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# GERMPLASM BANK INFORMATION RETRIEVAL SYSTEM

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# GERMPLASM BANK INFORMATION RETRIEVAL SYSTEM[1]


## ABSTRACT

The germplasm data bank is a computer file of all existing information on 78 descriptors (morphoagronomic and GEU traits) for about 41,000 cultivars in the world rice collection. To rapidly and accurately get information from this file, a Germplasm Bank Information Retrieval (GBIRET) program was developed in 1976. The program retrieves and displays data from the data bank based on a joint specification of one or more of the descriptors in the file.

This paper describes the germplasm data bank, details use of the GBIRET program, and lists the source program.


[1]By Kwanchai A. Gomez, statistician, Domingo Tuazon, former research assistant, and Nora Epifania Nano, research assistant, International Rice Research Institute (IRRI), Los Baños, Philippines. Submitted to the IRRI Research Paper Series Committee November 1979.

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# GERMPLASM BANK INFORMATION RETRIEVAL SYSTEM

The International Rice Research Institute (IRRI) has, since 1961, served as the central depository for the world's rice germplasm. The IRRI germplasm bank receives seed samples from all over the world and, in turn, disseminates seeds and information to the world's rice scientists. The germplasm bank now holds about 48,000 registered accessions of *Oryza sativa* and thousands of accessions are added annually.

All cultivars in the germplasm bank are planted at least once to gather data on their morphologic and agronomic traits (Fig. 1, characters 5-42) and to identify desirable traits such as high protein level and resistance to insects, diseases, drought, and toxic soils (Fig. 1, characters 43-78).

The volume of data for this world collection of rice is enormous -- about 1.4 million records from 78 descriptors of about 41,000 accessions. To manage these data, a computerized data management system was developed. The system stores existing data for all the rice accessions in the germplasm bank in appropriate data files that allow easy, rapid, and accurate access to all existing information.

A feature of the system is the Germplasm Bank Information Retrieval (GBIRET) program, developed at IRRI in 1976. It can rapidly and systematically retrieve from the germplasm data bank information required by rice scientists at IRRI and in national rice improvement programs.

We describe the major features of the germplasm computer data bank and the GBIRET program and include detailed instructions for its use and a listing of the source program.

## THE GERMPLASM DATA BANK

The germplasm data bank contains existing information on each accession for all the 78 descriptors-characters listed in Figure 1. The first 42 descriptors are recorded by the genetic resources staff. Experimental methods and data collection schemes for these characters are described in the *Catalog of rice cultivars and breeding lines* (*O. sativa* L.) *in the world collection of the International Rice Research Institute* (IRRI 1970). The remaining 36 traits are recorded as a result of screening at IRRI by teams of scientists in the Institute's Genetic Evaluation and Utilization (GEU) program. The GEU program is interdisciplinary and problem-oriented. Each team member contributes specialized knowledge to a joint effort of developing and identifying rice varieties that are outstanding in such characters as high protein content and resistance to or tolerance for adverse environments and pests (IRRI 1975). These characters are generally referred to as GEU traits.

All characters and traits of accessions in the germplasm data bank are determined at IRRI. Some traits, such as maturity and reaction to diseases and insects, may vary when grown in other environments or subjected to other strains or biotypes of diseases and insects.

Although all accessions in the germplasm bank are characterized by all the 38 morphoagronomic traits, not all accessions are screened for each GEU trait. For example, of the 40,768 accessions in the germplasm data file, only 21,405 have been screened for bacterial leaf blight, 19,115 for resistance to rice whorl maggot, and 14,539 for amylose content.

The germplasm data file consists of a 5-column accession number, which uniquely identifies each rice variety, and a chain of records corresponding to existing information on all traits of each registered accession. The file is maintained in sorted order based on accession number. To service the regular updating of the germplasm data file, two computer programs were developed at IRRI: one for the validation of the raw data and another for the addition of new data to the file or for the deletion, or change in existing data, or both (Gomez et al 1977)

The data format is a fixed one. Within a given entry, a unique physical location is assigned to each character (or descriptor) regardless of the presence or absence of data of a given field.

A sample data sheet for recording some of the morphoagronomic traits is shown in Figure 2. Such a sheet facilitates the collection of data that can be encoded directly onto cards or magnetic tape, i.e. without the need for intermediate transfer of data. To facilitate data encoding, a code number is assigned to each country and experimental station to indicate the origin and source of seeds (IRRI 1970).

Data on GEU traits are recorded on a trait basis. Data sheets, such as the one shown in Figure 3, are computer-generated from the germplasm data file specifically for each GEU scientist, depending on the specific set of accessions he is screening and the GEU trait of interest. Such a form facilitates data recording and minimizes transcription errors.

## THE GBIRET PROGRAM

The GBIRET program aims to retrieve and display data from the germplasm data bank based on a joint specification of one or more of the characteristics or traits in the file. The top-level program flowchart of GBIRET is illustrated in Figure 4. The source program is given in Appendix 1.

Fig. 1. Guide to the character names found in the Information Retrieval Request Form (Fig. 5). Unless specified, the scoring system for traits 43 to 78 follows the Standard Evaluation System for Rice (IRRI 1975).

| | | |
|---|---|---|
| 1. | ACC | Accession number |
| 2. | VARN | Variety name |
| 3. | SS | Seed source |
| 4. | ORI | Country of origin |
| 5. | VG | Variety group (1=Indica, 2=Japonica, 3=Javanica, 4=Hybrid) |
| 6. | SDHT | Seedling height (cm) |
| 7. | BLLT | Blade length (cm) |
| 8. | BLWD | Blade width (cm) |
| 9. | BLPB | Blade pubescence (1=glabrous, 2=pubescent) |
| 10. | BLFA | Blade flag angle (1=erect, 2=intermediate, 3=horizontal, 4=descending) |
| 11. | BLCO | Blade color (1=pale green, 2=green, 3=dark green, 4=purple margin, 5=purple trace, 6=purple) |
| 12. | LSCO | Leaf sheath color (1=green, 2=purple trace, 3=purple) |
| 13. | LIGLT | Ligule length (mm) |
| 14. | LIGCO | Ligule color (0=colorless to green, 1=purple) |
| 15. | CCO | Collar color (0=colorless, 1=green, 2=purple) |
| 16. | ACO | Auricle color (0=colorless to green, 1=shades of purple) |
| 17. | CULT | Culm length (cm) |
| 18. | CUNO | Culm number |
| 19. | CUAN | Culm angle (1=erect, 2=intermediate, 3=spreading) |
| 20. | CUDI | Culm diameter (mm) |
| 21. | CUST | Culm strength (1=brittle, 2=lodged, 3=weak, 4=sturdy) |
| 22. | INCO | Internode color (1=green, 2=gold, 3=purple) |
| 23. | PLT | Panicle length (cm) |
| 24. | PTY | Panicle type (1=open, 2=intermediate, 3=compact, 4=clustering) |
| 25. | PEX | Panicle exsertion (1=enclosed, 2=partly exserted, 3=exserted) |
| 26. | PTH | Panicle threshability (1=shattering, 2=intermediate, 3=tight) |
| 27. | GRLT | Grain length (mm) |
| 28. | GRWD | Grain width (mm) |
| 29. | SLLT | Sterile lemma length (1=short, 2=medium, 3=long) |
| 30. | SLCO | Sterile lemma color (1=colorless, 1=straw, 2=gold, 3=red, 4=purple) |
| 31. | LCO | Lemma color (1=straw, 2=gold to brown, 3=brown spots on straw, 4=brown furrows on straw, 5=red, 6=purple, 7=black) |
| 32. | APCO | Apiculus color (0=colorless to straw, 1=red, 2=purple) |
| 33. | AWPR | Awn presence (0=absent, 1=partly awned, 2=fully awned) |
| 34. | AWCO | Awn color (1=straw, 2=gold, 3=red, 4=purple) |
| 35. | STCO | Stigma color (0=colorless, 1=purple trace, 2=red, 3=purple) |
| 36. | SCCO | Seedcoat color (0=colorless, 1=speckled brown, 2=red, 3=purple) |
| 37. | EMBR | Embryo size (1=small, 2=medium, 3=large) |
| 38. | ENDO | Endosperm type (1=non waxy, 2=waxy) |
| 39. | SPKF | Spikelet fertility (1=highly sterile, 2=partly sterile, 3=fertile) |
| 40. | 1000 | 1000-grain weight (gms) |
| 41. | SEN | Leaf senescence (1=quick, 2=slow) |
| 42. | MAT | Maturity (duration from seedling to full heading plus 30 days) |
| 43. | GBB | Bacterial leaf blight |
| 44. | GBL | Blast |
| 45. | SHB | Sheath blight |
| 46. | RTV | Rice tungro virus (%) |
| 47. | GSV | Grassy tungro virus (%) |
| 48. | BPH1 | Brown planthopper-Biotype 1 |
| 49. | BPH2 | Brown planthopper-Biotype 2 |
| 50. | BPH3 | Brown planthopper-Biotype 3 |
| 51. | GLH | Green leafhopper |
| 52. | SBS1 | Striped-stemborer (% deadhearts) |
| 53. | SBS2 | Striped-stemborer (% whiteheads) |
| 54. | SBY1 | Yellow-stemborer (% deadhearts) |
| 55. | SBY2 | Yellow-stemborer (% whiteheads) |
| 56. | WM | Rice whorl maggot |
| 57. | WBPH | White-backed planthopper |
| 58. | ZLH | Zigzag leafhopper |
| 59. | PRT1 | Brown rice protein content (%) - dry season crops |
| 60. | PRT2 | Brown rice protein content (%) - wet season crops |
| 61. | DRT1 | Seedling vigor |
| 62. | DRT2 | Rate of recovery after the 1st stress |
| 63. | DRT3 | Rate of recovery after the 2nd stress |
| 64. | DRT4 | Drought resistance score at early vegetative stage (40 DAS) |
| 65. | DRT5 | Drought resistance score at late vegetative stage (60 to 80 DAS) |
| 66. | DRT6 | Drought resistance score at reproductive stage |
| 67. | DRT8 | Drought tolerance score at 1st drought scoring (3-4 bars) |
| 68. | DRT11 | Drought tolerance score at 2nd drought scoring (9-10 bars) |
| 69. | DRT12 | Rate of recovery after exposure to 9-10 bars |
| 70. | DSGH | Drought score from the drought screening greenhouse (1-9) |
| 71. | ALK | Alkali tolerance |
| 72. | SAL | Salt tolerance |
| 73. | ZC1 | Zinc deficiency (field test) |
| 74. | ZC2 | Zinc deficiency (screening test) |
| 75. | ELON | Elongation |
| 76. | FL | Flood tolerance |
| 77. | CT1 | Cold tolerance |
| 78. | AMY | Amylose (%) |

The program is written in IBM OS ANS COBOL and is run on an IBM 370/135 under OS/VS1 at the Agricultural Resource Center, Los Baños, Philippines (IRRI 1979):

1. Input requirements

The input to the program consists of one or more of the retrieval control cards through which the retrieval criteria are specified. These control cards are:

- the QUERY card, which indicates the *criterion descriptors*, their desired values or range of values, and the logical operators;
- the LIST? card, which counts the number of accessions that have no data on each of the specified variables (i.e. unknown);
- the OUTPUT card, which specifies the descriptors whose data should be displayed; and
- the TITLE card, which specifies the title of the printout.

The procedure for the preparation of each of the control cards is described in Appendix II.

To facilitate requests for retrieval of desired information from the IRRI germplasm data bank by IRRI scientists and by scientists in national rice improvement programs, a standardized request form (Fig. 5) is used. This form simplifies the requests made by scientists and serves as the source information in the preparation of the control cards.

2. Output structure

The output of the GBIRET program can be either:

- a subfile - all accessions satisfying the query and all their corresponding descriptors reconstituted into a subfile for additional analysis, and/or
- a printout - all accessions satisfying the query printed out together with some selected descriptors in specified format (see Fig. 6). The total number of accessions in the germplasm data file and the number of unknowns (i.e. accessions without data) of specified descriptors are also printed out.

