SEMANTIC RULES FOR AST CREATION

GROUP 4

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Grammar

1. <program> ===> <otherFunctions> <mainFunction>
2. <mainFunction> ===> TK_MAIN <stmts> TK_END
3. <otherFunctions> ===> <function><otherFunctions>
4. <otherFunctions> ===> e
5. <function> ===> TK_FUNID <input_par> <output_par> TK_SEM <stmts> TK_END
6. <input_par> ===> TK_INPUT TK_PARAMETER TK_LIST TK_SQL <parameter_list> TK_SQR
7. <output_par> ===> TK_OUTPUT TK_PARAMETER TK_LIST TK_SQL <parameter_list> TK_SQR
8. <output_par> ===> e
9. <parameter_list> ===> <dataType> TK_ID <remaining_list>
10. <dataType> ===> <primitiveDatatype>
11. <dataType> ===> <constructedDatatype>
12. <primitiveDatatype> = TK_INT
13. <primitiveDatatype> ===> TK_REAL
14. <constructedDatatype> ===> TK_RECORD TK_RECORDID
15. <remaining_list> ===> TK_COMMA <parameter_list>
16. <remaining_list> ===> e
17. <stmts> ===> <typeDefinitions> <declarations> <otherStmts><returnStmt>
18. <typeDefinitions> ===> <typeDefinition><typeDefinitions>
19. <typeDefinitions> ===> e
20. <typeDefinition> ===> TK_RECORD TK_RECORDID <fieldDefinitions> TK_ENDRECORD TK_SEM
21. <fieldDefinitions> ===> <fieldDefinition><fieldDefinition><moreFields>
22. <fieldDefinition> ===> TK_TYPE <primitiveDatatype> TK_COLON TK_FIELDID TK_SEM
23. <moreFields> ===> <fieldDefinition><moreFields>
24. <moreFields> ===> e
25. <declarations> ===> <declaration><declarations>
26. <declarations> ===> e
27. <declaration> ===> TK_TYPE <dataType> TK_COLON TK_ID <global_or_not> TK_SEM
28. <global_or_not> ===> TK_COLON TK_GLOBAL
29. <global_or_not> ===> e
30. <otherStmts> ===> <stmt><otherStmts>
31. <otherStmts> ===> e
32. <stmt> ===> <assignmentStmt>
33. <stmt> ===> <iterativeStmt>
34. <stmt> ===> <conditionalStmt>
35. <stmt> ===> <ioStmt>
36. <stmt> ===> <funCallStmt>

37. <assignmentStmt> ===> <singleOrRecId> TK_ASSIGNOP <arithmeticExpression> TK_SEM
38. <singleOrRecId> ===> TK_ID <temp>
39. <temp> ===> e
40. <temp> ===> TK_DOT TK_FIELDID
41. <funCallStmt> ===> <outputParameters> TK_CALL TK_FUNID TK_WITH TK_PARAMETERS <inputParameters> TK_SEM
42. <outputParameters> ===> TK_SQL <idList> TK_SQR TK_ASSIGNOP
43. <outputParameters> ===> e
44. <inputParameters> ===> TK_SQL <idList> TK_SQR
45. <iterativeStmt> ===> TK_WHILE TK_OP <booleanExpression> TK_CL <stmt><otherStmts> TK_ENDWHILE
46. <conditionalStmt> ===> TK_IF TK_OP <booleanExpression> TK_CL TK_THEN <stmt><otherStmts> <elsePart>
47. <elsePart> ===> TK_ELSE <stmt><otherStmts> TK_ENDIF
48. <elsePart> ===> TK_ENDIF
49. <ioStmt> ===> TK_READ TK_OP <singleOrRecId> TK_CL TK_SEM
50. <ioStmt> ===> TK_WRITE TK_OP <allVar> TK_CL TK_SEM
51. <allVar> ===> TK_ID <temp1>
52. <allVar> ===> TK_NUM
53. <allVar> ===> TK_RNUM
54. <temp1> ===> TK_DOT TK_FIELDID
55. <temp1> ===> e
56. <arithmeticExpression> ===> <term> <arithExp1>
57. <arithExp1> ===> <oper1> <term> <arithExp1>
58. <arithExp1> ===> e
59. <term> ===> <factor> <arithExp2>
60. <arithExp2> ===> <oper2> <factor> <arithExp2>
61. <arithExp2> ===> e
62. <factor> ===> TK_OP <arithmeticExpression> TK_CL
63. <factor> ===> <all>
64. <oper2> ===> TK_MUL
65. <oper2> ===> TK_DIV
66. <oper1> ===> TK_PLUS
67. <oper1> ===> TK_MINUS
68. <all> ===> TK_NUM
69. <all> ===> TK_RNUM
70. <all> ===> TK_ID <temp>
71. <temp> ===> e
72. <temp> ===> TK_DOT TK_FIELDID
73. <booleanExpression> ===> TK_OP <booleanExpression> TK_CL <logicalOp> TK_OP <booleanExpression> TK_CL
74. <booleanExpression> ===> <var> <relationalOp> <var>
75. <booleanExpression> ===> TK_NOT TK_OP <booleanExpression>TK_CL
76. <var> ===> TK_ID
77. <var> ===> TK_NUM
78. <var> ===> TK_RNUM
79. <logicalOp> ===> TK_AND
80. <logicalOp> ===> TK_OR
81. <relationalOp> ===> TK_LT
82. <relationalOp> ===> TK_LE
83. <relationalOp> ===> TK_EQ
84. <relationalOp> ===> TK_GT
85. <relationalOp> ===> TK_GE
86. <relationalOp> ===> TK_NE

