Group 12

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1.) Original Rule:
<program> ===> <otherFunctions> <mainFunction>

---Corresponding Semantic Rules---
other=new(other_functions,otherFunctions.addr)
main=new(main,mainFunction.addr)
root.addr=new(program,other,main)

2.) Original Rule:
<mainFunction>===> TK_MAIN <stmts> TK_END

---Corresponding Semantic Rules---
mainFunction.addr=stms.addr

3.) Original Rule:
<otherFunctions> ===> <function> <otherFunctions1>

---Corresponding Semantic Rules---
function=new(function,function.addr)
otherFunctions.addr=connectToHead(function,otherFunctions1.addr)

4.) Original Rule:
<otherFunctions> ===>eps

---Corresponding Semantic Rules---
otherFunctions.addr=NULL

5.) Original Rule:
<function> ===> TK_FUNID <input_par> <output_par> TK_SEM <stmts> TK_END

---Corresponding Semantic Rules---
stmts = new(statements, stmts.addr)
function.addr = connectToHead(TK_FUNID.addr, input_par.addr, output_par.addr, stmts)

6.) Original Rule:
<input_par> ===> TK_INPUT TK_PARAMETER TK_LIST TK_SQL <parameter_list> TK_SQR

---Corresponding Semantic Rules---
input_par.addr = new(input,parameter_list.addr)

7.) Original Rule:
<output_par> ===> TK_OUTPUT TK_PARAMETER TK_LIST TK_SQL <parameter_list> TK_SQR

---Corresponding Semantic Rules---
output_par.addr = new(output,parameter_list.addr)

8.) Original Rule:
<output_par> ===> eps

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      ---Corresponding Semantic Rules---
      output_par.addr=NULL

9.) Original Rule:
      <parameter_list> ===> <dataType>  TK_ID  <remaining_list>

      ---Corresponding Semantic Rules---
      data = new(data, dataType.addr, TK_ID.addr)
      parameter_list.addr=connectToHead(data, remaining_list.addr)

10.) Original Rule:
      <dataType> ===>  <primitiveDatatype>

      ---Corresponding Semantic Rules---
      dataType.addr = primitiveDatatype.addr


11.) Original Rule:
      <dataType> ===> <constructedDatatype>

      ---Corresponding Semantic Rules---
      dataType.addr = constructedDatatype.addr

12.) Original Rule:
      <primitiveDatatype> ===> TK_INT

      ---Corresponding Semantic Rules---
      primitiveDatatype.addr=TK_INT.addr

13.) Original Rule:
      <primitiveDatatype> ===> TK_REAL

      ---Corresponding Semantic Rules---
      primitiveDatatype.addr=TK_REAL.addr

14.) Original Rule:
      <constructedDatatype> ===> TK_RECORD  TK_RECORDID

      ---Corresponding Semantic Rules---
      constructedDatatype.addr = new(Record,TK_RECORDID.addr)

15.) Original Rule:
      <remaining_list> ===> TK_COMMA <parameter_list>

      ---Corresponding Semantic Rules---
      remaining_list.addr=parameter_list.addr

16.) Original Rule:
      <remaining_list> ===> eps

      ---Corresponding Semantic Rules---
      <remaining_list>.addr=NULL

17.) Original Rule:
      <stmts> ===> <typeDefinitions> <declarations> <otherStmts>
<returnStmt>

      ---Corresponding Semantic Rules---
      type = new(typedef, typeDefinitions.addr)
      dec = new(declaration, declaration.addr)
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      others = new(others, otherStmts.addr)
      return = new(returns, returnStmt.addr)
      stmts.addr = connectToHead(type, dec, others, return)

18.) Original Rule:
      <typeDefinitions> ===> <typeDefinition> <typeDefinitions1>

      ---Corresponding Semantic Rules---
      typeDefinitions.addr = connectToHead(typeDefinition.addr,
typeDefinitions1.addr)


19.) Original Rule:
      <typeDefinitions> ===>  eps

      ---Corresponding Semantic Rules---
      <typeDefinitions>.addr=NULL

20.) Original Rule:
      <typeDefinition> ===> TK_RECORD TK_RECORDID <fieldDefinitions>
TK_ENDRECORD TK_SEM

      ---Corresponding Semantic Rules---
      typeDefinition.addr = new(record, TK_RECORDID.addr,
fieldDefinitions.addr)

21.) Original Rule:
      <fieldDefinitions> ===> <fieldDefinition1> <fieldDefinition2>
<moreFields>

