```
[1]
     <PROGRAM>
                             \rightarrow <IDENT><ENV><DATA><PROC>
[2]
     <IDENT>
                                identification division <END INST> program-id.
                                 ID<END INST> author. WORDS<END INST>
                                 date-written. WORDS <END INST>
     <WORDS>
[3]
                                 ID <WORDS LR>
[4]
     <WORDS LR>
                                ID <WORDS LR>
[5]
[6]
     <END INST>
                                \cdot n
                                 environment division
<br/>
\langle {\rm END\_INST} \rangle configuration
[7]
     <ENV>
                                 section<END INST> source-computer.
                                 WORDS<END INST> object-computer.
                                 WORDS<END INST>
                                 data division<END INST> working-storage
[8]
     <DATA>
                                 section<END INST> <VAR LIST>
[9]
     <VAR LIST>
                                 <VAR DECL> <VAR LIST>
[10]
     <VAR DECL>
                             \rightarrow <LEVEL> ID pic IMAGE <VAR DECL TAIL>
[11]
[12]
    <VAR DECL TAIL>
                                value INTEGER<END INST>
[13]
                                 <END INST>
[14]
     <LEVEL>
                                INTEGER
     <PROC>
                                 procedure division<END INST> ID
[15]
                                 section<END INST> <LABELS> end program ID.
                                 <LABEL><END INST> <INSTRUCTION LIST>
[16]
    <LABELS>
                                 <LABELS LR>
[17]
                                 <LABEL><END INST> <INSTRUCTION LIST>
     <LABELS LR>
                                 <LABELS LR>
[18]
                                \varepsilon
[19]
     <LABEL>
                                ID
[20]
     <INSTRUCTION_LIST>
                                <INSTRUCTION> <INSTRUCTIONLIST>
[21]
[22]
     <INSTRUCTION>
                                <ASSIGNATION>
[23]
                             \rightarrow <IF>
[24]
                             \rightarrow <CALL>
                             \rightarrow <READ>
[25]
[26]
                                <WRITE>
[27]
                                stop run<END INST>
[28]
    <ASSIGNATION>
                                 move <EXPRESSION> to ID<END INST>
[29]
                                 compute ID = <EXPRESSION><END INST>
[30]
                                 add <EXPRESSION> to ID<END INST>
                                 subtract < EXPRESSION > from \ ID < END \quad INST >
[31]
[32]
                                multiply <ASSING END><END INST>
[33]
                                 divide <ASSING_END><END_INST>
[34]
    <ASSIGN END>
                                 <EXPRESSION>,<EXPRESSION> giving ID

ightarrow <EXP AND> <EXPRESSION LR>
[35]
     <EXPRESSION>
[36]
    <EXPRESSION LR>
                             \rightarrow or <EXP AND> <EXPRESSION LR>
[37]
                             \rightarrow
    \langle \text{EXP\_AND} \rangle

ightarrow <EXP EQUAL> <EXP AND LR>
[38]
[39]
    <EXP AND LR>
                                 and <EXP EQUAL> <EXP AND LR>
```

```
[40]
                            \rightarrow \varepsilon
[41]
    <EXP EQUAL>
                            \rightarrow <EXP ADD> <EXP EQUAL LR>
[42]
    <EXP EQUAL LR>
                            \rightarrow = <EXP ADD> <EXP EQUAL LR>
[43]

ightarrow < <EXP ADD> <EXP EQUAL LR>
                            \rightarrow > <EXP ADD> <EXP EQUAL LR>
[44]
[45]
                               <= <EXP_ADD> <EXP_EQUAL_LR>
                               >= <EXP ADD> <EXP EQUAL LR>
[46]
[47]
    <EXP ADD>
                               <EXP MULT> <EXP ADD LR>
[48]
    <EXP\_ADD\_LR>
                               + <EXP MULT> <EXP ADD LR>
[49]
[50]
                            \rightarrow - <EXP MULT> <EXP ADD LR>
[51]
[52]
    <EXP_NOT> <EXP_MULT_LR>
                            [53]
    <EXP_MULT_LR>
                               / < EXP NOT > < EXP MULT LR >
[54]
                            \rightarrow
[55]
    <EXP_NOT>
                            \rightarrow -<EXP NOT>
[56]
[57]
                               not <EXP_NOT>
[58]
                               <EXP PARENTHESIS>
[59]
    <EXP PARENTHESIS>
                            \rightarrow (\langle EXPRESSION \rangle)
[60]
                               <EXP TERM>
[61]
    <EXP_TERM>
                               ID
[62]
                               INTEGER
                            \rightarrow
[63]
                               true
[64]
                               false
    \langle IF \rangle
[65]
                               if <EXPRESSION> then <INSTRUCTION LIST>
                                <IF END>
    <IF END>
[66]
                                else <INSTRUCTION LIST> end-if
[67]
                                end-if
[68]
    <CALL>
                                perform ID < CALL_TAIL>
                                until <EXPRESSION><END INST>
[69]
    <CALL_TAIL>
                                <END INST>
[70]
[71]
    <READ>
                                accept ID<END INST>
                                display <WRITE TAIL>
[72]
    <WRITE>
[73]
    <WRITE_TAIL>
                               <EXPRESSION><END_INST>
[74]
                              STRING<END INST>
```

Variable	First^1	Follow^1
<program></program>	$\operatorname{first}(<\operatorname{IDENT}>)$	
<IDENT $>$	identification	
<WORDS $>$	ID	
$<$ WORDS_LR $>$	ID, follow(<words>)</words>	
$<$ END_INST $>$		
<ENV $>$	environment	
<DATA $>$	data	
$<$ VAR_LIST $>$	$first(\langle VAR_DECL \rangle), \varepsilon$	
$<$ VAR_DECL $>$	$\operatorname{first}(<\!\!\operatorname{LEVEL}>)$	
$<$ VAR_DECL_TAIL $>$	${\rm value,} < {\rm END_INST} >$	

```
<LEVEL>
                          INTEGER
<PROC>
                          procedure
<LABELS>
                          first(<LABEL>)
                          first(\langle LABEL \rangle), \varepsilon
<LABELS LR>
<LABEL>
<INSTRUCTION_LIST>
                          first(\langle INSTRUCTION \rangle), \varepsilon
<INSTRUCTION>
                          first(<ASSIGNATION>,
                                                     \langle IF \rangle,
                          CALL, READ, WRITE), stop
<ASSIGNATION>
                          move, compute, add, substract, mul-
                          tiply, divide
<ASSIGN END>
                          first(EXPRESSION)
                          first(EXP AND)
<EXPRESSION>
<EXPRESSION LR>
                          of, \varepsilon
<EXP AND>
                          first(EXP EQUAL)
<EXP AND LR>
                          and, \varepsilon
<EXP EQUAL>
                          first(EXP_ADD)
                          =, <, >, <=, >=, \varepsilon
<EXP EQUAL LR>
<EXP_ADD>
                          first(EXP_MULT)
<EXP ADD LR>
                          +, -, \varepsilon
<EXP_MULT>
                          first(EXP NOT)
<EXP MULT LR>
                          *, /, \varepsilon
<EXP NOT>
                          -, not, first(EXP_PARENTHESIS)
<EXP_PARENTHESIS>
                          (, first(EXP_TERM)
<\!\!\mathrm{EXP\_TERM}\!\!>
                          ID, INTEGER, true, false
                          if
<IF>
<IF END>
                          else, end-if
<CALL>
                          perform
<CALL TAIL>
                          until, first(END INST)
<READ>
                          accept
<WRITE>
                          display
<WRITE TAIL>
                          first(EXPRESSION), STRING
```