

ERPLAG - Grammar

1. $\langle \text{program} \rangle \rightarrow \langle \text{moduleDeclarations} \rangle \langle \text{otherModules} \rangle \langle \text{driverModule} \rangle \langle \text{otherModules} \rangle$
 - (a) $\langle \text{moduleDeclarations} \rangle \rightarrow \langle \text{moduleDeclaration} \rangle \langle \text{moduleDeclarations} \rangle \mid \epsilon$
 - (b) $\langle \text{moduleDeclaration} \rangle \rightarrow \text{DECLARE MODULE ID SEMICOL}$
 - (c) $\langle \text{otherModules} \rangle \rightarrow \langle \text{module} \rangle \langle \text{otherModules} \rangle \mid \epsilon$
 - (d) $\langle \text{driverModule} \rangle \rightarrow \text{DRIVERDEF DRIVER PROGRAM DRIVERENDDEF } \langle \text{moduleDef} \rangle$
 - (e) $\langle \text{module} \rangle \rightarrow \text{DEF MODULE ID ENDDEF TAKES INPUT SQBO } \langle \text{input_plist} \rangle \text{ SQBC SEMICOL } \langle \text{ret} \rangle \langle \text{moduleDef} \rangle$
 - (f) $\langle \text{moduleDef} \rangle \rightarrow \text{START } \langle \text{statements} \rangle \text{ END}$
 - (g) $\langle \text{ret} \rangle \rightarrow \text{RETURNS SQBO } \langle \text{output_plist} \rangle \text{ SQBC SEMICOL } \mid \epsilon$
 - (h) $\langle \text{input_plist} \rangle \rightarrow \text{ID COLON } \langle \text{dataType} \rangle \langle \text{IPL} \rangle$
 - (i) $\langle \text{IPL} \rangle \rightarrow \text{COMMA ID COLON } \langle \text{dataType} \rangle \langle \text{IPL} \rangle \mid \epsilon$
 - (j) $\langle \text{output_plist} \rangle \rightarrow \text{ID COLON } \langle \text{dataType} \rangle \langle \text{OPL} \rangle$
 - (k) $\langle \text{OPL} \rangle \rightarrow \text{COMMA ID COLON } \langle \text{dataType} \rangle \langle \text{OPL} \rangle \mid \epsilon$
2. $\langle \text{statements} \rangle \rightarrow \langle \text{statement} \rangle \langle \text{statements} \rangle \mid \epsilon$
3. $\langle \text{statement} \rangle \rightarrow \langle \text{ioStmt} \rangle \mid \langle \text{simpleStmt} \rangle \mid \langle \text{conditionalStmt} \rangle \mid \langle \text{declareStmt} \rangle \mid \langle \text{iterativeStmt} \rangle$
 - (a) $\langle \text{ioStmt} \rangle \rightarrow \text{GET_VALUE BO ID BC SEMICOL} \mid \text{PRINT BO } \langle \text{print_var} \rangle \text{ BC SEMICOL}$
 - i. $\langle \text{print_var} \rangle \rightarrow \langle \text{var} \rangle \mid \text{TRUE} \mid \text{FALSE}$
 - (b) $\langle \text{simpleStmt} \rangle \rightarrow \langle \text{assignmentStmt} \rangle$
 - i. $\langle \text{assignmentStmt} \rangle \rightarrow \text{ID } \langle \text{whichStmt} \rangle$
 - ii. $\langle \text{whichStmt} \rangle \rightarrow \langle \text{lvalueIDStmt} \rangle \mid \langle \text{lvalueARRStmt} \rangle$
 - iii. $\langle \text{lvalueIDStmt} \rangle \rightarrow \text{ASSIGNOP } \langle \text{expression_new} \rangle \text{ SEMICOL}$
 - iv. $\langle \text{lvalueARRStmt} \rangle \rightarrow \text{SQBO SQBC ASSIGNOP } \langle \text{expression_new} \rangle \text{ SEMICOL}$
 - (c) $\langle \text{simpleStmt} \rangle \rightarrow \langle \text{moduleReuseStmt} \rangle$
 - i. $\langle \text{moduleReuseStmt} \rangle \rightarrow \langle \text{optional} \rangle \text{ USE MODULE ID WITH PARAMETERS } \langle \text{idList} \rangle \text{ SEMICOL}$
 - ii. $\langle \text{optional} \rangle \rightarrow \text{SQBO } \langle \text{idList} \rangle \text{ SQBC ASSIGNOP } \mid \epsilon$
 - (d) $\langle \text{declareStmt} \rangle \rightarrow \text{DECLARE } \langle \text{idList} \rangle \text{ COLON } \langle \text{dataType} \rangle \text{ SEMICOL}$
 - (e) $\langle \text{iterativeStmt} \rangle \rightarrow \text{FOR BO IN } \langle \text{range_new} \rangle \text{ BC START } \langle \text{statements} \rangle \text{ END}$
 - (f) $\langle \text{iterativeStmt} \rangle \rightarrow \text{WHILE BO } \langle \text{expression} \rangle \text{ BC START } \langle \text{statements} \rangle \text{ END}$
 - (g) $\langle \text{conditionalStmt} \rangle \rightarrow \text{SWITCH BO ID BC START CASE } \langle \text{value} \rangle \text{ COLON } \langle \text{statements} \rangle \text{ BREAK SEMICOL } \langle \text{caseStmt} \rangle \langle \text{default} \rangle \text{ END}$
 - i. $\langle \text{caseStmt} \rangle \rightarrow \text{CASE } \langle \text{value} \rangle \text{ COLON } \langle \text{statements} \rangle \text{ BREAK SEMICOL } \langle \text{caseStmt} \rangle \mid \epsilon$
 - ii. $\langle \text{default} \rangle \rightarrow \text{DEFAULT COLON } \langle \text{statements} \rangle \text{ BREAK SEMICOL } \mid \epsilon$