An example of a printout, which lists the accessions in the germplasm data bank that are of the Indica type, that have culms longer than

150 cm and grains longer than 6.5 mm, with maturity of more than 160 days, and are resistant to blast and bacterial leaf blight, is shown in Figure 6. Of 40,768 accessions in the germplasm data bank, 4 were found to satisfy the conditions specified. Only 28,208 accessions have data on varietal type, 28,112 on culm length, 28,259 on grain length, 28,188 on maturity, 21,405 on bacterial leaf blight, and 17,833 on blast.

3. Program limitation

The present version of the GBIRET program contains the following restrictions:

- the maximum number of criterion descriptors allowed is 20;
- the maximum number of descriptors that can be specified in either the OUTPUT card or the LIST? card is 10; and
- the program processes logical expression in the QUERY card from left to right without any logical connective precedence rule.

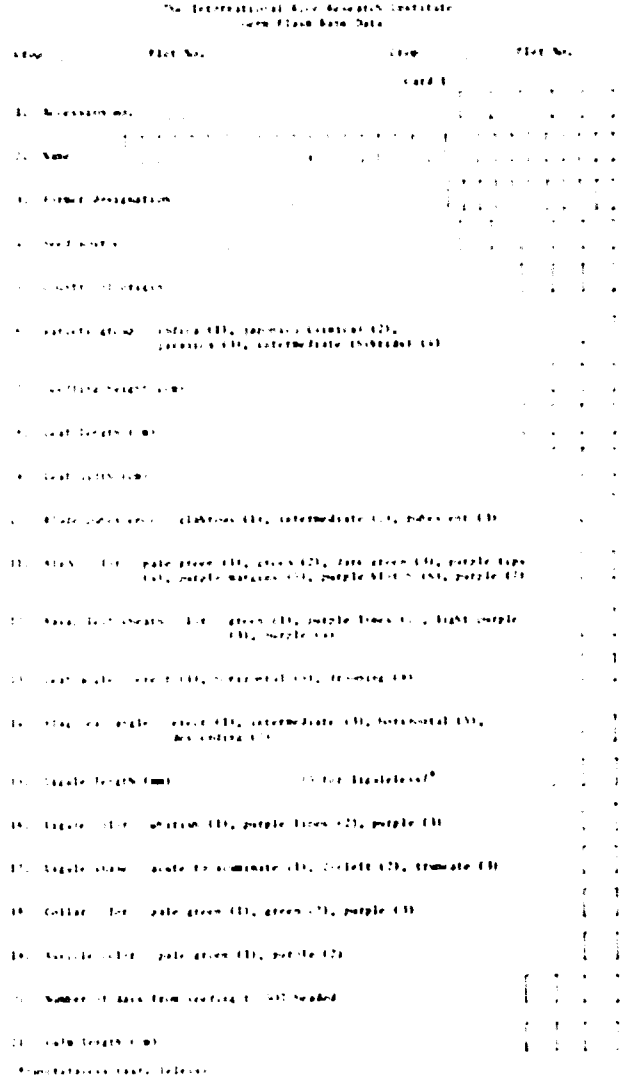

Fig. 2. A sample data sheet for recording morphoagronomic traits.

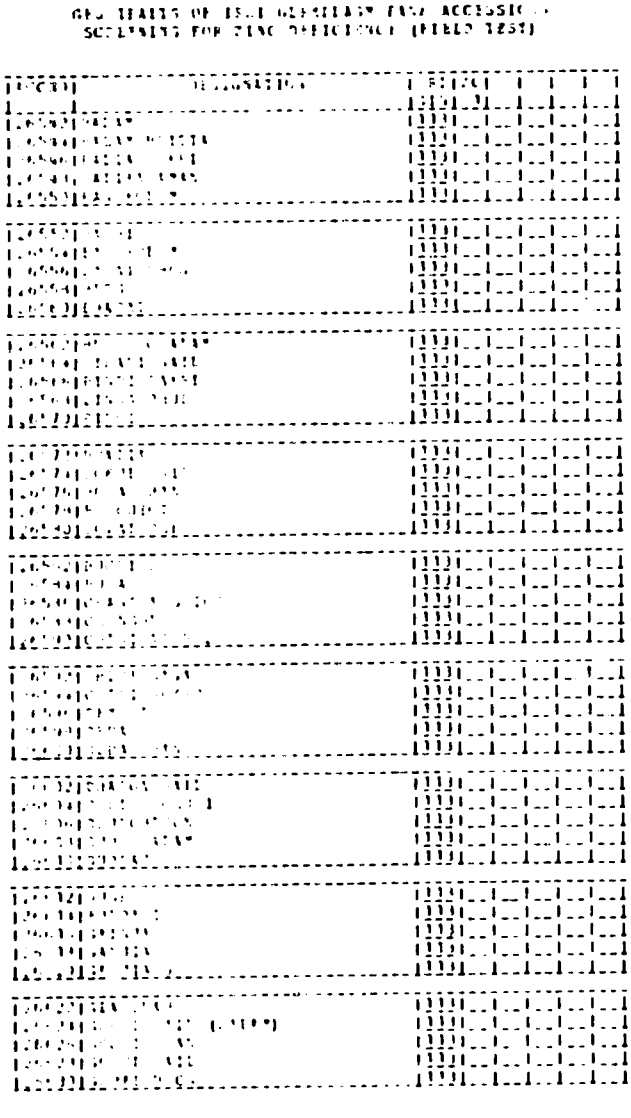

Fig. 3. A sample computer-generated data sheet used in screening specified accessions in the IRRI germplasm bank for GEU traits.

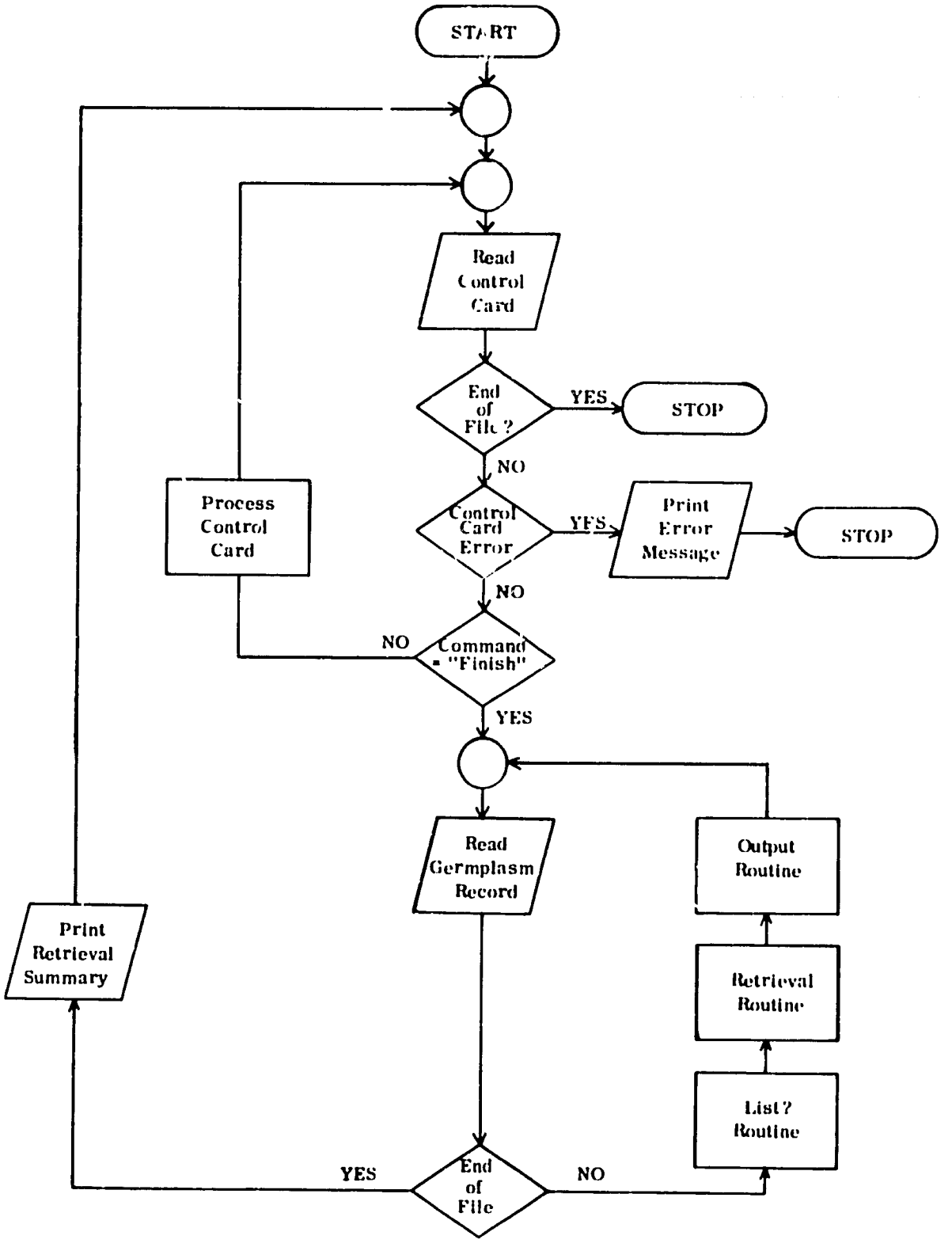


Fig. 4. Top level program flowchart of the Germplasm Bank Information Retrieval (GBIRET) program.

Form GB

The International Rice Research Institute

Information Retrieval Request Form

Operator

- less than
- equal to
- less than or equal to
- greater than or equal to
- > greater than
- ≠ not equal to

Researcher

Date submitted

Department

Date needed

| | Character | Criterion: Operator | Criterion: Value | Criterion: Output | | Character | Criterion: Operator | Criterion: Value | Criterion: Output | | Character | Criterion: Operator | Criterion: Value | Criterion: Output |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | ACC | | | | 27. | GRLT | | | | 53. | SBS2 | | | |
| 2. | VARN | | | | 28. | PWD | | | | 54. | SBH1 | | | |
| 3. | SS | | | | 29. | SLLT | | | | 55. | SBH2 | | | |
| 4. | PRY | | | | 30. | SLCO | | | | 56. | WM | | | |
| 5. | VG | | | | 31. | LCO | | | | 57. | *WBFH | | | |
| 6. | SOWT | | | | 32. | AFCO | | | | 58. | *ZLH | | | |
| 7. | BLLT | | | | 33. | AWFR | | | | 59. | FRT1 | | | |
| 8. | BLWC | | | | 34. | AWCO | | | | 60. | FRT2 | | | |
| 9. | BLFB | | | | 35. | STCO | | | | 61. | FRT3 | | | |
| 10. | BLFA | | | | 36. | SCCO | | | | 62. | FRT4 | | | |
| 11. | BLCO | | | | 37. | EMBR | | | | 63. | FRT5 | | | |
| 12. | LSCO | | | | 38. | ENSO | | | | 64. | FRT6 | | | |
| 13. | LSLT | | | | 39. | SFHF | | | | 65. | FRT7 | | | |
| 14. | LSCC | | | | 40. | 1000 | | | | 66. | FRT8 | | | |
| 15. | CCO | | | | 41. | SE% | | | | 67. | FRT9 | | | |
| 16. | ACO | | | | 42. | MAT | | | | 68. | FRT11 | | | |
| 17. | CLLT | | | | 43. | *GBB | | | | 69. | FRT12 | | | |
| 18. | CLWC | | | | 44. | *GBL | | | | 70. | *CSGH | | | |
| 19. | CLAN | | | | 45. | *SHR | | | | 71. | ALB | | | |
| 20. | CLDT | | | | 46. | RT% | | | | 72. | JAL | | | |
| 21. | CLST | | | | 47. | GS% | | | | 73. | ZC1 | | | |
| 22. | INCO | | | | 48. | *BFH1 | | | | 74. | ZC2 | | | |
| 23. | PLT | | | | 49. | *BFH2 | | | | 75. | ELC% | | | |
| 24. | PT% | | | | 50. | *BFH3 | | | | 76. | FL | | | |
| 25. | PEX | | | | 51. | GLH | | | | 77. | CT1 | | | |
| 26. | PTH | | | | 52. | SBS1 | | | | 78. | AWI | | | |

* Information on the 'number of tests' is kept for these characters. Place * in all specifications wherever 'no. of tests' is required.