87. <returnStmt> ===> TK_RETURN <optionalReturn> TK_SEM
88. <optionalReturn> ===> TK_SQL <idList> TK_SQR
89. <optionalReturn> ===> e
90. <idList> ===> TK_ID <more_ids>
91. <more_ids> ===> TK_COMMA <idList>
92. <more_ids> ===> e

Semantic Rules

1. program.addr = makeNode(program1,otherFunctions.addr,mainFunction.addr)
2. mainFunction.addr = makeNode(mainFunction1,stmts.addr)
3. otherFunctions.addr = makeNode(otherFunctions1,function.addr,otherFunctions.addr)
4. otherFunctions.addr = NULL
5. function.addr = makeNode(function1,TK_FUNID.addr,input_par.addr,output_par.addr,stmts.addr)
6. input_par.addr = makeNode(input_par1,parameter_list.addr)
7. output_par.addr = makeNode(output_par1,parameter_list.addr)
8. output_par.addr = NULL
9. parameter_list.addr = makeNode(parameter_list1,dataType.addr,TK_ID.addr,remaining_list.addr)
10. dataType.addr = primitiveDatatype.addr, free(primitiveDatatype)
11. dataType.addr = constructedDatatype.addr, free(constructedDatatype)
12. primitiveDatatype.addr = makeLeaf(TK_INT.addr)
13. primitiveDatatype.addr = makeLeaf(TK_REAL.addr)
14. constructedDatatype.addr = makeNode(constructedDatatype1,TK_RECORDID.addr)
15. remaining_list.addr = makeNode(remaining_list1,parameter_list.addr)
16. remaining_list.addr = NULL
17. stmts.addr = makeNode(stmts1,typeDefinitions.addr,declarations.addr,otherStmts.addr,returnStmt.addr)
18. typeDefinitions.addr = makeNode(typeDefinitions1,typeDefinition.addr,typeDefinitions.addr)
19. typeDefinitions.addr = NULL
20. typeDefinition.addr = makeNode(typeDefinition1,TK_RECORDID.addr,fieldDefinitions.addr)
21. fieldDefinitions.addr = makeNode(fieldDefinitions1,fieldDefinition1.addr,fieldDefinition2.addr,moreFields.addr)
22. fieldDefinition.addr = makeNode(fieldDefinition1,primitiveDatatype.addr,TK_FIELDID.addr)
23. moreFields.addr = makeNode(moreFields1,fieldDefinition.addr,moreFields.addr)
24. moreFields.addr = NULL
25. declarations.addr = makeNode(declarations1,declaration.addr,declarations.addr)
26. declarations.addr = NULL
27. declaration.addr = makeNode(,dataType.addr,TK_ID.addr,global_or_not.addr)
28. global_or_not.addr = NULL
29. otherStmts.addr = makeNode(otherStmts1,stmt.addr,otherStmts.addr)
30. otherStmts.addr = NULL
31. stmt.addr = assignmentStmt.addr, free(assignmentStmt)
32. stmt.addr = iterativeStmt.addr, free(iterativeStmt)
33. stmt.addr = conditionalStmt.addr, free(conditionalStmt)
34. stmt.addr = ioStmt.addr, free(ioStmt)
35. stmt.addr = funCallStmt.addr, free(funCallStmt)

