```
[1]
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                             \rightarrow <IDENT><ENV><DATA><PROC>
[2]
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                                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]
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                                 section<END_INST> source-computer.
                                 WORDS<END INST> object-computer.
                                 WORDS<END INST>
                                 data division<END INST> working-storage
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[9]
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[11]
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                                value INTEGER<END INST>
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[14]
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                                INTEGER
     <PROC>
                                 procedure division<END INST> ID
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[18]
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[19]
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[21]
[22]
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                             \rightarrow <READ>
[26]
                                <WRITE>
[27]
                                stop run<END INST>
[28]
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                                 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 <ASSIGN END><END INST>
[33]
                                 divide <ASSIGN_END><END_INST>
[34]
    <ASSIGN END>
                                 <EXPRESSION>,<EXPRESSION> giving ID
[35]
     <EXPRESSION>

ightarrow <EXP AND> <EXPRESSION LR>
[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>
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```
[40]
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                             \rightarrow = <EXP ADD> <EXP EQUAL LR>
[43]

ightarrow < <EXP ADD> <EXP EQUAL LR>
                             \rightarrow > <EXP ADD> <EXP EQUAL LR>
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                                >= <EXP ADD> <EXP EQUAL LR>
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[60]

ightarrow <EXP TERM>
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[61]
                             \rightarrow ID
[62]
                                INTEGER
                             \rightarrow
[63]
                             \rightarrow true
[64]
                                false
[65]
    \langle IF \rangle
                                if <EXPRESSION> then <INSTRUCTION_LIST>
                                 <IF END>
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[67]
                                end-if
[68]
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                                until <EXPRESSION><END INST>
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[70]
[71]
    <READ>
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[72]
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[73]
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[74]
                                STRING<END INST>
```

| Variable | First^1 | $Follow^1$ |
|---------------------|--------------------|-------------|
| <program></program> | identification | |
| <IDENT $>$ | identification | environment |
| <WORDS $>$ | ID | |
| $<$ WORDS_LR $>$ | ID, ε | |

| <end_inst></end_inst> | | program-id, date-written, environment, configuration, source-computer, object-computer, data, working-storage, INTEGER, ε , ID, move, compute, add, substract, multiply, divide, if, perform, accept, display, stop |
|---|--|---|
| <env></env> | environment | data |
| <data></data> | data | procedure |
| <var list=""></var> | INTEGER, ε | - |
| <var_list></var_list> | INTEGER, E INTEGER | procedure |
| _ | | INTEGER, ε |
| <var_decl_tail></var_decl_tail> | value, . | INTEGER, ε |
| <level></level> | INTEGER | ID |
| <proc></proc> | procedure | 1 |
| <labels></labels> | ID | end |
| <labels_lr></labels_lr> | ID, ε | end |
| <label></label> | ID | · |
| <instruction_list></instruction_list> | move, compute, add, substract, multiply, divide, if, perform, accept, display, stop, ε | ID, ε |
| <instruction></instruction> | move, compute, add, substract, | move, compute, add, substract, mul- |
| | multiply, divide, if, perform, | tiply, divide, if, perform, accept, dis- |
| | accept, display, stop | play, stop, ε |
| <assignation></assignation> | move, compute, add, substract, | move, compute, add, substract, mul- |
| (11001011111011) | multiply, divide | tiply, divide, if, perform, accept, dis- |
| | maroipi, arvide | play, stop, ε |
| <assign end=""></assign> | -, not, (, ID, INTEGER, true, false | piaj, stop, c |
| <expression></expression> | -, not, (, ID, INTEGER, true, false | to, ., from, , , giving,), then |
| <expression lr=""></expression> | or, ε | to, ., from, , , giving,), then |
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| <exp and="" lr=""></exp> | and, ε | or, ε |
| <exp equal=""></exp> | -, not, (, ID, INTEGER, true, false | and, ε |
| <u> </u> | | _^ |
| <exp_equal_lr> <exp_add></exp_add></exp_equal_lr> | $=,<,>,<=,>=,\varepsilon$ -, not, (, ID, INTEGER, true, false | and, ε |
| <exp_add_lr></exp_add_lr> | $+$, $-$, ε | |
| <exp mult=""></exp> | | $=,<,>,<=,>=,\varepsilon$ |
| <u> </u> | -, not, (, ID, INTEGER, true, false | $+$, -, ε |
| <exp_mult_lr></exp_mult_lr> | *, /, ε | +, -, ε * / - |
| <exp_not></exp_not> | -, not, (, ID, INTEGER, true, false | *, /, ε |
| <exp_parenthesis></exp_parenthesis> | (, ID, INTEGER, true, false | *, /, ε |
| <exp_term></exp_term> | ID, INTEGER, true, false | *,/,arepsilon |
| <if></if> | if | move, compute, add, substract, mul- |
| | | tiply, divide, if, perform, accept, dis- |
| ID DND | 1 1.0 | play, stop, ε |
| <if_end></if_end> | else, end-if | move, compute, add, substract, mul- |
| | | tiply, divide, if, perform, accept, dis- |
| | | play, stop, ε |
| | | |

<CALL>perform move, compute, add, substract, multiply, divide, if, perform, accept, display, stop, ε <CALL TAIL>until, . move, compute, add, substract, multiply, divide, if, perform, accept, display, stop, ε <READ> move, compute, add, substract, mulaccept tiply, divide, if, perform, accept, display, stop, ε <WRITE>display move, compute, add, substract, multiply, divide, if, perform, accept, display, stop, ε <WRITE_TAIL>STRING, -, not, (, ID, INTEGER, move, compute, add, substract, multrue, false tiply, divide, if, perform, accept, display, stop, ε

| PROGRAM> 1 IDENT> 2 WORDS> 3 WORDS_LR> 4 5 END_INST> 6 ENV> 7 DATA> 8 VAR_LIST> 9 10 VAR_DECL> 11 VAR_DECL_TAIL> 13 12 LEVEL> 14 14 PROC> 16 17 LABELS_LR> 17 18 LABEL> 19 10 INSTRUCTION_LIST> 21 11 ASSIGNATION> 34 34 ASSIGN_END> 35 35 EXPRESSION_LR> 37 38 EXP_AND_LR> 38 38 | | identification | ID | | environment | data | INTEGER | value |
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| — n | _ | П | | | | | | |

| | procedure | move | compute | add | substract | multiply | divide |
|---------------------------------------|-----------|------|---------|-----------------|-----------------|-----------------|-----------------|
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| \WIGHT_IMIL/ | I | | | | | | |

| | perform | accept | display | stop | _ | not | (| true | false |
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| $<$ EXP $_$ EQUAL $_$ LR $>$ | | | | | | | | | |
| $\langle \text{EXP_ADD} \rangle$ | | | | | 48 | 48 | 48 | 48 | 48 |
| $<$ EXP_ADD_LR $>$ | | | | | 50 | | | | |
| $<$ EXP $_$ MULT $>$ | | | | | 52 | 52 | 52 | 52 | 52 |
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| <write_tail></write_tail> | | | . – | | 73 | 73 | 73 | 73 | 73 |
| | I | | | | . ~ | . • | | . • | . • |

| | or | and | = | < | > | <= | >= | * | / | if | else | end-if | + | until |
|---------------------------------------|----|-----|-----|-----|-----|-----|-----|----|------------|----|------|--------|----|-------|
| <PROGRAM $>$ | | | | | | | | | , | | | | | |
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