Remarks:

Fig. 5. Information retrieval request form.

THESE ARE ACCESSIONS THAT ARE INDICA WITH CULM LENGTH GREATER THAN 150; GRAIN LENGTH GREATER THAN 6.5; MATURITY GREATER THAN 160 AND ARE RESISTANT TO BLAST AND BACTERIAL BLIGHT

| ACCN. No. | VARIETY NAME | VARIETY GROUP | CULM LENGTH | GRAIN LENGTH | MATURITY | BACT. BLIGHT | BLAST |
|---|---|---|---|---|---|---|---|
| 4931 | [illegible] | 1 | 152 | 10.6 | 163 | 3 | 4 |
| 5347 | MUJABA | 1 | 173 | 9.8 | 164 | 3 | 3 |
| [illegible] | TD 37 | 1 | 158 | 10.1 | 171 | 3 | 3 |
| 3775 | ENGLISH RICE | 1 | 153 | 7.8 | 178 | 2 | 3 |

END OF RETRIEVAL

SUMMARY OF RETRIEVED INFORMATION

| | |
|---|---|
| NO. OF ACCESSIONS WITH UNKNOWN VG | * 12560 |
| NO. OF ACCESSIONS WITH UNKNOWN CLLT | * 12656 |
| NO. OF ACCESSIONS WITH UNKNOWN GRLT | * 12509 |
| NO. OF ACCESSIONS WITH UNKNOWN MAT | * 12500 |
| NO. OF ACCESSIONS WITH UNKNOWN GBB | * 19363 |
| NO. OF ACCESSIONS WITH UNKNOWN GBL | * 22535 |
| NO. OF ACCESSIONS SATISFYING QUERY | * 4 |
| NO. OF ACCESSIONS IN THE DATA BANK | * 43760 |
| LAST ACCESSION NO. IN THE DATA BANK | * 43760 |

Fig. 6. An example of a printout output in the GBIRET program.

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IRRI (International Rice Research Institute). 1979. The IRRI Reporter 3/79. Los Baños, Philippines.