      ---Corresponding Semantic Rules---
      field1 = new(field, fieldDefinition1.addr)
      field2 = new(field, fieldDefinition2.addr)
      fieldDefinitions.addr = connectToHead(field1, field2,
moreFields.addr)

22.) Original Rule:
      <fieldDefinition> ===> TK_TYPE <primitiveDatatype> TK_COLON
TK_FIELDID TK_SEM

      ---Corresponding Semantic Rules---
      fieldDefinition.addr = connectToHead(primitiveDatatype.addr,
TK_FIELDID.addr)

23.) Original Rule:
      <moreFields> ===> <fieldDefinition> <moreFields1>

      ---Corresponding Semantic Rules---
      moreFields.addr =
connectToHead(fieldDefinition.addr,moreFields1.addr)


24.) Original Rule:
      <moreFields> ===> eps

      ---Corresponding Semantic Rules---
      morefields.addr=NULL

25.) Original Rule:
      <declarations> ===> <declaration> <declarations1>
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---Corresponding Semantic Rules---
dec = new(var_declr, declaration.addr)
declarations.addr= connectToHead(dec, declarations1.addr)

26.) Original Rule:
<declarations> ===> eps

---Corresponding Semantic Rules---
declarations.addr=NULL

27.) Original Rule:
<declaration> ===> TK_TYPE <dataType> TK_COLON TK_ID
<global_or_not> TK_SEM

---Corresponding Semantic Rules---
declaration.addr = connectToHead(dataType.addr, TK_ID.addr,
global_or_not.addr)

28.) Original Rule:
<global_or_not> ===> TK_COLON TK_GLOBAL

---Corresponding Semantic Rules---
global_or_not.addr=TK_GLOBAL.addr

29.) Original Rule:
<global_or_not> ===> eps

---Corresponding Semantic Rules---
global_or_not.addr=NULL

30.) Original Rule:
<otherStmts> ===> <stmt> <otherStmts1>

---Corresponding Semantic Rules---
otherStmts.addr = connectToHead(stmt.addr, otherstmts1.addr)

31.) Original Rule:
<otherStmts> ===> eps

---Corresponding Semantic Rules---
otherstmts.addr=NULL

32.) Original Rule:
<stmt> ===> <assignmentStmt>

---Corresponding Semantic Rules---
stmt.addr= new(assignStmt, assignmentStmt.addr)

33.) Original Rule:
<stmt> ===> <funCallStmt>

---Corresponding Semantic Rules---
stmt.addr=new(funcStmt,funcallstmt.addr)

34.) Original Rule:
<stmt> ===> <iterativeStmt>

---Corresponding Semantic Rules---

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      stmt.addr=new(iterStmt,iterativestmt.addr)

35.) Original Rule:
      <stmt> ===> <conditionalStmt>

      ---Corresponding Semantic Rules---
      stmt.addr=new(condStmt,conditionalstmt.addr)
36.) Original Rule:
      <stmt> ===> <ioStmt>

      ---Corresponding Semantic Rules---
      stmt.addr=new(IO_Stmt,iostmt.addr)

37.) Original Rule:
      <assignmentStmt> ===> <singleOrRecId> TK_ASSIGNOP
<arithmeticExpression> TK_SEM

      ---Corresponding Semantic Rules---
      single = new(varID, singleorRecid.addr)
      assignmentStmt.addr = connectToHead(single,
arithmeticExpression.addr)

38.) Original Rule:
      <singleOrRecId> ===>TK_ID  <new_24>

      ---Corresponding Semantic Rules---
      singleOrRecId.addr = connectToHead(TK_ID.addr, new_24.addr)

39.) Original Rule:
      <new_24> ===> TK_DOT  TK_FIELDID

      ---Corresponding Semantic Rules---
      new_24.addr = new(recField, TK_FIELDID.addr)

40.) Original Rule:
      <new_24> ===> eps

      ---Corresponding Semantic Rules---
      new_24.addr= NULL

41.) Original Rule:
      <funCallStmt> ===> <outputParameters> TK_CALL  TK_FUNID  TK_WITH
TK_PARAMETERS <inputParameters>  TK_SEM

      ---Corresponding Semantic Rules---
      input  = new(inParams, inputParameters.addr)
      funCallStmt.addr = connectToHead( outputParameters.addr,
TK_FUNID.addr, input)

42.) Original Rule:
      <outputParameters> ==> TK_SQL <idList> TK_SQR TK_ASSIGNOP

      ---Corresponding Semantic Rules---
      outputParameters.addr = new(outParams, idList.addr)

43.) Original Rule:
      <outputParameters> ==> eps

      ---Corresponding Semantic Rules---
      outputParameters.addr=NULL
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44.) Original Rule:
<inputParameters> ===> TK_SQL <idList> TK_SQR

