

# Tiny Programming Language

## Context Free Grammar

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### Production Rules:

1. Program  $\rightarrow$  Function\_Statements Main\_Function

Function\_Statements  $\rightarrow$  Function\_Statement Function\_Statements |  $\epsilon$

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2. Main\_Function  $\rightarrow$  Datatype main() Function\_Body

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3. Function\_Statement  $\rightarrow$  Function\_Declaration Function\_Body

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4. Function\_Body  $\rightarrow$  {Statements Return\_Statement}

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5. Function\_Declaration  $\rightarrow$  Datatype Function\_Name (Parameter\_List)

Parameter\_List  $\rightarrow$  Parameter More\_Parameters |  $\epsilon$

More\_Parameters  $\rightarrow$  , Parameter More\_Parameters |  $\epsilon$

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6. Parameter  $\rightarrow$  Datatype Identifier

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7. Function\_Name  $\rightarrow$  Identifier

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8. Repeat\_Statement  $\rightarrow$  repeat Statements until Condition\_Statement

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9. If\_Statement  $\rightarrow$  if Condition\_Statement then Statements Else\_Close

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10. Else\_If\_Statement  $\rightarrow$  elseif Condition\_Statement then Statements Else\_Close

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11. Else\_Statement  $\rightarrow$  else Statements end

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12. Else\_Close  $\rightarrow$  Else\_If\_Statement | Else\_Statement | end

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13. Condition\_Statement  $\rightarrow$  Condition Condition\_End

Condition\_End  $\rightarrow$  Boolean\_Operator Condition Condition\_End |  $\epsilon$

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14. Boolean\_Operator  $\rightarrow$  AndOp | OrOp

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15. Condition  $\rightarrow$  Identifier Condition\_Operator Term

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16. Condition\_Operator  $\rightarrow$  LessThanOp | GreaterThanOp | EqualOp | NotEqualOp

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17. Return\_Statement  $\rightarrow$  return Expression;

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18. Read\_Statement  $\rightarrow$  read Identifier;

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19. Write\_Statement  $\rightarrow$  write Write\_Expression;

Write\_Expression  $\rightarrow$  Expression | endl

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20. Declaration\_Statement  $\rightarrow$  Datatype Declare\_Rest ;

Declare\_Rest  $\rightarrow$  Identifier Declare\_Identifiers | Assignment\_Statement Declare\_Identifiers

Declare\_Identifiers  $\rightarrow$  , Identifier Declare\_Identifiers | , Assignment\_Statement Declare\_Identifiers |  $\epsilon$

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21. Datatype  $\rightarrow$  int | float | string

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22. Assignment\_Statement  $\rightarrow$  Identifier AssignOp Expression

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23. Expression  $\rightarrow$  StringLiteral | Term | Equation

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24. Equation  $\rightarrow$  Term Equation\_End | '(' Equation ')' Equation\_End

Equation\_End  $\rightarrow$  Arithmetic\_Operator Equation Equation\_End |  $\epsilon$

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25. Arithmetic\_Operator  $\rightarrow$  PlusOp | MinusOp | MultiplyOp | DivideOp

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26. Term  $\rightarrow$  Number | Identifier | Function\_Call

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27. Function\_Call  $\rightarrow$  Identifier (Identifier\_List)

Identifier\_List  $\rightarrow$  Identifier More\_Identifiers |  $\epsilon$

More\_Identifiers  $\rightarrow$  , Identifier More\_Identifiers |  $\epsilon$

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28. Statements  $\rightarrow$  Statement Statements |  $\epsilon$

Statement  $\rightarrow$  Repeat\_Statement | Function\_Call | If\_Statement | Read\_Statement | Write\_Statement |  
Declaration\_Statement | Assignment\_Statement

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AndOp  $\rightarrow$  &&

OrOp  $\rightarrow$  ||

LessThanOp  $\rightarrow$  <

GreaterThanOp  $\rightarrow$  >

EqualOp  $\rightarrow$  =

NotEqualOp  $\rightarrow$  <>

AssignOp  $\rightarrow$  :=

PlusOp  $\rightarrow$  +

MinusOp  $\rightarrow$  - MultiplyOp

$\rightarrow$  \*

DivideOp  $\rightarrow$  /

## Terminals:

int | float | string | read | write | repeat | until | if | elseif | else | then | return | endl | identifier |  
StringLiteral |

Number | + | - | \* | / | < | > | = | <> | := | ! | " | # | \$ | % | & | ' | ( | ) | , | . | : | ; | ? | @ | [ | \ | ] | ^ | \_ |  
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{ | } | ~ | && | | [a-zA-z] | [0-9] |  $\epsilon$