**Appendix I. GBIRET PROGRAM LISTING.**

This is an abridged version of the GBIRET program for use only with the first 42 descriptors, out of the 78 as listed in Fig. 1, that are more commonly used. Readers who wish to have the program listing for the unabridged version can request it from Statistics Department, IRRI.

```
IDENTIFICATION DIVISION.
PROGRAM-ID. IRGBRET1.
ENVIRONMENT DIVISION.
INPUT-OUTPUT SECTION.
FILE-CONTROL.
    SELECT CONTROL-CARD ASSIGN TO UT-S-FILE1.
    SELECT GERMPLASM-FILE ASSIGN TO UT-S-FILE2.
    SELECT PRINT-FILE  ASSIGN TO UT-S-FILE3.
    SELECT TEMP-FILE ASSIGN TO UT-S-FILE4.
DATA DIVISION.
FILE SECTION.
FD  CONTROL-CARD
    BLOCK CONTAINS 0 RECORDS
    LABEL RECORD OMITTED
    DATA RECORD IS CONTROL-DATA.
01  CONTROL-DATA.
    02 COMMAND          PIC X(6).
    02 KODE             PIC X.
    02 TTL.
       03 X-DATA        PIC X OCCURS 73.
FD  GERMPLASM-FILE RECORDING MODE IS F
    LABEL RECORD STANDARD
    BLOCK CONTAINS 0 RECORDS
    DATA RECORD IS GERMPLASM-DATA.
01  GERMPLASM-DATA.
   02 AREA-1.
    03 XACC             PIC XXXXX.
    03 VAR              PIC X(30).
    03 XSSD             PIC XXXXX.
    03 XORG             PIC XXX.
    03 XFGN             PIC XXXX.
    03 XVGF             PIC X.
    03 XSHT             PIC XX.
    03 XBLT             PIC XXX.
    03 XBLW.
       04 W-NO          PIC X.
       04 D-NO          PIC X.
    03 XBLP             PIC X.
    03 XBFA             PIC X.
    03 XBLC             PIC X.
    03 XLSC             PIC X.
    03 XLLT             PIC XX.
    03 XLLC             PIC X.
    03 XCOC             PIC X.
    03 XAUC             PIC X.
    03 XCLT             PIC XXX.
    03 XCNO             PIC XX.
    03 XCAG             PIC X.
    03 XCDA             PIC XX.
    03 XCST             PIC X.
    03 XINC             PIC X.
    03 XPLT             PIC XX.
    03 XPTY             PIC X.
    03 XPEX             PIC X.
    03 XPTH             PIC X.
    03 XGRL.
       04 W-NO          PIC XX.
       04 D-NO          PIC X.
    03 XGRW.
       04 W-NO          PIC X.
       04 D-NO          PIC X.
```

```
          03 XSLT              PIC X.                                  IRG00620
          03 XSLC              PIC X.                                  IRG00630
          03 XLCP              PIC X.                                  IRG00640
          03 XAPC              PIC X.                                  IRG00650
          03 XAPF              PIC X.                                  IRG00660
          03 XACO              PIC X.                                  IRG00670
          03 XSTC              PIC X.                                  IRG00680
          03 XSOC              PIC X.                                  IRG00690
          03 XEMS              PIC X.                                  IRG00700
          03 XENT              PIC X.                                  IRG00710
          03 XSPF              PIC X.                                  IRG00720
          03 XGWT              PIC XX.                                 IRG00730
          03 XSSC              PIC X.                                  IRG00740
          03 XMAT              PIC XXX.                                IRG00750
        02 AREA-2 REDEFINES AREA-1.                                    IRG00760
          03 ACC               PIC 99999.                              IRG00770
          03 FILLER            PIC X(30).                              IRG00780
             03 SSO            PIC 99999.                              IRG00790
          03 OFG               PIC 999.                                IRG00800
          03 FGN               PIC 9999.                               IRG00810
          03 VGR               PIC 9.                                  IRG00820
          03 SHT               PIC 99.                                 IRG00830
          03 BLT               PIC 999.                                IRG00840
          03 BLW               PIC 99.                                 IRG00850
          03 BLP               PIC 9.                                  IRG00860
          03 BFA               PIC 9.                                  IRG00870
          03 BLC               PIC 9.                                  IRG00880
          03 LSC               PIC 9.                                  IRG00890
              03 LLT           PIC 99.                                 IRG00900
          03 LLC               PIC 9.                                  IRG00910
          03 CGC               PIC 9.                                  IRG00920
          03 AUC               PIC 9.                                  IRG00930
          03 CLT               PIC 999.                                IRG00940
          03 CNG               PIC 99.                                 IRG00950
          03 CAG               PIC 9.                                  IRG00960
              03 CDA           PIC 99.                                 IRG00970
          03 CST               PIC 9.                                  IRG00980
          03 INC               PIC 9.                                  IRG00990
          03 PLT               PIC 99.                                 IRG01000
          03 PTY               PIC 9.                                  IRG01010
          03 PEX               PIC 9.                                  IRG01020
          03 PTH               PIC 9.                                  IRG01030
          03 GRL               PIC 999.                                IRG01040
          03 GRW               PIC 99.                                 IRG01050
          03 SLT               PIC 9.                                  IRG01060
          03 SLC               PIC 9.                                  IRG01070
          03 LCP               PIC 9.                                  IRG01080
          03 APC               PIC 9.                                  IRG01090
          03 APF               PIC 9.                                  IRG01100
          03 ACO               PIC 9.                                  IRG01110
          03 STC               PIC 9.                                  IRG01120
          03 SOC               PIC 9.                                  IRG01130
              03 EMS           PIC 9.                                  IRG01140
          03 ENT               PIC 9.                                  IRG01150
          03 SPF               PIC 9.                                  IRG01160
          03 GWT               PIC 99.                                 IRG01170
          03 SSO               PIC 9.                                  IRG01180
          03 MAT               PIC 999.                                IRG01190
105K FD   PRINT-FILE                                                   IRG01200
105L       LABEL RECORD OMITTED                                        IRG01210
          BLOCK CONTAINS 0 RECORDS                                     IRG01220
          DATA RECORD IS LPAR.                                         IRG01230
      01  LPA                 PIC X(133).                             IRG01240
      FD  TEMP-FILE RECORDING MODE IS F                                IRG01250
          LABEL RECORD STANDARD                                        IRG01260
          BLOCK CONTAINS 0 RECORDS                                     IRG01270
          DATA RECORD IS TEMP-DATA.                                    IRG01280
      01  TEMP-DATA      PIC X(170).                                  IRG01290
```

```
WORKING-STORAGE SECTION.                                                IRG01300
01  FILLER              PIC X(64)  VALUE ALL 'X'.                       IRG01310
01  SAVE-AREAS.                                                         IRG01320
    02 K                PIC 99.                                         IRG01330
    02 I                PIC 99.                                         IRG01340
    02 J                PIC 99.                                         IRG01350
    02 N-PASS           PIC 99.                                         IRG01360
    02 NOUT             PIC 99.                                         IRG01370
    02 SW               PIC 9.                                          IRG01380
    02 NUK              PIC 99.                                         IRG01390
    02 T-NO             PIC 99999.                                      IRG01400
    02 N-CASES          PIC 99999.                                      IRG01410
    02 LACC             PIC 99999 VALUE 0.                              IRG01420
    02 N-LINES          PIC 99.                                         IRG01430
    02 N-PAGE           PIC 99.                                         IRG01440
    02 NLOC             PIC 99 OCCURS 20.                               IRG01450
    02 N-GP             PIC 9 OCCURS 20.                                IRG01460
    02 CRIT             PIC 99999 OCCURS 20.                            IRG01470
    02 NCOM             PIC 9 OCCURS 20.                                IRG01480
    02 N-OUT                 PIC 99 OCCURS 10.                           IRG01490
    02 N-UNK            PIC 99 OCCURS 20.                               IRG01500
    02 COMD.                                                            IRG01510
        03 COM          PIC X OCCURS 12.                                IRG01520
    02 X-CRT            PIC X(5)  JUST RIGHT.                           IRG01530
    02 CRT-1            PIC X.                                          IRG01540
    02 CRT-2            PIC XX.                                         IRG01550
    02 CRT-3            PIC XXX.                                        IRG01560
    02 CRT-4            PIC XXXX.                                       IRG01570
    02 CRT-5            PIC XXXXX.                                      IRG01580
    02 CRT.                                                             IRG01590
        03 N-CRIT       PIC X OCCURS 5.                                 IRG01600
    02 OP.                                                              IRG01610
        03 OP-1         PIC X.                                          IRG01620
        03 OP-2         PIC X.                                          IRG01630
    02 COM.                                                             IRG01640
        03 COM1         PIC X.                                          IRG01650
        03 COM2         PIC X.                                          IRG01660
        03 COM3         PIC X.                                          IRG01670
    02 K-UNK            PIC 99999 OCCURS 20.                            IRG01680
    02 F-2.                                                             IRG01690
        03 N-N          PIC XXX JUST RIGHT.                             IRG01700
        03 FILLER       PIC X VALUE '.'.                                IRG01710
        03 D-N          PIC X.                                          IRG01720
    02 LT-1.                                                            IRG01730
        03 F            PIC X(12) VALUE 'ACC          '.                IRG01740
        03 F            PIC X(12) VALUE 'SS           '.                IRG01750
        03 F            PIC X(12) VALUE 'ORI          '.                IRG01760
        03 F            PIC X(12) VALUE 'FAC          '.                IRG01770
        03 F            PIC X(12) VALUE 'VG           '.                IRG01780
        03 F            PIC X(12) VALUE 'SOHT         '.                IRG01790
        03 F            PIC X(12) VALUE 'BLLT         '.                IRG01800
        03 F            PIC X(12) VALUE 'BLWD         '.                IRG01810
        03 F            PIC X(12) VALUE 'BLPB         '.                IRG01820
        03 F            PIC X(12) VALUE 'BLFA         '.                IRG01830
        03 F            PIC X(12) VALUE 'BLCO         '.                IRG01840
        03 F            PIC X(12) VALUE 'LSCO         '.                IRG01850
        03 F            PIC X(12) VALUE 'LIGLT        '.                IRG01860
        03 F            PIC X(12) VALUE 'LIGCO        '.                IRG01870
        03 F            PIC X(12) VALUE 'CCC          '.                IRG01880
        03 F            PIC X(12) VALUE 'ACC          '.                IRG01890
        03 F            PIC X(12) VALUE 'COLT         '.                IRG01900
        03 F            PIC X(12) VALUE 'COMA         '.                IRG01910
        03 F            PIC X(12) VALUE 'COJA         '.                IRG01920
        03 F            PIC X(12) VALUE 'COJU         '.                IRG01930
        02 F            PIC X(12) VALUE 'COST         '.                IRG01940
        03 F            PIC X(12) VALUE 'TRCC         '.                IRG01950
        03 F            PIC X(12) VALUE 'PLT          '.                IRG01960
        03 F            PIC X(12) VALUE 'PTY          '.                IRG01970
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      03 F              PIC X(12) VALUE 'PEX          '.          IRG01980
      03 F              PIC X(12) VALUE 'PTH          '.          IRG01990
      03 F              PIC X(12) VALUE 'GRLT         '.          IRG02000
      03 F              PIC X(12) VALUE 'GRWD         '.          IRG02010
