** Function\_Name ( arguments )
* **Term**