---Corresponding Semantic Rules---
inputParameters.addr = idlist.addr

45.) Original Rule:
<iterativeStmt> ===> TK_WHILE TK_OP <booleanExpression> TK_CL <stmt> <otherStmts> TK_ENDWHILE

---Corresponding Semantic Rules---
statements = new(statements, stmt.addr, otherStmts.addr)
iterativeStmt.addr = connectToHead(booleanExpression.addr, statements)

46.) Original Rule:
<conditionalStmt> ===> TK_IF TK_OP <booleanExpression> TK_CL TK_THEN <stmt> <otherStmts> <elsePart>

---Corresponding Semantic Rules---
statements = new(statements, stmt.addr, otherStmts.addr)
conditionalstmt.addr = connectToHead(booleanExpression.addr, statements, elsePart.addr)

47.) Original Rule:
<elsePart> ===> TK_ELSE <stmt> <otherStmts> TK_ENDIF

---Corresponding Semantic Rules---
statements = new(statements, stmt.addr, otherStmts.addr)
elsePart.addr = new(else, statements)

48.) Original Rule:
<elsePart> ===> TK_ENDIF

---Corresponding Semantic Rules---
elsePart.addr=NULL

49.) Original Rule:
<ioStmt> ===> TK_READ TK_OP <singleOrRecId> TK_CL TK_SEM

---Corresponding Semantic Rules---
iostmt.addr = new(readStmt, singleOrRecid.addr)

50.) Original Rule:
<ioStmt> ===> TK_WRITE TK_OP <allVar> TK_CL TK_SEM

---Corresponding Semantic Rules---
iostmt.addr = new(writeStmt, allvar.addr)

51.) Original Rule:
<allVar> ===> TK_ID <newallvar>

---Corresponding Semantic Rules---
allVar.addr= new(varName, TK_ID, newallvar.addr)

52.) Original Rule:
<allVar> ===> TK_RNUM

---Corresponding Semantic Rules---
allVar.addr= TK_RNUM.addr

53.) Original Rule:
<allVar> ===> TK_NUM

---Corresponding Semantic Rules---
allVar.addr= TK_NUM.addr

54.) Original Rule:
<newallvar> ===> TK_DOT TK_FIELDID

---Corresponding Semantic Rules---
newallvar.addr= new(recName, TK_FIELDID)

55.) Original Rule:
<newallvar> ===> eps

---Corresponding Semantic Rules---
newallvar.addr= NULL

56.) Original Rule:
<arithmeticExpression> ===> <term> <expPrime>

---Corresponding Semantic Rules---
arithmeticExpression.addr= new(arith, term.addr, expPrime.addr)

57.) Original Rule:
<expPrime> ===> <lowPrecedenceOperators> <term> <expPrime>

---Corresponding Semantic Rules---
expPrime.addr= new(lowerPrec, term.addr,
lowPrecedenceOperators.addr, expPrime.addr)

58.) Original Rule:
<expPrime> ===> eps

---Corresponding Semantic Rules---
expPrime.addr= NULL

59.) Original Rule:
<term> ===> <factor> <termPrime>

---Corresponding Semantic Rules---
term.addr= connectToHead(factor.addr, termPrime.addr)

60.) Original Rule:
<termPrime> ===> <highPrecedenceOperators> <factor> <termPrime>

---Corresponding Semantic Rules---
termPrime.addr= new(higherPrec, factor.addr,
highPrecedenceOperators.addr, termPrime.addr)

61.) Original Rule:
<termPrime> ===> eps

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      ---Corresponding Semantic Rules---
      termPrime.addr= NULL

62.) Original Rule:
      <factor> ===> <all>

      ---Corresponding Semantic Rules---
      factor.addr= all.addr

63.) Original Rule:
      <factor> TK_OP <arithmeticExpression> TK_CL

      ---Corresponding Semantic Rules---
      factor.addr= arithmeticExpression.addr
64.) Original Rule:
      <lowPrecedenceOperators> ===>  TK_MINUS

      ---Corresponding Semantic Rules---
      lowPrecedenceOperators.addr= TK_MINUS

65.) Original Rule:
      <lowPrecedenceOperators> ===> TK_PLUS

      ---Corresponding Semantic Rules---
      lowPrecedenceOperators.addr=tk_plus.addr

66.) Original Rule:
      <highPrecedenceOperators> ===> TK_MUL

      ---Corresponding Semantic Rules---
      highPrecedenceOperators.addr=tk_mul.addr