      03 F              PIC X(12) VALUE 'SLLT         '.          IRG02020
      03 F              PIC X(12) VALUE 'SLGW         '.          IRG02030
      03 F              PIC X(12) VALUE 'LCL          '.          IRG02040
      03 F              PIC X(12) VALUE 'APCL         '.          IRG02050
      03 F              PIC X(12) VALUE 'AWPR         '.          IRG02060
      03 F              PIC X(12) VALUE 'AWCL         '.          IRG02070
      03 F              PIC X(12) VALUE 'STCL         '.          IRG02080
      03 F              PIC X(12) VALUE 'SCCL         '.          IRG02090
      03 F              PIC X(12) VALUE '[illegible]  '.          IRG02100
      03 F              PIC X(12) VALUE '[illegible]  '.          IRG02110
      03 F              PIC X(12) VALUE 'STRF         '.          IRG02120
      03 F              PIC X(12) VALUE 'LDCC         '.          IRG02130
      03 F              PIC X(12) VALUE 'SLW          '.          IRG02140
      03 F              PIC X(12) VALUE 'LST          '.          IRG02150
   02 LT-2 REDEFINES LT-1.                                        IRG02160
      03 DESC           PIC X(12) OCCURS 42.                      IRG02170
   02 LT-3 REDEFINES LT-2.                                        IRG02180
      03 DUMMY          PIC X(22).                                IRG02190
      03 XDESC          PIC X(12) OCCURS 41.                      IRG02200
   02 LT-4.                                                       IRG02210
    04 FILLER PIC X(24) VALUE '  [illegible]              F/O  '.  IRG02220
    04 FILLER PIC X(24) VALUE ' VA[illegible]TY[illegible]LI[illegible]G BLAD[illegible] '.  IRG02230
    04 FILLER PIC X(24) VALUE ' BLADE   BLADE   BLADE '.          IRG02240
    04 FILLER PIC X(24) VALUE ' BLADE  LENGTH LIGHT  '.          IRG02250
    04 FILLER PIC X(24) VALUE ' LIGHT  COLLAR [illegible]ICLE '.  IRG02260
    04 FILLER PIC X(24) VALUE '  COLM   COLM   COLM  '.          IRG02270
    04 FILLER PIC X(24) VALUE '  COLM   COLM  [illegible] '.      IRG02280
    04 FILLER PIC X(24) VALUE ' PARTICLE PARTICLE PARTICLE '.     IRG02290
    04 FILLER PIC X(24) VALUE 'PARTICLE  [illegible]  [illegible] '.  IRG02300
    04 FILLER PIC X(24) VALUE ' [illegible]  [illegible] '.       IRG02310
    04 FILLER PIC X(24) VALUE 'APPCOLOR  [illegible]  [illegible] '.  IRG02320
    04 FILLER PIC X(24) VALUE ' [illegible] '.                    IRG02330
    04 FILLER PIC X(24) VALUE '[illegible]SPEVS[illegible] '.     IRG02340
    04 FILLER PIC X(16) VALUE '                '.                 IRG02350
   02 LT-5 REDEFINES LT-4.                                        IRG02360
      03 HDR-1          PIC X(8) OCCURS 41.                       IRG02370
   02 LT-6.                                                       IRG02380
    04 FILLER PIC X(24) VALUE ' [illegible]  ORIGIN  G.S.[illegible] '.  IRG02390
    04 FILLER PIC X(24) VALUE '  GROUP  HEIGHT  LENGTH '.         IRG02400
    04 FILLER PIC X(24) VALUE ' WIDTH  POLISH FL.ANGLE '.         IRG02410
    04 FILLER PIC X(24) VALUE ' COLOR   COLOR   LENGTH '.         IRG02420
    04 FILLER PIC X(24) VALUE ' COLOR   COLOR   COLOR  '.         IRG02430
    04 FILLER PIC X(24) VALUE '  LENGTH NUMBER  ANGLE  '.         IRG02440
    04 FILLER PIC X(24) VALUE 'DIAMETER-STRENGTH COLOR  '.        IRG02450
    04 FILLER PIC X(24) VALUE ' LENGTH   TYPE  [illegible] '.     IRG02460
    04 FILLER PIC X(24) VALUE 'THREAD   LENGTH  WIDTH '.          IRG02470
    04 FILLER PIC X(24) VALUE ' LENGTH  COLOR   COLOR  '.         IRG02480
    04 FILLER PIC X(24) VALUE ' COLOR  PRESSURE COLOR '.          IRG02490
    04 FILLER PIC X(24) VALUE ' COLOR   COLOR   SIZE  '.          IRG02500
    04 FILLER PIC X(24) VALUE '  TYPE   [illegible]  WEIGHT '.    IRG02510
    04 FILLER PIC X(16) VALUE 'SCHEDCONMATURITY'.                 IRG02520
   02 LT-7 REDEFINES LT-6.                                        IRG02530
      03 HDR-2          PIC X(8) OCCURS 41.                       IRG02540
   02 LT-8              PIC X(12) VALUE '[illegible]'.            IRG02550
   02 LT-9 REDEFINES LT-1.                                        IRG02560
      03 DP-LIT         PIC XX OCCURS 42.                         IRG02570
01 ERROR-SYSOUT.                                                  IRG02580
    02 ERROR-MESSAGE    PIC X(50) VALUE SPACES.                   IRG02590
    02 DATA-ERR         PIC X(80) VALUE SPACES.                   IRG02600
01 HDG-0.                                                         IRG02610
   02 FILLER        PIC X(11) VALUE SPACES.                        IRG02620
   02 FILLER        PIC X(11) VALUE ' DATE - '.                    IRG02630
   02 HDR-DATE      PIC X(8).                                      IRG02640
   02 FILLER        PIC X(70) VALUE SPACES.                        IRG02650
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    02 FILLER            PIC X(6) VALUE 'PAGE: '.
    02 P-CTR             PIC 999.
01  HDG-1.
    02 FILLER            PIC X(25) VALUE SPACES.
    02 TTL-1             PIC X(73).
01  HDG-2.
    02 FILLER            PIC X(25) VALUE SPACES.
    02 TTL-2             PIC X(73).
01  HDG-3.
    02 FILLER            PIC X(25) VALUE SPACES.
    02 TTL-3             PIC X(73).
01  HDG-4.
    02 FILLER            PIC XX VALUE SPACES.
    02 FILLER            PIC X(5) VALUE 'ACCN.'.
     02 F                PIC X(33) VALUE SPACES.
     02 CARMEN1          PIC X(90) VALUE SPACES.
     02 NEMY1 REDEFINES CARMEN1.
        03 F OCCURS 10.
           04 F          PIC X.
           04 LPR1       PIC X(8).
01  HDG-5.
    02 FILLER            PIC XXX VALUE SPACES.
    02 FILLER            PIC XXX VALUE 'NO.'.
     02 F                PIC X(5) VALUE SPACES.
    02 FILLER            PIC X(12) VALUE 'VARIETY NAME'.
     02 F                PIC X(17) VALUE SPACES.
     02 CARMEN2          PIC X(90) VALUE SPACES.
     02 NEMY2 REDEFINES CARMEN2.
        03 F OCCURS 10.
           04 F          PIC X.
           04 LPR2       PIC X(8).
01  DTL-LINE.
    02 FILLER            PIC XX VALUE SPACES.
    02 WACC              PIC X(5).
     02 F                PIC X VALUE SPACE.
    02 WVAR              PIC X(30).
     02 F                PIC X(6) VALUE SPACES.
     02 CARMEN3          PIC X(90) VALUE SPACES.
     02 NEMY3 REDEFINES CARMEN3.
        03 F OCCURS 10.
           04 W-R        PIC X(5).
           04 F          PIC XXXX.
01  HDG-6.
    02 FILLER             PIC X VALUE SPACE.
    02 FILLER            PIC X(40) VALUE ALL '-'.
    02 FILLER            PIC X(18) VALUE ' END OF RETRIEVAL '.
    02 FILLER            PIC X(74) VALUE ALL '-'.
01  END-HD-1.
    02 FILLER            PIC X(7) VALUE SPACES.
    02 FILLER            PIC X(56) VALUE ALL '-'.
01  END-HD-2.
     02 F                PIC X(9) VALUE SPACES.
    02 FILLER            PIC X(32) VALUE
    'SUMMARY OF RETRIEVED INFORMATION'.
01  END-HD-3.
     02 F                PIC X(10) VALUE SPACES.
    02 FILLER            PIC X(31) VALUE
    'NO. OF ACCESSIONS WITH UNKNOWN '.
     02 W-DESC           PIC X(12) VALUE SPACES.
    02 FILLER           PIC XXX VALUE ' = '.
    02 W-UNK             PIC ZZZZ9.
01  END-HD-4.
     02 F                PIC X(10) VALUE SPACES.
    02 E-LIT             PIC X(33).
    02 E-VALUE           PIC ZZZZ9.
PROCEDURE DIVISION.
OPEN-FILE. OPEN INPUT CONTROL-CARD OUTPUT PRINT-FILE.
    MOVE CURRENT-DATE TO RUN-DATE.
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START-HERE. MOVE 0 TO N-PASS NOUT NNK SW T-NC W-CASES P-CTR        IRG03340
    MOVE SPACES TO TTL-1 TTL-2 TTL-3.                              IRG03350
    PERFORM SZ-1 THRU SZ-X VARYING J FROM 1 BY 1 UNTIL J > 10.     IRG03360
    PERFORM SZ-2 THRU SZ-X VARYING J FROM 1 BY 1 UNTIL J > 20.     IRG03370
A0. MOVE 0 TO K.                                                   IRG03380
A1. READ CONTROL-CARD AT END GO TO CLOSE-FILE.                     IRG03390
    MOVE 1 TO I                                                    IRG03400
    IF COMMAND = 'QUERY ' GO TO A2.                                IRG03410
    IF COMMAND = 'OUTPUT' GO TO A7X.                               IRG03420
    IF COMMAND = 'LIST ?' GO TO A10.                               IRG03430
    IF COMMAND = 'TITLE ' GO TO A12.                               IRG03440
    IF COMMAND = 'FINISH' GO TO B1.                                IRG03450
    MOVE ' COMMAND ERROR ENCOUNTERED AT ' TO ERROR-MESSAGE.        IRG03460
    MOVE CONTROL-DATA TO DATA-ERR DISPLAY ERROR-SYSOUT.            IRG03470
    GO TO ERROR-RTN.                                               IRG03480
A2. ADD 1 TO K.                                                    IRG03490
    MOVE SPACES TO COMD.                                           IRG03500
A3. PERFORM A31 THRU A-X2 VARYING J FROM 1 BY 1 UNTIL J > 97.      IRG03510
    PERFORM A21 THRU A-X VARYING J FROM 1 BY 1 UNTIL J > 12.       IRG03520
A4. MOVE ' DESCRIPTOR COMMAND ERROR ENCOUNTERED AT '               IRG03530
    TO ERROR-MESSAGE MOVE CONTROL-DATA TO DATA-ERR                 IRG03540
    DISPLAY ERROR-SYSOUT GO TO ERROR-RTN.                          IRG03550
A4. MOVE J TO NCOD (K) ADD 1 TO I                                  IRG03560
    MOVE X-DATA (I) TO OP-1 ADD 1 TO I MOVE X-DATA (I) TO OP-2.    IRG03570
    PERFORM A41 THRU A-X3 VARYING J FROM 1 BY 1 UNTIL J > 6.       IRG03580
    MOVE ' OPERATOR COMMAND ERROR ENCOUNTERED AT '                 IRG03590
    TO ERROR-MESSAGE MOVE CONTROL-DATA TO DATA-ERR                 IRG03600
    DISPLAY ERROR-SYSOUT GO TO ERROR-RTN.                          IRG03610
A5. MOVE J TO N-OP (K) ADD 2 TO I MOVE SPACES TO X-CRT             IRG03620
    PERFORM A51 THRU A-X4 VARYING J FROM 1 BY 1 UNTIL J > 5.       IRG03630
A6. EXAMINE X-CRT REPLACING LEADING ' ' BY '0'.                    IRG03640
    IF X-CRT IS NUMERIC MOVE X-CRT TO CRIT (K)                     IRG03650
    ELSE MOVE 99999 TO CRIT (K).                                   IRG03660
    ADD 1 TO I IF X-DATA (I) = ' ' MOVE K TO N-PASS                IRG03670
    MOVE 0 TO NCON (K) GO TO A0.                                   IRG03680
    MOVE SPACES TO COR                                             IRG03690
    MOVE X-DATA (I) TO CON1 ADD 1 TO I                             IRG03700
    MOVE X-DATA (I) TO CON2 ADD 1 TO I                             IRG03710
    MOVE X-DATA (I) TO CON3 ADD 2 TO I.                            IRG03720
    IF COR = 'OR ' MOVE 1 TO NCON (K) ELSE MOVE 0 TO NCON (K).     IRG03730
    IF X-DATA (I) = ' ' OR I > 73 GO TO A1.                        IRG03740
    GO TO A2.                                                      IRG03750
A7X. IF KODE = 'X' MOVE 99 TO NOUT GO TO A0.                       IRG03760
A7. MOVE SPACES TO COMD.                                           IRG03770
    PERFORM A71 THRU A-X6 VARYING J FROM 1 BY 1 UNTIL J > 12.      IRG03780
A8. ADD 1 TO NOUT                                                  IRG03790
    PERFORM A81 THRU A-X7 VARYING J FROM 1 BY 1 UNTIL J > 96.      IRG03800
    GO TO A0.                                                      IRG03810
A9. MOVE J TO W-OUT (NOUT) ADD 1 TO I                              IRG03820
    IF X-DATA (I) = ' ' OR I > 72 GO TO A0 ELSE GO TO A9.          IRG03830
A10. MOVE SPACES TO COMD.                                          IRG03840
    ADD 1 TO NNK PERFORM A101 THRU A-X9 VARYING J FROM 1 BY 1      IRG03850
    UNTIL J > 12.                                                  IRG03860
A11.                                                               IRG03870
    PERFORM A111 THRU A-X10 VARYING J FROM 1 BY 1 UNTIL J > 97.    IRG03880
    GO TO A0.                                                      IRG03890
A112. MOVE J TO W-NNK (NNK) ADD 1 TO I                             IRG03900
    IF X-DATA (I) = ' ' OR I > 72 GO TO A1 ELSE GO TO A10.         IRG03910
A12. IF KODE = '1' MOVE TTL TO TTL-1.                              IRG03920
    IF KODE = '2' MOVE TTL TO TTL-2.                               IRG03930
    IF KODE = '3' MOVE TTL TO TTL-3.                               IRG03940
    GO TO A0.                                                      IRG03950
B1. IF NOUT = 99 OPEN OUTPUT TEMP-FILE GO TO B1X.                  IRG03960
    IF NOUT > 0 PERFORM TRANS THRU TR-EX VARYING J FROM 1 BY 1     IRG03970
    UNTIL J > NOUT PERFORM WR-HD THRU WR-EX.                       IRG03980
B1X. OPEN INPUT GEXMPLASM-FILE.                                    IRG03990
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B2. READ GERMPLASM-FILE AT END GO TO END-RTN.                          IRG04000
    IF ACC > EACC MOVE ACC TO EACC.                                    IRG04010
    ADD 1 TO T-NO.                                                     IRG04020
    IF NNK < 1 GO TO B4.                                               IRG04030
    PERFORM B3 THRU CX VARYING J FROM 1 BY 1 UNTIL J > NNK.            IRG04040
B4. IF N-PASS < 1 GO TO B5.                                            IRG04050
    MOVE 0 TO J.                                                       IRG04060
B6. IF J < N-PASS ADD 1 TO J PERFORM B4X THRU DX-1                     IRG04070
    ELSE ADD 1 TO N-CASES GO TO B5.                                    IRG04080
    GO TO B6.                                                          IRG04090
B5. IF NOUT = 99 MOVE GERMPLASM-DATA TO TEMP-DATA                      IRG04100