36. assignmentStmt.addr = makeNode(assignmentStmt1,singleOrRecId.addr,arithmeticExpression.addr)
37. singleOrRecId.addr = makeNode(singleOrRecId1,TK_ID.addr,temp.addr)
38. temp.addr = NULL
39. temp.addr = makeLeaf(TK_FIELDID.addr)
40. funCallStmt.addr = makeNode(funCallStmt1,outputParameters.addr,TK_FUNID.addr,inputParameters.addr)
41. outputParameters.addr = makeNode(outputParameters1,idList.addr)
42. outputParameters.addr = NULL
43. inputParameters.addr = makeNode(inputParameters1,idList.addr)
44. iterativeStmt.addr = makeNode(iterativeStmt1,booleanExpression.addr,stmt.addr,otherStmts.addr)
45. conditionalStmt.addr = makeNode(conditionalStmt1,booleanExpression.addr,stmt.addr,otherStmts.addr,elsePart.addr)
46. elsePart.addr = makeNode(elsePart1,stmt.addr,otherStmts.addr)
47. elsePart.addr = NULL
48. ioStmt.addr = makeNode(ioStmt1, TK_READ.addr, singleOrRecId.addr)
49. ioStmt.addr = makeNode(ioStmt2, TK_WRITE.addr, allVar.addr)
50. allVar.addr = makeNode(allVar1, TK_ID.addr, temp1.addr)
51. allVar.addr = makeLeaf(TK_NUM.addr)
52. allVar.addr = makeLeaf(TK_RNUM.addr)
53. temp1.addr = makeLeaf(TK_FIELDID.addr)
54. temp1.addr = NULL
55. arithmeticExpression.addr = arithExp1.syn, arithExp1.inh = term.addr
56. arithExp1_1.syn = arithExp1_2.syn, arithExp1_2.inh = makeNode(oper1.addr,term.addr,arithExp1_1.inh)
57. arithExp1.syn = arithExp1.inh
58. term.addr = arithExp2.syn, arithExp2.inh = factor.addr
59. arithExp2_1.syn = arithExp2_2.syn, arithExp2_2.inh = makeNode(oper2.addr, factor.addr,arithExp2_1.inh)
60. arithExp2.syn = arithExp2.inh
61. factor.addr = arithmeticExpression.addr
62. factor.addr = all.addr, free(all)
63. oper2.addr = makeLeaf(TK_MUL.addr)
64. oper2.addr = makeLeaf(TK_DIV.addr)
65. oper1.addr = makeLeaf(TK_PLUS.addr)
66. oper1.addr = makeLeaf(TK_MINUS.addr)
67. all.addr = makeLeaf(TK_NUM.addr)
68. all.addr = makeLeaf(TK_RNUM.addr)
69. all.addr = makeNode(all1, TK_ID.addr, temp.addr)
70. temp.addr = NULL
71. temp.addr = makeLeaf(TK_FIELDID.addr)
72. booleanExpression.addr = makeNode(booleanExpression1, booleanExpression1.addr, logicalOp.addr, booleanExpression2.addr)
73. booleanExpression.addr = makeNode(booleanExpression2, var1.addr, relationalOp.addr, var2.addr)
74. booleanExpression.addr = makeNode(booleanExpression3, TK_NOT.addr, booleanExpression.addr)
75. var.addr = makeLeaf(TK_ID.addr)
76. var.addr = makeLeaf(TK_NUM.addr)
77. var.addr = makeLeaf(TK_RNUM.addr)
78. logicalOp.addr = makeLeaf(TK_AND.addr)
79. logicalOp.addr = makeLeaf(TK_OR.addr)

80. relationalOp.addr = makeLeaf(TK_LT.addr)
81. relationalOp.addr = makeLeaf(TK_LE.addr)
82. relationalOp.addr = makeLeaf(TK_EQ.addr)
83. relationalOp.addr = makeLeaf(TK_GT.addr)
84. relationalOp.addr = makeLeaf(TK_GE.addr)
85. relationalOp.addr = makeLeaf(TK_NE.addr)
86. returnStmt.addr = makeNode(returnStmt1, TK_RETURN.addr, optionalReturn.addr)
87. optionalReturn.addr = idList.addr, free(idList)
88. optionalReturn.addr = NULL
89. idList.addr = makeNode(idList1, TK_ID.addr, more_ids.addr)
90. more_ids.addr = idList.addr, free(idList)
91. more_ids.addr = NULL