

**Gramática LL1 da Linguagem GF**  
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**Período: 2018.2**

Obs.: (i) não-terminais cujos nomes terminam com os termos *fat* ou *r* indicam que se fez necessário realizar uma fatoração ou eliminar uma recursão (à esquerda) para manter a gramática no padrão de um analisador LL(1); e (ii) a gramática original se encontra disponível em <https://bit.ly/2PyKoG>.

**PROGRAM = FUNCTIONS MAINFUNC**

**PROGRAM = DECL 'endLine' GLDECL FUNCTIONS MAINFUNC**

**GLDECL = DECL 'endLine' GLDECL**

**GLDECL =  $\epsilon$**

**FUNCTIONS = 'funDecl' 'id' PARAMS RETURNTYPE BLOCK FUNCTIONS**

**FUNCTIONS =  $\epsilon$**

**MAINFUNC = 'main' 'paramBeg' 'paramEnd' TYPE BLOCK**

**PARAMS = 'paramBeg' PARAMSfat**

**PARAMSfat = 'paramEnd'**

**PARAMSfat = LISTPARAMS 'paramEnd'**

**LISTPARAMS = TYPE NAME LISTPARAMSr**

**LISTPARAMSr = 'commaSep' LISTPARAMS**

**LISTPARAMSr =  $\epsilon$**

**TYPE = 'typeInt'**

**TYPE = 'typeFloat'**

**TYPE = 'typeBool'**

**TYPE = 'typeChar'**

**TYPE = 'typeString'**

**TYPE = 'typeEmpty'**

**TYPE = 'typeNull'**

**RETURNTYPE = TYPE RETURNTYPEfat**

**RETURNTYPEfat = 'arrayBeg' 'arrayEnd'**

**RETURNTYPEfat =  $\epsilon$**

NAME = 'id' NAMEfat  
NAMEfat = 'arrayBeg' EXPR 'arrayEnd'  
NAMEfat =  $\epsilon$   
NAMEfat = 'arrayBeg' EXPR 'arrayEnd'  
NAMEfat2 = EXPR 'arrayEnd'  
NAMEfat2 = 'arrayEnd'

BLOCK = 'blockBeg' CMDS 'blockEnd'

CMDS = CMD CMDS  
CMDS =  $\epsilon$

CMD = DECL 'endLine'  
CMD = id CMDfat  
CMD = PRINT 'endLine'  
CMD = READ 'endLine'  
CMD = IFELSE  
CMD = WHILE  
CMD = REPEAT  
CMD = RETURN 'endLine'  
CMDfat = 'arrayBeg' EXPR 'arrayEnd' ASSG 'endLine'  
CMDfat = ASSG 'endLine'  
CMDfat = FUNCCALL 'endLine'  
CMDfat =  $\epsilon$

DECL = 'varDecl' TYPE NAME DECLfat  
DECLfat = ASSG  
DECLfat =  $\epsilon$

ASSG = 'opAssign' VALUE

VALUE = ARRAY  
VALUE = EXPR

ARRAY = 'arrayBeg' ELEMENTS 'arrayEnd'

ELEMENTS = EXPR ELEMENTSr  
ELEMENTSr = 'commaSep' ELEMENTS  
ELEMENTSr =  $\epsilon$

CONSTANT = 'constNumInt'

CONSTANT = 'constNumFloat'

CONSTANT = 'constBool'

CONSTANT = 'constChar'

CONSTANT = 'constString'

FUNCCALL = 'paramBeg' LISTPARAMSCALL 'paramEnd'

LISTPARAMSCALL = PARAMITEM LISTPARAMSCALLr

LISTPARAMSCALLr = 'commaSep' LISTPARAMSCALL

LISTPARAMSCALLr =  $\epsilon$

PARAMITEM = CONSTANT

PARAMITEM = NAME PARAMITEMfat

PARAMITEM =  $\epsilon$

PARAMITEMfat = FUNCCALL

PARAMITEMfat =  $\epsilon$

PRINT = 'cmdPrint' 'paramBeg' EXPR 'paramEnd'

READ = 'cmdRead' 'paramBeg' NAME 'paramEnd'

IFELSE = IF ELIF ELSE

IF = 'cmdIf' 'paramBeg' EXPR 'paramEnd' BLOCK

ELIF = 'cmdElif' 'paramBeg' EXPR 'paramEnd' BLOCK ELIF

ELIF =  $\epsilon$

ELSE = 'cmdElse' BLOCK

ELSE =  $\epsilon$

WHILE = 'cmdWhile' 'paramBeg' EXPR 'paramEnd' BLOCK

REPEAT = 'cmdRepeat' 'id' 'cmdIn' 'paramBeg' EXPR 'commaSep'

EXPR REPEATfat 'paramEnd' BLOCK

REPEATfat = 'commaSep' EXPR

REPEATfat =  $\epsilon$

RETURN = 'cmdReturn' EXPR

EXPR = EXPROR

EXPROR = EXPRAND EXPRORr

EXPRORr = 'opOr' EXPRAND EXPRORr

EXPRORr =  $\epsilon$

EXPRAND = EXPREQUALS EXPRANDr

EXPRANDr = 'opAnd' EXPREQUALS EXPRANDr

EXPRANDr =  $\epsilon$

EXPREQUALS = EXPRREL EXPREQUALSr

EXPREQUALSr = 'opEquals' EXPRREL EXPREQUALSr

EXPREQUALSr =  $\epsilon$

EXPRREL = EXPRADD EXPRRELr

EXPRRELr = 'opRel' EXPRADD EXPRRELr

EXPRRELr =  $\epsilon$

EXPRADD = EXPRAMULT EXPRADDR

EXPRADDR = 'opAditiv' EXPRAMULT EXPRADDR

EXPRADDR =  $\epsilon$

EXPRAMULT = EXPRUN EXPRAMULTr

EXPRAMULTr = 'opMult' EXPRUN EXPRAMULTr

EXPRAMULTr =  $\epsilon$

EXPRUN = 'opUnaryNeg' EXPRUN

EXPRUN = EXPRPARAM

EXPRPARAM = 'paramBeg' EXPR 'paramEnd'

EXPRPARAM = EXPRVALUES

EXPRVALUES = 'constNumInt'

EXPRVALUES = 'constNumFloat'

EXPRVALUES = 'constBool'

EXPRVALUES = 'constChar'

EXPRVALUES = 'constString' EXPRVALUESfat

EXPRVALUES = 'id' EXPRVALUESfat2

EXPRVALUESfat = CONCAT

EXPRVALUESfat =  $\epsilon$

EXPRVALUESfat2 = 'arrayBeg' EXPR 'arrayEnd' ARRCONCAT

EXPRVALUESfat2 = FUNCCALL

EXPRVALUESfat2 = CONCAT

EXPRVALUESfat2 =  $\epsilon$

ARRCONCAT = CONCAT

**ARRCONCAT =  $\epsilon$**

**CONCAT = 'opConcat' CONCATfat**

**CONCATfat = 'constString'**

**CONCATfat = 'id'**