    WRITE TEMP-DATA GO TO B2.                                          IRG04110
    IF NOUT < 1 GO TO B2 ELSE MOVE XACC TO WACC MOVE VAR TO WVAR.      IRG04120
    PERFORM B5X THRU EX VARYING J FROM 1 BY 1 UNTIL J > NOUT.          IRG04130
    WRITE LPAR FROM DTL-LINE AFTER POSITIONING 1                       IRG04140
    ADD 1 TO N-LINES                                                   IRG04150
    IF N-LINES > 9 MOVE SPACES TO LPAR MOVE 0 TO N-LINES               IRG04160
    WRITE LPAR AFTER POSITIONING 1 ADD 1 TO N-PAGE.                    IRG04170
    IF N-PAGE > 3 MOVE ALL '-' TO LPAR                                 IRG04180
    WRITE LPAR AFTER POSITIONING 2                                     IRG04190
    MOVE SPACES TO LPAR                                                IRG04200
    WRITE LPAR AFTER POSITIONING 2                                     IRG04210
    WRITE LPAR AFTER POSITIONING 3                                     IRG04220
    PERFORM WR-HD THRU WR-EX.                                          IRG04230
    GO TO B2.                                                          IRG04240
A21. MOVE X-DATA (I) TO COM (J).                                       IRG04250
    ADD 1 TO I IF X-DATA (I) = ' ' GO TO A3.                           IRG04260
A-X. EXIT.                                                             IRG04270
A31. IF COMD = DESC (J) GO TO A6.                                      IRG04280
A-X2. EXIT.                                                            IRG04290
A41. IF OP = OP-LIT (J) GO TO A5.                                      IRG04300
A-X3. EXIT.                                                            IRG04310
A51.  MOVE X-DATA (I) TO N-CRIT (J).                                   IRG04320
    ADD 1 TO I IF X-DATA (I) = ' ' NEXT SENTENCE ELSE GO TO A-X4.IRG04330
    IF J = 1 MOVE CRT TO CRT-1 MOVE CRT-1 TO X-CRT GO TO A6.           IRG04340
    IF J = 2 MOVE CRT TO CRT-2 MOVE CRT-2 TO X-CRT GO TO A6.           IRG04350
    IF J = 3 MOVE CRT TO CRT-3 MOVE CRT-3 TO X-CRT GO TO A6.           IRG04360
    IF J = 4 MOVE CRT TO CRT-4 MOVE CRT-4 TO X-CRT GO TO A6.           IRG04370
    IF J = 5 MOVE CRT TO CRT-5 MOVE CRT-5 TO X-CRT GO TO A6.           IRG04380
A-X4. EXIT.                                                            IRG04390
A71. MOVE X-DATA (I) TO COM (J)                                        IRG04400
    ADD 1 TO I IF X-DATA (I) = ' ' GO TO A8.                           IRG04410
A-X6. EXIT.                                                            IRG04420
A81.  IF COMD = XDESC (J) GO TO A9.                                    IRG04430
A-X7. EXIT.                                                            IRG04440
A101. MOVE X-DATA (I) TO COM (J)                                       IRG04450
    ADD 1 TO I IF X-DATA (I) = ' ' GO TO A11.                          IRG04460
A-X9. EXIT.                                                            IRG04470
A111. IF COMD = DESC (J) GO TO A112.                                   IRG04480
A-X10. EXIT.                                                           IRG04490
WR-HD. ADD 1 TO P-CTR MOVE 0 TO N-PAGE N-LINES                         IRG04500
    WRITE LPAR FROM HDG-0 AFTER POSITIONING 0                          IRG04510
    MOVE ALL '-' TO LPAR WRITE LPAR AFTER POSITIONING 1                IRG04520
    MOVE ALL '-' TO LPAR WRITE LPAR AFTER POSITIONING 1                IRG04530
    WRITE LPAR FROM HDG-1 AFTER POSITIONING 2.                         IRG04540
    WRITE LPAR FROM HDG-2 AFTER POSITIONING 1.                         IRG04550
    WRITE LPAR FROM HDG-3 AFTER POSITIONING 1.                         IRG04560
    MOVE SPACES TO LPAR WRITE LPAR AFTER POSITIONING 1.                IRG04570
    MOVE ALL '-' TO LPAR WRITE LPAR AFTER POSITIONING 1.               IRG04580
    WRITE LPAR FROM HDG-4 AFTER POSITIONING 1.                         IRG04590
    WRITE LPAR FROM HDG-5 AFTER POSITIONING 1.                         IRG04600
    MOVE ALL '-' TO LPAR WRITE LPAR AFTER POSITIONING 1.               IRG04610
    MOVE SPACES TO LPAR WRITE LPAR AFTER POSITIONING 1.                IRG04620
WR-EX. EXIT.                                                           IRG04630
TRANS.  MOVE N-OUT (J) TO K MOVE HDR-1 (K) TO LPR1 (J)                 IRG04640
    MOVE HDR-2 (K) TO LPR2 (J).                                        IRG04650
TR-EX. EXIT.                                                           IRG04660
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B3. GO TO C1 C2 C3 C4 C5 C6 C7 C8 C9 Z10 Z11 Z12 C13 C14 C15 C16 IRG04670
    C17 C18 C19 C20 C21 C22 C23 C24 C25 C26 C27 C28 C29 C30 C31  IRG04680
    C32 C33 C34 C35 C36 C37 C38 C39 C40 C41 C42                  IRG04690
    DEPENDING ON N-UNK (J).                                      IRG04700
C1.  IF XACC = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04710
C2.  IF XSSO = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04720
C3.  IF XORG = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04730
C4.  IF XFGN = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04740
C5.  IF XVGR = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04750
C6.  IF XSHT = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04760
C7.  IF XBLT = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04770
C8.  IF XBLW = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04780
C9.  IF XBLP = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04790
Z10. IF XBFA = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04800
Z11. IF XBLC = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04810
Z12. IF XLSC = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04820
C13. IF XLLT = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04830
C14. IF XLLC = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04840
C15. IF XCOC = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04850
C16. IF XAUC = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04860
C17. IF XCLT = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04870
C18. IF XCNJ = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04880
C19. IF XCAG = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04890
C20. IF XCDA = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04900
C21. IF XCST = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04910
C22. IF XINC = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04920
C23. IF XPLT = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04930
C24. IF XPTY = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04940
C25. IF XPEX = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04950
C26. IF XPTH = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04960
C27. IF XGRL = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04970
C28. IF XGRW = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04980
C29. IF XSLT = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG04990
C30. IF XSLC = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG05000
C31. IF XLCR = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG05010
C32. IF XAPC = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG05020
C33. IF XAPR = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG05030
C34. IF XACJ = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG05040
C35. IF XSTC = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG05050
C36. IF XSDC = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG05060
C37. IF XEMS = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG05070
C38. IF XENT = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG05080
C39. IF XSPF = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG05090
C40. IF XGWT = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG05100
C41. IF XSSC = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG05110
C42. IF XMAT = SPACES ADD 1 TO K-UNK (J) GO TO CX ELSE GO TO CX. IRG05120
CX. EXIT.                                                        IRG05130
B4X. GO TO D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14 D15 D16IRG05140
    D17 D18 D19 D20 D21 D22 D23 D24 D25 D26 D27 D28 D29 D30 D31  IRG05150
    D32 D33 D34 D35 D36 D37 D38 D39 D40 D41 D42                  IRG05160
    DEPENDING ON NLOC (J).                                       IRG05170
D1.  IF XACC = SPACES GO TO XXB.                                 IRG05180
    GO TO R11 R12 R13 R14 R15 R16 DEPENDING ON N-JP (J).         IRG05190
R11.  IF ACC = CRIT (J) GO TO DX ELSE GO TO XB.                  IRG05200
R12.  IF ACC < CRIT (J) GO TO DX ELSE GO TO XB.                  IRG05210
R13.  IF ACC > CRIT (J) GO TO DX ELSE GO TO XB.                  IRG05220
R14.  IF ACC < CRIT (J) OR ACC = CRIT (J) GO TO DX ELSE GO TO XB.IRG05230
R15.  IF ACC > CRIT (J) OR ACC = CRIT (J) GO TO DX ELSE GO TO XB.IRG05240
R16.  IF ACC NOT = CRIT (J) GO TO DX ELSE GO TO XB.              IRG05250
D2.  IF XSSO = SPACES GO TO XXB.                                 IRG05260
    EXAMINE XSSO REPLACING ALL ' ' BY '0'.                       IRG05270
    GO TO R21 R22 R23 R24 R25 R26 DEPENDING ON N-JP (J).         IRG05280
R21.  IF SSO = CRIT (J) GO TO DX ELSE GO TO XB.                  IRG05290
R22.  IF SSO < CRIT (J) GO TO DX ELSE GO TO XB.                  IRG05300
R23.  IF SSO > CRIT (J) GO TO DX ELSE GO TO XB.                  IRG05310
R24.  IF SSO < CRIT (J) OR SSO = CRIT (J) GO TO DX ELSE GO TO XB.IRG05320
R25.  IF SSO > CRIT (J) OR SSO = CRIT (J) GO TO DX ELSE GO TO XB.IRG05330
R26.  IF SSO NOT = CRIT (J) GO TO DX ELSE GO TO XB.              IRG05340
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D3.  IF XDKG = SPACES GO TO XX8.                                    IRG05350
     EXAMINE XDKG REPLACING LEADING ' ' BY '0'.                     IRG05360
     GO TO R31 R32 R33 R34 R35 R36 DEPENDING ON N-OP (J).           IRG05370
R31.  IF DKG = CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05380
R32.  IF DKG < CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05390
R33.  IF DKG > CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05400
R34.  IF DKG < CRIT (J) OR DKG = CRIT (J) GO TO DX ELSE GO TO X8.IRG05410
R35.  IF DKG > CRIT (J) OR DKG = CRIT (J) GO TO DX ELSE GO TO X8.IRG05420
R36.  IF DKG NOT = CRIT (J) GO TO DX ELSE GO TO X8.                 IRG05430
D4.  IF XFGN = SPACES GO TO XX8.                                    IRG05440
     EXAMINE XFGN REPLACING LEADING ' ' BY '0'.                     IRG05450
     GO TO R41 R42 R43 R44 R45 R46 DEPENDING ON N-OP (J).           IRG05460
R41.  IF FGN = CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05470
R42.  IF FGN < CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05480
R43.  IF FGN > CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05490
R44.  IF FGN < CRIT (J) OR FGN = CRIT (J) GO TO DX ELSE GO TO X8.IRG05500
R45.  IF FGN > CRIT (J) OR FGN = CRIT (J) GO TO DX ELSE GO TO X8.IRG05510
R46.  IF FGN NOT = CRIT (J) GO TO DX ELSE GO TO X8.                 IRG05520
D5.  IF XVGR = SPACES GO TO XX8.                                    IRG05530
     GO TO R51 R52 R53 R54 R55 R56 DEPENDING ON N-OP (J).           IRG05540
R51.  IF VGR = CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05550
R52.  IF VGR < CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05560
R53.  IF VGR > CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05570
R54.  IF VGR < CRIT (J) OR VGR = CRIT (J) GO TO DX ELSE GO TO X8.IRG05580
R55.  IF VGR > CRIT (J) OR VGR = CRIT (J) GO TO DX ELSE GO TO X8.IRG05590
R56.  IF VGR NOT = CRIT (J) GO TO DX ELSE GO TO X8.                 IRG05600
D6.  IF XSHT = SPACES GO TO XX8.                                    IRG05610
     EXAMINE XSHT REPLACING LEADING ' ' BY '0'.                     IRG05620
     GO TO R61 R62 R63 R64 R65 R66 DEPENDING ON N-OP (J).           IRG05630
R61.  IF SHT = CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05640
R62.  IF SHT < CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05650
R63.  IF SHT > CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05660
R64.  IF SHT < CRIT (J) OR SHT = CRIT (J) GO TO DX ELSE GO TO X8.IRG05670
R65.  IF SHT > CRIT (J) OR SHT = CRIT (J) GO TO DX ELSE GO TO X8.IRG05680
R66.  IF SHT NOT = CRIT (J) GO TO DX ELSE GO TO X8.                 IRG05690
D7.  IF XBLT = SPACES GO TO XX8.                                    IRG05700
     EXAMINE XBLT REPLACING LEADING ' ' BY '0'.                     IRG05710
     GO TO R71 R72 R73 R74 R75 R76 DEPENDING ON N-OP (J).           IRG05720
R71.  IF BLT = CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05730
R72.  IF BLT < CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05740
R73.  IF BLT > CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05750
R74.  IF BLT < CRIT (J) OR BLT = CRIT (J) GO TO DX ELSE GO TO X8.IRG05760
R75.  IF BLT > CRIT (J) OR BLT = CRIT (J) GO TO DX ELSE GO TO X8.IRG05770
R76.  IF BLT NOT = CRIT (J) GO TO DX ELSE GO TO X8.                 IRG05780
D8.  IF XBLW = SPACES GO TO XX8.                                    IRG05790
     EXAMINE XBLW REPLACING LEADING ' ' BY '0'.                     IRG05800
     GO TO R81 R82 R83 R84 R85 R86 DEPENDING ON N-OP (J).           IRG05810
R81.  IF BLW = CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05820
R82.  IF BLW < CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05830
R83.  IF BLW > CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05840
R84.  IF BLW < CRIT (J) OR BLW = CRIT (J) GO TO DX ELSE GO TO X8.IRG05850
