

## MS2

### Task 1:

## Tiny Language CFG

### Team Members

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i. Terminals:

1. number
2. stringLine
3. reserved\_words
4. comment\_statement
5. identifier
6. booleanOp
7. conditionOp
8. assignOp
9. semicolon
10. dot
11. comma
12. leftParanthesis
13. rightParanthesis
14. leftPracket
15. rightPracket
16. equalOp
17. assignmentOp
18. lessThanOp
19. greaterThanOp
20. notEqualOp
21. andOp
22. orOp
23. plusOp
24. minusOp
25. multiplyOp
26. divideOp

## ii. Production Rules:

NUMBER	RULE
1	$Datatype \rightarrow \text{int} \mid \text{float} \mid \text{string}$
2	$Statement \rightarrow Write\_statement \mid Read\_statement \mid$ $Assignment\_statement \mid Declaration\_statement \mid If\_statement \mid$ $Repeat\_statement \mid Function\_call$
3	$Statements \rightarrow Statements Statement \mid Statement$ $Statements \rightarrow Statement Statements'$ $Statements' \rightarrow Statement Statements' \mid \varepsilon$
4	$Function\_call \rightarrow \text{identifier} (Identifier\_list \mid \varepsilon)$
5	$Term \rightarrow \text{number} \mid \text{identifier} \mid Function\_call$
6	$Equation \rightarrow Equation Ops Equation \mid (Equation) \mid Term$ $Equation \rightarrow (Equation) Equation' \mid Term Equation'$ $Equation' \rightarrow Ops Equation Equation' \mid \varepsilon$
7	$Expression \rightarrow \text{stringLine} \mid Term \mid Equation$
8	$Assignment\_statement \rightarrow \text{identifier assignmentOp Expression} ;$
9	$Declaration\_statement \rightarrow Datatype Identifier\_list ;$
10	$Identifier\_list \rightarrow Identifier\_list , Id \mid Id$ $Identifier\_list \rightarrow Id Identifier\_list'$ $Identifier\_list' \rightarrow , Id Identifier\_list' \mid \varepsilon$
11	$Id \rightarrow \text{identifier} \mid \text{identifier assignmentOp Expression}$

	$Id \rightarrow \text{identifier } Id'$ $Id' \rightarrow \varepsilon \mid \text{assignmentOp Expression}$
12	$\text{Write\_statement} \rightarrow \text{write Expression ;} \mid \text{write endl ;}$ $\text{Write\_statement} \rightarrow \text{write Write\_statement'}$ $\text{Write\_statement'} \rightarrow \text{Expression ;} \mid \text{endl ;}$
13	$\text{Read\_statement} \rightarrow \text{read identifier ;}$
14	$\text{Return\_statement} \rightarrow \text{return Expression ;}$
15	$\text{Ret\_statement} \rightarrow \text{Return\_statement} \mid \varepsilon$
16	$\text{ConditionOp} \rightarrow \text{notEqualOp} \mid \text{equalOp} \mid \text{lessThanOp} \mid \text{greaterThanOp}$
17	$\text{BooleanOp} \rightarrow \text{andOp} \mid \text{orOp}$
18	$\text{Ops} \rightarrow \text{plusOp} \mid \text{minusOp} \mid \text{multiplyOp} \mid \text{divideOp}$
19	$\text{Condition} \rightarrow \text{identifier ConditionOp Term}$
20	$\text{Condition\_statement} \rightarrow \text{Condition\_statement BooleanOp Condition} \mid \text{Condition}$ $\text{Condition\_statement} \rightarrow \text{Condition Condition\_statement'}$ $\text{Condition\_statement'} \rightarrow \text{BooleanOp Condition Condition\_statement'} \mid \varepsilon$
21	$\text{If\_statement} \rightarrow \text{if Condition\_statement then Statements Ret\_statement Else\_if\_statement Else\_statement end}$
22	$\text{Else\_if\_statement} \rightarrow \text{elseif Condition\_statement then Statements Ret\_statement Else\_statement} \mid \varepsilon$
23	$\text{Else\_statement} \rightarrow \text{else Statements} \mid \varepsilon$

24	$\text{Repeat\_statement} \rightarrow \text{repeat Statements until Condition\_statement}$
25	$\text{Parameter} \rightarrow \text{Datatype identifier} \mid \varepsilon$
26	$\text{Parameters} \rightarrow \text{Parameters, Parameter} \mid \text{Parameter}$ $\text{Parameters} \rightarrow \text{Parameter Parameters'}$ $\text{Parameters'} \rightarrow , \text{Parameter Parameters'} \mid \varepsilon$
27	$\text{Function\_declaration} \rightarrow \text{Datatype identifier (Parameters)}$
28	$\text{Function\_body} \rightarrow \{ \text{Statements Return\_statement} \}$
29	$\text{Function\_statement} \rightarrow \text{Function\_declaration Function\_body} \mid \varepsilon$
30	$\text{Function\_statements} \rightarrow \text{Function\_statements Function\_statement}$ $\mid \text{Function\_statement}$ $\text{Function\_statements} \rightarrow \text{Function\_statement Function\_statements'}$ $\text{Function\_statements'} \rightarrow \text{Function\_statement Function\_statements'}$ $\mid \varepsilon$
31	$\text{Main\_function} \rightarrow \text{Datatype main()} \text{Function\_body}$
32	$\text{Program} \rightarrow \text{Function\_statements Main\_function}$