4. $\langle expression_new \rangle \rightarrow \langle expression \rangle \mid \langle U \rangle$
5. $\langle U \rangle \rightarrow \mathbf{PLUS} \langle factor_new \rangle \mid \mathbf{MINUS} \langle factor_new \rangle$
6. $\langle expression \rangle \rightarrow \langle boolTerm \rangle \langle bT \rangle$
7. $\langle bT \rangle \rightarrow \langle logicalOp \rangle \langle boolTerm \rangle \langle bT \rangle \mid \epsilon$
 - (a) $\langle boolTerm \rangle \rightarrow \langle arithmeticExpr \rangle \langle aE \rangle \mid \mathbf{TRUE} \mid \mathbf{FALSE}$
 - (b) $\langle aE \rangle \rightarrow \langle relationalOp \rangle \langle arithmeticExpr \rangle \mid \epsilon$
 - i. $\langle arithmeticExpr \rangle \rightarrow \langle term \rangle \langle aT \rangle$
 - ii. $\langle aT \rangle \rightarrow \langle pmop \rangle \langle term \rangle \langle aT \rangle \mid \epsilon$
 - A. $\langle term \rangle \rightarrow \langle factor \rangle \langle aF \rangle$
 - B. $\langle aF \rangle \rightarrow \langle mdop \rangle \langle factor \rangle \langle aF \rangle \mid \epsilon$
 - C. $\langle factor \rangle \rightarrow \mathbf{BO} \langle expression \rangle \mathbf{BC} \mid \langle var \rangle$
 - D. $\langle factor_new \rangle \rightarrow \mathbf{BO} \langle arithmeticExpr \rangle \mathbf{BC} \mid \langle var \rangle$
8. $\langle logicalOp \rangle \rightarrow \mathbf{AND} \mid \mathbf{OR}$
9. $\langle relationalOp \rangle \rightarrow \mathbf{LT} \mid \mathbf{LE} \mid \mathbf{GT} \mid \mathbf{GE} \mid \mathbf{EQ} \mid \mathbf{NE}$
10. $\langle pmop \rangle \rightarrow \mathbf{PLUS} \mid \mathbf{MINUS}$
11. $\langle mdop \rangle \rightarrow \mathbf{MUL} \mid \mathbf{DIV}$
12. $\langle dataType \rangle \rightarrow \mathbf{INTEGER} \mid \mathbf{REAL} \mid \mathbf{BOOLEAN} \mid \mathbf{ARRAY} \mathbf{SQBO} \langle range \rangle \mathbf{SQBC} \mathbf{OF} \langle type \rangle$
13. $\langle type \rangle \rightarrow \mathbf{INTEGER} \mid \mathbf{REAL} \mid \mathbf{BOOLEAN}$
14. $\langle var \rangle \rightarrow \mathbf{ID} \langle whichID \rangle \mid \mathbf{NUM} \mid \mathbf{RNUM}$
15. $\langle whichID \rangle \rightarrow \mathbf{SQBO} \langle index_new \rangle \mathbf{SQBC} \mid \epsilon$
16. $\langle index_new \rangle \rightarrow \mathbf{NUM} \mid \mathbf{ID}$
17. $\langle value \rangle \rightarrow \mathbf{NUM} \mid \mathbf{TRUE} \mid \mathbf{FALSE}$
18. $\langle range \rangle \rightarrow \langle index_new \rangle \mathbf{RANGEOP} \langle index_new \rangle$
19. $\langle range_new \rangle \rightarrow \mathbf{NUM} \mathbf{RANGEOP} \mathbf{NUM}$
20. $\langle idList \rangle \rightarrow \mathbf{ID} \langle idL \rangle$
21. $\langle idL \rangle \rightarrow \mathbf{COMMA} \mathbf{ID} \langle idL \rangle \mid \epsilon$