R85.  IF BLW > CRIT (J) OR BLW = CRIT (J) GO TO DX ELSE GO TO X8.IRG05860
R86.  IF BLW NOT = CRIT (J) GO TO DX ELSE GO TO X8.                 IRG05870
D9.  IF XBLP = SPACES GO TO XX8.                                    IRG05880
     GO TO R91 R92 R93 R94 R95 R96 DEPENDING ON N-OP (J).           IRG05890
R91.  IF BLP = CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05900
R92.  IF BLP < CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05910
R93.  IF BLP > CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05920
R94.  IF BLP < CRIT (J) OR BLP = CRIT (J) GO TO DX ELSE GO TO X8.IRG05930
R95.  IF BLP > CRIT (J) OR BLP = CRIT (J) GO TO DX ELSE GO TO X8.IRG05940
R96.  IF BLP NOT = CRIT (J) GO TO DX ELSE GO TO X8.                 IRG05950
D10. IF XBFA = SPACES GO TO XX8.                                    IRG05960
     GO TO R101 R102 R103 R104 R105 R106 DEPENDING ON N-OP (J).     IRG05970
R101. IF BFA = CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05980
R102. IF BFA < CRIT (J) GO TO DX ELSE GO TO X8.                     IRG05990
R103. IF BFA > CRIT (J) GO TO DX ELSE GO TO X8.                     IRG06000
R104. IF BFA < CRIT (J) OR BFA = CRIT (J) GO TO DX ELSE GO TO X8.IRG06010
R105. IF BFA > CRIT (J) OR BFA = CRIT (J) GO TO DX ELSE GO TO X8.IRG06020
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R106. IF BFA NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG06030
D11. IF XBLC = SPACES GO TO XXB.                                   IRG06040
    GO TO R111 R112 R113 R114 R115 R116 DEPENDING ON N-OP (J).     IRG06050
R111. IF BLC = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06060
R112. IF BLC < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06070
R113. IF BLC > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06080
R114. IF BLC < CRIT (J) OR BLC = CRIT (J) GO TO DX ELSE GO TO XB.IRG06090
R115. IF BLC > CRIT (J) OR BLC = CRIT (J) GO TO DX ELSE GO TO XB.IRG06100
R116. IF BLC NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG06110
D12. IF XLSC = SPACES GO TO XXB.                                   IRG06120
    GO TO R121 R122 R123 R124 R125 R126 DEPENDING ON N-OP (J).     IRG06130
R121. IF LSC = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06140
R122. IF LSC < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06150
R123. IF LSC > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06160
R124. IF LSC < CRIT (J) OR LSC = CRIT (J) GO TO DX ELSE GO TO XB.IRG06170
R125. IF LSC > CRIT (J) OR LSC = CRIT (J) GO TO DX ELSE GO TO XB.IRG06180
R126. IF LSC NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG06190
D13. IF XLLT = SPACES GO TO XXB.                                   IRG06200
    EXAMINE XLLT REPLACING LEADING ' ' BY '0'.                     IRG06210
    GO TO R131 R132 R133 R134 R135 R136 DEPENDING ON N-OP (J).     IRG06220
R131. IF LLT = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06230
R132. IF LLT < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06240
R133. IF LLT > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06250
R134. IF LLT < CRIT (J) OR LLT = CRIT (J) GO TO DX ELSE GO TO XB.IRG06260
R135. IF LLT > CRIT (J) OR LLT = CRIT (J) GO TO DX ELSE GO TO XB.IRG06270
R136. IF LLT NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG06280
D14. IF XLLC = SPACES GO TO XXB.                                   IRG06290
    GO TO R141 R142 R143 R144 R145 R146 DEPENDING ON N-OP (J).     IRG06300
R141. IF LLC = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06310
R142. IF LLC < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06320
R143. IF LLC > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06330
R144. IF LLC < CRIT (J) OR LLC = CRIT (J) GO TO DX ELSE GO TO XB.IRG06340
R145. IF LLC > CRIT (J) OR LLC = CRIT (J) GO TO DX ELSE GO TO XB.IRG06350
R146. IF LLC NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG06360
D15. IF XCUC = SPACES GO TO XXB.                                   IRG06370
    GO TO R151 R152 R153 R154 R155 R156 DEPENDING ON N-OP (J).     IRG06380
R151. IF CUC = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06390
R152. IF CUC < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06400
R153. IF CUC > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06410
R154. IF CUC < CRIT (J) OR CUC = CRIT (J) GO TO DX ELSE GO TO XB.IRG06420
R155. IF CUC > CRIT (J) OR CUC = CRIT (J) GO TO DX ELSE GO TO XB.IRG06430
R156. IF CUC NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG06440
D16. IF XAUC = SPACES GO TO XXB.                                   IRG06450
    GO TO R161 R162 R163 R164 R165 R166 DEPENDING ON N-OP (J).     IRG06460
R161. IF AUC = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06470
R162. IF AUC < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06480
R163. IF AUC > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06490
R164. IF AUC < CRIT (J) OR AUC = CRIT (J) GO TO DX ELSE GO TO XB.IRG06500
R165. IF AUC > CRIT (J) OR AUC = CRIT (J) GO TO DX ELSE GO TO XB.IRG06510
R166. IF AUC NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG06520
D17. IF XCLT = SPACES GO TO XXB.                                   IRG06530
    EXAMINE XCLT REPLACING LEADING ' ' BY '0'.                     IRG06540
    GO TO R171 R172 R173 R174 R175 R176 DEPENDING ON N-OP (J).     IRG06550
R171. IF CLT = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06560
R172. IF CLT < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06570
R173. IF CLT > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06580
R174. IF CLT < CRIT (J) OR CLT = CRIT (J) GO TO DX ELSE GO TO XB.IRG06590
R175. IF CLT > CRIT (J) OR CLT = CRIT (J) GO TO DX ELSE GO TO XB.IRG06600
R176. IF CLT NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG06610
D18. IF XCNU = SPACES GO TO XXB.                                   IRG06620
    EXAMINE XCNU REPLACING LEADING ' ' BY '0'.                     IRG06630
    GO TO R181 R182 R183 R184 R185 R186 DEPENDING ON N-OP (J).     IRG06640
R181. IF CNU = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06650
R182. IF CNU < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06660
R183. IF CNU > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG06670
R184. IF CNU < CRIT (J) OR CNU = CRIT (J) GO TO DX ELSE GO TO XB.IRG06680
R185. IF CNU > CRIT (J) OR CNU = CRIT (J) GO TO DX ELSE GO TO XB.IRG06690
R186. IF CNU NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG06700
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D19. IF XCAG = SPACES GO TO XXB.                                    IRG06710
    GO TO R191 R192 R193 R194 R195 R196 DEPENDING ON N-OP (J).      IRG06720
R191. IF CAG = CRIT (J) GO TO DX ELSE GO TO XB.                     IRG06730
R192. IF CAG < CRIT (J) GO TO DX ELSE GO TO XB.                     IRG06740
R193. IF CAG > CRIT (J) GO TO DX ELSE GO TO XB.                     IRG06750
R194. IF CAG < CRIT (J) OR CAG = CRIT (J) GO TO DX ELSE GO TO XB.IRG06760
R195. IF CAG > CRIT (J) OR CAG = CRIT (J) GO TO DX ELSE GO TO XB.IRG06770
R196. IF CAG NOT = CRIT (J) GO TO DX ELSE GO TO XB.                 IRG06780
D20. IF XCDA = SPACES GO TO XXB.                                    IRG06790
    EXAMINE XCDA REPLACING LEADING ' ' BY '0'.                      IRG06800
    GO TO R201 R202 R203 R204 R205 R206 DEPENDING ON N-OP (J).      IRG06810
R201. IF CDA = CRIT (J) GO TO DX ELSE GO TO XB.                     IRG06820
R202. IF CDA < CRIT (J) GO TO DX ELSE GO TO XB.                     IRG06830
R203. IF CDA > CRIT (J) GO TO DX ELSE GO TO XB.                     IRG06840
R204. IF CDA < CRIT (J) OR CDA = CRIT (J) GO TO DX ELSE GO TO XB.IRG06850
R205. IF CDA > CRIT (J) OR CDA = CRIT (J) GO TO DX ELSE GO TO XB.IRG06860
R206. IF CDA NOT = CRIT (J) GO TO DX ELSE GO TO XB.                 IRG06870
D21. IF XCST = SPACES GO TO XXB.                                    IRG06880
    GO TO R211 R212 R213 R214 R215 R216 DEPENDING ON N-OP (J).      IRG06890
R211. IF CST = CRIT (J) GO TO DX ELSE GO TO XB.                     IRG06900
R212. IF CST < CRIT (J) GO TO DX ELSE GO TO XB.                     IRG06910
R213. IF CST > CRIT (J) GO TO DX ELSE GO TO XB.                     IRG06920
R214. IF CST < CRIT (J) OR CST = CRIT (J) GO TO DX ELSE GO TO XB.IRG06930
R215. IF CST > CRIT (J) OR CST = CRIT (J) GO TO DX ELSE GO TO XB.IRG06940
R216. IF CST NOT = CRIT (J) GO TO DX ELSE GO TO XB.                 IRG06950
D22. IF XINC = SPACES GO TO XXB.                                    IRG06960
    GO TO R221 R222 R223 R224 R225 R226 DEPENDING ON N-OP (J).      IRG06970
R221. IF INC = CRIT (J) GO TO DX ELSE GO TO XB.                     IRG06980
R222. IF INC < CRIT (J) GO TO DX ELSE GO TO XB.                     IRG06990
R223. IF INC > CRIT (J) GO TO DX ELSE GO TO XB.                     IRG07000
R224. IF INC < CRIT (J) OR INC = CRIT (J) GO TO DX ELSE GO TO XB.IRG07010
R225. IF INC > CRIT (J) OR INC = CRIT (J) GO TO DX ELSE GO TO XB.IRG07020
R226. IF INC NOT = CRIT (J) GO TO DX ELSE GO TO XB.                 IRG07030
D23. IF XPLT = SPACES GO TO XXB.                                    IRG07040
    EXAMINE XPLT REPLACING LEADING ' ' BY '0'.                      IRG07050
    GO TO R231 R232 R233 R234 R235 R236 DEPENDING ON N-OP (J).      IRG07060
R231. IF PLT = CRIT (J) GO TO DX ELSE GO TO XB.                     IRG07070
R232. IF PLT < CRIT (J) GO TO DX ELSE GO TO XB.                     IRG07080
R233. IF PLT > CRIT (J) GO TO DX ELSE GO TO XB.                     IRG07090
R234. IF PLT < CRIT (J) OR PLT = CRIT (J) GO TO DX ELSE GO TO XB.IRG07100
R235. IF PLT > CRIT (J) OR PLT = CRIT (J) GO TO DX ELSE GO TO XB.IRG07110
R236. IF PLT NOT = CRIT (J) GO TO DX ELSE GO TO XB.                 IRG07120
D24. IF XPTY = SPACES GO TO XXB.                                    IRG07130
    GO TO R241 R242 R243 R244 R245 R246 DEPENDING ON N-OP (J).      IRG07140
R241. IF PTY = CRIT (J) GO TO DX ELSE GO TO XB.                     IRG07150
R242. IF PTY < CRIT (J) GO TO DX ELSE GO TO XB.                     IRG07160
R243. IF PTY > CRIT (J) GO TO DX ELSE GO TO XB.                     IRG07170
R244. IF PTY < CRIT (J) OR PTY = CRIT (J) GO TO DX ELSE GO TO XB.IRG07180
R245. IF PTY > CRIT (J) OR PTY = CRIT (J) GO TO DX ELSE GO TO XB.IRG07190
R246. IF PTY NOT = CRIT (J) GO TO DX ELSE GO TO XB.                 IRG07200
D25. IF XPEX = SPACES GO TO XXB.                                    IRG07210
    GO TO R251 R252 R253 R254 R255 R256 DEPENDING ON N-OP (J).      IRG07220
R251. IF PEX = CRIT (J) GO TO DX ELSE GO TO XB.                     IRG07230
R252. IF PEX < CRIT (J) GO TO DX ELSE GO TO XB.                     IRG07240
R253. IF PEX > CRIT (J) GO TO DX ELSE GO TO XB.                     IRG07250
R254. IF PEX < CRIT (J) OR PEX = CRIT (J) GO TO DX ELSE GO TO XB.IRG07260
R255. IF PEX > CRIT (J) OR PEX = CRIT (J) GO TO DX ELSE GO TO XB.IRG07270
R256. IF PEX NOT = CRIT (J) GO TO DX ELSE GO TO XB.                 IRG07280
D26. IF XPTH = SPACES GO TO XXB.                                    IRG07290
    GO TO R261 R262 R263 R264 R265 R266 DEPENDING ON N-OP (J).      IRG07300
R261. IF PTH = CRIT (J) GO TO DX ELSE GO TO XB.                     IRG07310
R262. IF PTH < CRIT (J) GO TO DX ELSE GO TO XB.                     IRG07320
R263. IF PTH > CRIT (J) GO TO DX ELSE GO TO XB.                     IRG07330
R264. IF PTH < CRIT (J) OR PTH = CRIT (J) GO TO DX ELSE GO TO XB.IRG07340
R265. IF PTH > CRIT (J) OR PTH = CRIT (J) GO TO DX ELSE GO TO XB.IRG07350
R266. IF PTH NOT = CRIT (J) GO TO DX ELSE GO TO XB.                 IRG07360
D27. IF XGRL = SPACES GO TO XXB.                                    IRG07370
    EXAMINE XGRL REPLACING LEADING ' ' BY '0'.                      IRG07380
    GO TO R271 R272 R273 R274 R275 R276 DEPENDING ON N-OP (J).      IRG07390
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R271. IF GRL = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07430
R272. IF GRL < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07410
R273. IF GRL > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07420
R274. IF GRL < CRIT (J) OR GRL = CRIT (J) GO TO DX ELSE GO TO XB.IRG07430
R275. IF GRL > CRIT (J) OR GRL = CRIT (J) GO TO DX ELSE GO TO XB.IRG07440
R276. IF GRL NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG07450
D28. IF XGRW = SPACES GO TO XXB.                                   IRG07460
    EXAMINE XGRW REPLACING LEADING ' ' BY '0'.                     IRG07470
    GO TO R281 R282 R283 R284 R285 R286 DEPENDING ON N-OP (J).     IRG07480
R281. IF GRW = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07490
R282. IF GRW < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07500
R283. IF GRW > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07510
R284. IF GRW < CRIT (J) OR GRW = CRIT (J) GO TO DX ELSE GO TO XB.IRG07520
R285. IF GRW > CRIT (J) OR GRW = CRIT (J) GO TO DX ELSE GO TO XB.IRG07530
R286. IF GRW NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG07540
D29. IF XSLT = SPACES GO TO XXB.                                   IRG07550
    GO TO R291 R292 R293 R294 R295 R296 DEPENDING ON N-OP (J).     IRG07560
R291. IF SLT = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07570
R292. IF SLT < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07580
R293. IF SLT > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07590
R294. IF SLT < CRIT (J) OR SLT = CRIT (J) GO TO DX ELSE GO TO XB.IRG07600
R295. IF SLT > CRIT (J) OR SLT = CRIT (J) GO TO DX ELSE GO TO XB.IRG07610
