

## Grammar Rules

```
1  program => moduleDeclarations otherModules1 driverModule otherModules2
2  moduleDeclarations => moduleDeclaration moduleDeclarations1
3  moduleDeclarations => epsilon
4  moduleDeclaration => DECLARE MODULE ID SEMICOL
5  otherModules => module otherModules1
6  otherModules => epsilon
7  driverModule => DRIVERDEF DRIVER PROGRAM DRIVERENDDEF moduleDef
8  module => DEF MODULE ID ENDDEF TAKES INPUT SQBO inputPList SQBC SEMICOL ret
   moduleDef
9  ret => RETURNS SQBO outputPList SQBC SEMICOL
10 ret => epsilon
11 inputPList => ID COLON dataType iPList2
12 iPList2 => COMMA ID COLON dataType iPList21
13 iPList2 => epsilon
14 outputPList => ID COLON type oPList2
15 oPList2 => COMMA ID COLON type oPList2
16 oPList2 => epsilon
17 dataType => INTEGER
18 dataType => REAL
19 dataType => BOOLEAN
20 dataType => ARRAY SQBO arrRange SQBC OF type
21 arrRange => signedIndex1 RANGEOP signedIndex2
22 type => INTEGER
23 type => REAL
24 type => BOOLEAN
25 moduleDef => START statements END
26 statements => statement statements1
27 statements => epsilon
28 statement => ioStmt
29 statement => simpleStmt
30 statement => declareStmt
31 statement => conditionalStmt
32 statement => iterativeStmt
33 ioStmt => GET_VALUE BO ID BC SEMICOL
34 ioStmt => PRINT BO varPrint BC SEMICOL
35 varPrint => ID arrIndex
36 varPrint => NUM
37 varPrint => RNUM
38 varPrint => boolConst
39 boolConst => TRUE
40 boolConst => FALSE
```

41 arrIndex => SQBO signedIndex SQBC  
42 arrIndex => epsilon  
43 simpleStmt => moduleReuseStmt  
44 simpleStmt => assignmentStmt  
45 assignmentStmt => ID whichStmt  
46 whichStmt => IValueIDStmt  
47 whichStmt => IValueArrStmt  
48 IValueIDStmt => ASSIGNOP expression SEMICOL  
49 IValueArrStmt => SQBO indexWithExpressions SQBC ASSIGNOP expression SEMICOL  
50 signedIndex => sign index  
51 index => NUM  
52 index => ID  
53 sign => PLUS  
54 sign => MINUS  
55 sign => epsilon  
56 moduleReuseStmt => optional USE MODULE ID WITH PARAMETERS actualPList SEMICOL  
57 actualPList => sign param actualPList2  
58 actualPList2 => COMMA sign param actualPList21  
59 actualPList2 => epsilon  
60 param => NUM  
61 param => RNUM  
62 param => boolConst  
63 param => ID arrIndexWithExpressions  
64 optional => SQBO idList SQBC ASSIGNOP  
65 optional => epsilon  
66 idList => ID idList2  
67 idList2 => COMMA ID idList21  
68 idList2 => epsilon  
69 expression => arithmeticOrLogicalExpr  
70 expression => unaryOpExpr  
71 unaryOpExpr => unaryOp unsignedArithExpr  
72 unsignedArithExpr => BO arithmeticExpr BC  
73 unsignedArithExpr => varIDNum  
74 unaryOp => PLUS  
75 unaryOp => MINUS  
76 varIDNum => ID  
77 varIDNum => NUM  
78 varIDNum => RNUM  
79 arithmeticOrLogicalExpr => anyTerm logicalOpExpr  
80 logicalOpExpr => logicalOp anyTerm logicalOpExpr  
81 logicalOpExpr => epsilon  
82 anyTerm => arithmeticExpr relationOpExpr  
83 relationOpExpr => relationalOp arithmeticExpr  
84 relationOpExpr => epsilon  
85 arithmeticExpr => term addSubExpr  
86 addSubExpr => addSubOp term addSubExpr1  
87 addSubExpr => epsilon  
88 term => factor mulDivExpr

```
89  mulDivExpr => mulDivOp factor mulDivExpr1
90  mulDivExpr => epsilon
91  factor => BO arithmeticOrLogicalExpr BC
92  factor => NUM
93  factor => RNUM
94  factor => boolConst
95  factor => ID arrIndexWithExpressions
96  arrIndexWithExpressions => SQBO indexWithExpressions SQBC
97  arrIndexWithExpressions => epsilon
98  indexWithExpressions => sign arrExpr
99  arrExpr => arrTerm arrAddSubExpr
100 arrAddSubExpr => addSubOp arrTerm arrAddSubExpr1
101 arrAddSubExpr => epsilon
102 arrTerm => arrFactor arrMulDivExpr
103 arrMulDivExpr => mulDivOp arrFactor arrMulDivExpr1
104 arrMulDivExpr => epsilon
105 arrFactor => ID
106 arrFactor => NUM
107 arrFactor => boolConst
108 arrFactor => BO arrExpr BC
109 addSubOp => PLUS
110 addSubOp => MINUS
111 mulDivOp => MUL
112 mulDivOp => DIV
113 logicalOp => AND
114 logicalOp => OR
115 relationalOp => LT
116 relationalOp => LE
117 relationalOp => GT
118 relationalOp => GE
119 relationalOp => EQ
120 relationalOp => NE
121 declareStmt => DECLARE idList COLON dataType SEMICOL
122 conditionalStmt => SWITCH BO ID BC START caseStmts defaultCase END
123 caseStmts => CASE caseValue COLON statements BREAK SEMICOL caseStmts2
124 caseStmts2 => CASE caseValue COLON statements BREAK SEMICOL caseStmts21
125 caseStmts2 => epsilon
126 caseValue => NUM
127 caseValue => boolConst
128 defaultCase => DEFAULT COLON statements BREAK SEMICOL
129 defaultCase => epsilon
130 iterativeStmt => FOR BO ID IN forLoopRange BC START statements END
131 iterativeStmt => WHILE BO arithmeticOrLogicalExpr BC START statements END
132 forLoopRange => forLoopIndex1 RANGEOP forLoopIndex2
133 forLoopIndex => sign NUM
```