67.) Original Rule:
      <highPrecedenceOperators> ===> TK_DIV

      ---Corresponding Semantic Rules---
      highPrecedenceOperators.addr=tk_div.addr
68.) Original Rule:
      <all> ===>  TK_ID <allnew>

      ---Corresponding Semantic Rules---
      all.addr= new(varName, TK_ID, allnew.addr)

69.) Original Rule:
      <all> ===>  TK_NUM

      ---Corresponding Semantic Rules---
      all.addr= TK_NUM.addr
70.) Original Rule:
      <all> ===>  TK_RNUM

      ---Corresponding Semantic Rules---
      all.addr= TK_RNUM.addr

71.) Original Rule:
      <allnew> ===>  <temp>

      ---Corresponding Semantic Rules---
      allnew.addr= temp.addr
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72.) Original Rule:
<allnew> ===> eps

---Corresponding Semantic Rules---
allnew.addr= NULL

73.) Original Rule:
<temp> ===> eps

---Corresponding Semantic Rules---
temp.addr= NULL

74.) Original Rule:
<temp> TK_DOT TK_FIELDID

---Corresponding Semantic Rules---
temp.addr= new(recID, TK_FIELDID)

75.) Original Rule:
<booleanExpression> ===> TK_OP <booleanExpression1> TK_CL <logicalOp> TK_OP <booleanExpression2> TK_CL

---Corresponding Semantic Rules---
booleanExpression.addr= new(boolean, booleanExpression1.addr, logicalOp.addr, booleanExpression2.addr)

76.) Original Rule:
<booleanExpression> ===> <allVar> <relationalOp> <allVar>

---Corresponding Semantic Rules---
booleanExpression.addr= new(boolean, var.addr, relationalOp.addr, var.addr)

77.) Original Rule:
<booleanExpression> ===> TK_NOT TK_OP <booleanExpression1>TK_CL

---Corresponding Semantic Rules---
booleanExpression.addr= new(boolean, TK_NOT, booleanExpression.addr)

78.) Original Rule:
<var> ===> TK_NUM

---Corresponding Semantic Rules---
var.addr=TK_NUM.addr

79.) Original Rule:
<var> ===> TK_RNUM

---Corresponding Semantic Rules---
var.addr=TK_RNUM.addr

80.) Original Rule:
<var> ===> <TK_ID>

---Corresponding Semantic Rules---
var.addr = TK_ID.addr

81.) Original Rule:
<logicalOp> ===> TK_AND

---Corresponding Semantic Rules---
logicalOp.addr= TK_AND.addr

82.) Original Rule:
<logicalOp> ===> TK_OR

---Corresponding Semantic Rules---
logicalOp.addr= TK_OR.addr

83.) Original Rule:
<relationalOp> ===> TK_LT

---Corresponding Semantic Rules---
relationalOp.addr=TK_LT.addr

84.) Original Rule:
<relationalOp> ===> TK_LE

---Corresponding Semantic Rules---
relationalOp.addr=TK_LE.addr

85.) Original Rule:
<relationalOp> ===> TK_EQ

---Corresponding Semantic Rules---
relationalOp.addr=TK_EQ.addr

86.) Original Rule:
<relationalOp> ===> TK_GT

---Corresponding Semantic Rules---
relationalOp.addr=TK_GT.addr

87.) Original Rule:
<relationalOp> ===> TK_GE

---Corresponding Semantic Rules---
relationalOp.addr=TK_GE.addr

88.) Original Rule:
<relationalOp> ===> TK_NE

---Corresponding Semantic Rules---
relationalOp.addr=TK_NE.addr

89.) Original Rule:
<returnStmt> ===> TK_RETURN <optionalReturn> TK_SEM

---Corresponding Semantic Rules---
returnStmt.addr = optionalReturn.addr

90.) Original Rule:
<optionalReturn> ===> TK_SQL <idList> TK_SQR

---Corresponding Semantic Rules---
optionalReturn.addr=idlist.addr

91.) Original Rule:
<optionalReturn> ===> eps

---Corresponding Semantic Rules---
optionalReturn.addr=NULL

92.) Original Rule:
<idList> ===> TK_ID <more_ids>

---Corresponding Semantic Rules---
ID = new(id, TK_ID.addr)
idlist.addr = connectToHead(ID, moreid.addr)

93.) Original Rule:
<more_ids> ===> TK_COMMA <idList>

---Corresponding Semantic Rules---
moreids.addr=idlist.addr

94.) Original Rule:
<more_ids> ===> eps

---Corresponding Semantic Rules---
moreids.addr=NULL