Compiler Theory Project MS2

1)- **Number->** Integer | Float

- **Integer** → Digit DigitSeq
- DigitSeq → Digit DigitSeq | ε
- **Float** → Digit DigitSeq "." Digit DigitSeq
- **Digit** → [0-9]

2)- **String->** "\"" StringContent "\""

- StringContent → StringChar StringContent | ε
- StringChar → **Letter** | **Digit**
- **Letter** →[a-zA-Z]
- **Digit** → [0-9]

3)- **Reserved_Keywords->** "int" | "float" | "string"| "read" | "write"

| "repeat" | "until" | "if" | "elseif" | "else" | "then" | "return" | "endl"

7)- **Term -> number | Identifier | FunctionCall**

6)- **FunctionCall-> Identifier** LeftBracket ArgList RightBracket

- ArgList -> **Identifier** ArgTail | ε
- ArgTail -> "," **Identifier** ArgTail | ε

15)- **Read_Statement -> "read" Identifier ";"**

16)- **Return_Statement** → "return" **Expression** ";"

20)- **Condition_Statement** → Condition Condition_Statement_Tail

- Condition_Statement_Tail → **Boolean_Operator Condition** Condition_Statement_Tail | ε

26)- **Parameter**-> **Datatype Identifier**

27)- **Function_Declaration->Datatype FunctionName** "("paramlist")"

- paramlist **->Parameter** paramTail | ε
- paramTail **-> "," Parameter** paramTail | ε

28)- **Function_Body ->** "{"Statements **Return_Statement**"}"

30)- **Main_Function-> Datatype** "main" " ()" **Function_Body**

31)- **Program ->** F **Main_Function**

- F **->Function_Statement** F | ε

11)- **Assignment_Statement ->Identifier**:= **Expression**

12)- **Datatype ->"**int" |"float" |"string"

18)- **Condition -> Identifiers condition_operator Term**

21)- **If_Statement ->"**if" **Condition_Statement** "then" Statements If_Second_Part

- Statements **->**Statement Statements | ε
- Statement **->Declaration_Statement** ";" | **Assignment_Statement** ";" | **Write_Statement** ";" | **Read_Statement** | **Return_Statement** ";" | **Repeat_Statement** ";" | **FunctionCall** ";"
- If_Second_Part **-> Else_If_Statement** | **Else_Statement** |"end"

24)- **Repeat_Statement ->** "repeat" Statements "until" **Condition_Statement**

25)- FunctionName -> Identifier

29)- Function_Statement-> Function_Declaration Function_Body

10)- Expression -> String | Term | Equation

9)- Equation -> Factor Equation_Tail

- Equation_Tail **->** AddOp Factor Equation_Tail | MulOp Factor Equation_Tail | ε
- Factor **-> Term** | "(" **Equation** ")"
- AddOp → "+" | "-"
- MulOp → "*" |"/"

14)- Write_Statement -> "Write"WC ";"

- WC → **Expression** | "Endl"

13)- Declaration_Statement -> Datatype Identifier Identifier_Optional_Assign Identifier_List_Cont ";"

- Identifier_List_Cont **->** "," **Identifier** Identifier_Optional_Assign Identifier_List_Cont | ε
- Identifier_Optional_Assign**-> Assignment_Statement** | ε

22)- Else_If_Statement-> "elseIf" **Condition_Statement** "then" Statements If_Second_Part

23)- Else_Statement -> "else" Statements "end"

4)- Comment_Statement -> "/*" Comment_Content "*/"

- Comment_Content **->** Comment_Char Comment_Content | ε
- Comment_Char**->** [^*] | * [^/]

19)- Boolean_Operator-> And_Operator | Or_Operator

- And_Operator **->** "&&"
- Or_Operator **->**"||"

17)- **Condition_Operator ->** Less_Than | Greater_Than | Equals | Not_Equals

- Less_Than **->** "<"
- Greater_Than **->** ">"
- Equals **->** "="
- Not_Equals **->** "<>"

8)- **Arithmatic_Operator ->** PlusOp | MinusOp | MultiplyOp | DivideOp

- PlusOp **->** "+"
- MinusOp **->** "-"
- MultiplyOp **->** "*"
- DivideOp **->** "/"

5)- **Identifier ->** Letter IdentifierBody

- IdentifierBody **->** (Letter | Digit) IdentifierBody | ε
- Letter **->** [a-zA-Z]·Digit → [0-9]