R296. IF SLT NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG07620
D30. IF XSLC = SPACES GO TO XXB.                                   IRG07630
    GO TO R301 R302 R303 R304 R305 R306 DEPENDING ON N-OP (J).     IRG07640
R301. IF SLC = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07650
R302. IF SLC < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07660
R303. IF SLC > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07670
R304. IF SLC < CRIT (J) OR SLC = CRIT (J) GO TO DX ELSE GO TO XB.IRG07680
R305. IF SLC > CRIT (J) OR SLC = CRIT (J) GO TO DX ELSE GO TO XB.IRG07690
R306. IF SLC NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG07700
D31. IF XLCR = SPACES GO TO XXB.                                   IRG07710
    GO TO R311 R312 R313 R314 R315 R316 DEPENDING ON N-OP (J).     IRG07720
R311. IF LCR = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07730
R312. IF LCR < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07740
R313. IF LCR > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07750
R314. IF LCR < CRIT (J) OR LCR = CRIT (J) GO TO DX ELSE GO TO XB.IRG07760
R315. IF LCR > CRIT (J) OR LCR = CRIT (J) GO TO DX ELSE GO TO XB.IRG07770
R316. IF LCR NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG07780
D32. IF XAPC = SPACES GO TO XXB.                                   IRG07790
    GO TO R321 R322 R323 R324 R325 R326 DEPENDING ON N-OP (J).     IRG07800
R321. IF APC = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07810
R322. IF APC < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07820
R323. IF APC > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07830
R324. IF APC < CRIT (J) OR APC = CRIT (J) GO TO DX ELSE GO TO XB.IRG07840
R325. IF APC > CRIT (J) OR APC = CRIT (J) GO TO DX ELSE GO TO XB.IRG07850
R326. IF APC NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG07860
D33. IF XAPR = SPACES GO TO XXB.                                   IRG07870
    GO TO R331 R332 R333 R334 R335 R336 DEPENDING ON N-OP (J).     IRG07880
R331. IF APR = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07890
R332. IF APR < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07900
R333. IF APR > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07910
R334. IF APR < CRIT (J) OR APR = CRIT (J) GO TO DX ELSE GO TO XB.IRG07920
R335. IF APR > CRIT (J) OR APR = CRIT (J) GO TO DX ELSE GO TO XB.IRG07930
R336. IF APR NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG07940
D34. IF XALG = SPACES GO TO XXB.                                   IRG07950
    GO TO R341 R342 R343 R344 R345 R346 DEPENDING ON N-OP (J).     IRG07960
R341. IF ALG = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07970
R342. IF ALG < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07980
R343. IF ALG > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG07990
R344. IF ALG < CRIT (J) OR ALG = CRIT (J) GO TO DX ELSE GO TO XB.IRG08000
R345. IF ALG > CRIT (J) OR ALG = CRIT (J) GO TO DX ELSE GO TO XB.IRG08010
R346. IF ALG NOT = CRIT (J) GO TO DX ELSE GO TO XB.                IRG08020
D35. IF XSTC = SPACES GO TO XXB.                                   IRG08030
    GO TO R351 R352 R353 R354 R355 R356 DEPENDING ON N-OP (J).     IRG08040
R351. IF STC = CRIT (J) GO TO DX ELSE GO TO XB.                    IRG08050
R352. IF STC < CRIT (J) GO TO DX ELSE GO TO XB.                    IRG08060
R353. IF STC > CRIT (J) GO TO DX ELSE GO TO XB.                    IRG08070
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R354. IF STC < CRIT (J) OR STC = CRIT (J) GO TO DX ELSE GO TO XB.I-G00060
R355. IF STC > CRIT (J) OR STC = CRIT (J) GO TO DX ELSE GO TO XB.I-G00090
R356. IF STC NOT = CRIT (J) GO TO DX ELSE GO TO XB.                I-G00100
D36. IF XSDC = SPACES GO TO XXB.                                   I-G00110
    GO TO R361 R362 R363 R364 R365 R366 DEPENDING ON W-OP (J).     I-G00120
R361. IF SDC = CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00130
R362. IF SDC < CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00140
R363. IF SDC > CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00150
R364. IF SDC < CRIT (J) OR SDC = CRIT (J) GO TO DX ELSE GO TO XB.I-G00160
R365. IF SDC > CRIT (J) OR SDC = CRIT (J) GO TO DX ELSE GO TO XB.I-G00170
R366. IF SDC NOT = CRIT (J) GO TO DX ELSE GO TO XB.                I-G00180
D37. IF XEMS = SPACES GO TO XXB.                                   I-G00190
    GO TO R371 R372 R373 R374 R375 R376 DEPENDING ON W-OP (J).     I-G00200
R371. IF EMS = CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00210
R372. IF EMS < CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00220
R373. IF EMS > CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00230
R374. IF EMS < CRIT (J) OR EMS = CRIT (J) GO TO DX ELSE GO TO XB.I-G00240
R375. IF EMS > CRIT (J) OR EMS = CRIT (J) GO TO DX ELSE GO TO XB.I-G00250
R376. IF EMS NOT = CRIT (J) GO TO DX ELSE GO TO XB.                I-G00260
D38. IF XCNT = SPACES GO TO XXB.                                   I-G00270
    GO TO R381 R382 R383 R384 R385 R386 DEPENDING ON W-OP (J).     I-G00280
R381. IF CNT = CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00290
R382. IF CNT < CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00300
R383. IF CNT > CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00310
R384. IF CNT < CRIT (J) OR CNT = CRIT (J) GO TO DX ELSE GO TO XB.I-G00320
R385. IF CNT > CRIT (J) OR CNT = CRIT (J) GO TO DX ELSE GO TO XB.I-G00330
R386. IF CNT NOT = CRIT (J) GO TO DX ELSE GO TO XB.                I-G00340
D39. IF XSPF = SPACES GO TO XXB.                                   I-G00350
    GO TO R391 R392 R393 R394 R395 R396 DEPENDING ON W-OP (J).     I-G00360
R391. IF SPF = CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00370
R392. IF SPF < CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00380
R393. IF SPF > CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00390
R394. IF SPF < CRIT (J) OR SPF = CRIT (J) GO TO DX ELSE GO TO XB.I-G00400
R395. IF SPF > CRIT (J) OR SPF = CRIT (J) GO TO DX ELSE GO TO XB.I-G00410
R396. IF SPF NOT = CRIT (J) GO TO DX ELSE GO TO XB.                I-G00420
D40. IF XGWT = SPACES GO TO XXB.                                   I-G00430
    EXAMINE XGWT REPLACING LEADING ' ' BY '0'.                     I-G00440
    GO TO R401 R402 R403 R404 R405 R406 DEPENDING ON W-OP (J).     I-G00450
R401. IF GWT = CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00460
R402. IF GWT < CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00470
R403. IF GWT > CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00480
R404. IF GWT < CRIT (J) OR GWT = CRIT (J) GO TO DX ELSE GO TO XB.I-G00490
R405. IF GWT > CRIT (J) OR GWT = CRIT (J) GO TO DX ELSE GO TO XB.I-G00500
R406. IF GWT NOT = CRIT (J) GO TO DX ELSE GO TO XB.                I-G00510
D41. IF XSSC = SPACES GO TO XXB.                                   I-G00520
    GO TO R411 R412 R413 R414 R415 R416 DEPENDING ON W-OP (J).     I-G00530
R411. IF SSC = CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00540
R412. IF SSC < CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00550
R413. IF SSC > CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00560
R414. IF SSC < CRIT (J) OR SSC = CRIT (J) GO TO DX ELSE GO TO XB.I-G00570
R415. IF SSC > CRIT (J) OR SSC = CRIT (J) GO TO DX ELSE GO TO XB.I-G00580
R416. IF SSC NOT = CRIT (J) GO TO DX ELSE GO TO XB.                I-G00590
D42. IF XMAT = SPACES GO TO XXB.                                   I-G00600
    EXAMINE XMAT REPLACING ALL ' ' BY '0'.                         I-G00610
    GO TO R421 R422 R423 R424 R425 R426 DEPENDING ON W-OP (J).     I-G00620
R421. IF MAT = CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00630
R422. IF MAT < CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00640
R423. IF MAT > CRIT (J) GO TO DX ELSE GO TO XB.                    I-G00650
R424. IF MAT < CRIT (J) OR MAT = CRIT (J) GO TO DX ELSE GO TO XB.I-G00660
R425. IF MAT > CRIT (J) OR MAT = CRIT (J) GO TO DX ELSE GO TO XB.I-G00670
R426. IF MAT NOT = CRIT (J) GO TO DX ELSE GO TO XB.                I-G00680
XXB. IF CRIT (J) = 9999 GO TO DX.                                  I-G00690
XB. IF NCON (J) = 0 GO TO DX ELSE GO TO DX-1.                      I-G00700
DX. IF NCON (J) = 0 GO TO DX-1.                                    I-G00710
    ADD 1 TO J GO TO DX.                                           I-G00720
DX-1. EXIT.                                                        I-G00730
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85X. GO TO E1 E2 E3 04 E5 E6 E7 08 09  10  11 E12  13  14  15 E16IRG08740
     E17  18 E19  20  21 E22  23  24  25 E26 E27  28  29  30  31  IRG08750
      32  33  34  35  36  37  38 E39  40 E41                      IRG08760
     DEPENDING ON N-OUT (J).                                      IRG08770
E1.   EXAMINE XSSD REPLACING LEADING '0' BY ' '                   IRG08780
     MOVE      XSSD TO W-R (J) GO TO EX.                          IRG08790
E2.   EXAMINE XORG REPLACING LEADING '0' BY ' '                   IRG08800
     MOVE      XORG TO W-R (J) GO TO EX.                          IRG08810
E3.   EXAMINE XFGN REPLACING LEADING '0' BY ' '                   IRG08820
     MOVE      XFGN TO W-R (J) GO TO EX.                          IRG08830
04.  MOVE      XVGR TO W-R (J) GO TO EX.                          IRG08840
E5.   EXAMINE XSHT REPLACING LEADING '0' BY ' '                   IRG08850
     MOVE      XSHT TO W-R (J) GO TO EX.                          IRG08860
E6.   EXAMINE XBLT REPLACING LEADING '0' BY ' '                   IRG08870
     MOVE      XBLT TO W-R (J) GO TO EX.                          IRG08880
E7.  IF XBLW = SPACES MOVE XBLW TO W-R (J) GO TO EX ELSE          IRG08890
      EXAMINE XBLW REPLACING LEADING '0' BY ' '                   IRG08900
     MOVE CORR XBLW TO F-2 MOVE F-2 TO W-R (J) GO TO EX.          IRG08910
08.  MOVE      XBLP TO W-R (J) GO TO EX.                          IRG08920
09.  MOVE      XBFA TO W-R (J) GO TO EX.                          IRG08930
10.  MOVE      XBLC TO W-R (J) GO TO EX.                          IRG08940
11.  MOVE      XLSC TO W-R (J) GO TO EX.                          IRG08950
E12. EXAMINE XLLT REPLACING LEADING '0' BY ' '                    IRG08960
     MOVE      XLLT TO W-R (J) GO TO EX.                          IRG08970
13.  MOVE      XLLC TO W-R (J) GO TO EX.                          IRG08980
14.  MOVE      XCOC TO W-R (J) GO TO EX.                          IRG08990
15.  MOVE      XAUC TO W-R (J) GO TO EX.                          IRG09000
E16. EXAMINE XCLT REPLACING LEADING '0' BY ' '                    IRG09010
     MOVE      XCLT TO W-R (J) GO TO EX.                          IRG09020
E17. EXAMINE XCNC REPLACING LEADING '0' BY ' '                    IRG09030
     MOVE      XCNC TO W-R (J) GO TO EX.                          IRG09040
18.  MOVE      XCAG TO W-R (J) GO TO EX.                          IRG09050
E19. EXAMINE XCDA REPLACING LEADING '0' BY ' '                    IRG09060
     MOVE      XCDA TO W-R (J) GO TO EX.                          IRG09070
20.  MOVE      XCST TO W-R (J) GO TO EX.                          IRG09080
21.  MOVE      XINC TO W-R (J) GO TO EX.                          IRG09090
E22. EXAMINE XPLT REPLACING LEADING '0' BY ' '                    IRG09100
     MOVE      XPLT TO W-R (J) GO TO EX.                          IRG09110
23.  MOVE      XPTY TO W-R (J) GO TO EX.                          IRG09120
24.  MOVE      XPEX TO W-R (J) GO TO EX.                          IRG09130
25.  MOVE      XPTH TO W-R (J) GO TO EX.                          IRG09140
E26. IF XGRL = SPACES MOVE XGRL TO W-R (J) GO TO EX ELSE          IRG09150
      EXAMINE XGRL REPLACING LEADING '0' BY ' '                   IRG09160
     MOVE CORR XGRL TO F-2 MOVE F-2 TO W-R (J) GO TO EX.          IRG09170
E27. IF XGRW = SPACES MOVE XGRW TO W-R (J) GO TO EX ELSE          IRG09180
      EXAMINE XGRW REPLACING LEADING '0' BY ' '                   IRG09190
     MOVE CORR XGRW TO F-2 MOVE F-2 TO W-R (J) GO TO EX.          IRG09200
28.  MOVE      XSLT TO W-R (J) GO TO EX.                          IRG09210
29.  MOVE      XSLC TO W-R (J) GO TO EX.                          IRG09220
30.  MOVE      XLCR TO W-R (J) GO TO EX.                          IRG09230
31.  MOVE      XAPC TO W-R (J) GO TO EX.                          IRG09240
32.  MOVE      XAPR TO W-R (J) GO TO EX.                          IRG09250
33.  MOVE      XACO TO W-R (J) GO TO EX.                          IRG09260
34.  MOVE      XSTC TO W-R (J) GO TO EX.                          IRG09270
35.  MOVE      XSDC TO W-R (J) GO TO EX.                          IRG09280
36.  MOVE      XEMS TO W-R (J) GO TO EX.                          IRG09290
37.  MOVE      XEMT TO W-R (J) GO TO EX.                          IRG09300
38.  MOVE      XSPF TO W-R (J) GO TO EX.                          IRG09310
E39. EXAMINE XGWT REPLACING LEADING '0' BY ' '                    IRG09320
     MOVE      XGWT TO W-R (J) GO TO EX.                          IRG09330
40.  MOVE      XSSC TO W-R (J) GO TO EX.                          IRG09340
E41. EXAMINE XMAT REPLACING LEADING '0' BY ' '                    IRG09350
     MOVE      XMAT TO W-R (J) GO TO EX.                          IRG09360
EX.  EXIT.                                                        IRG09370
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END-RTN. IF NOUT = 99 CLOSE TEMP-FILE ELSE IF NOUT > 0                IRG09380
    WRITE LPAR FROM HDG-0 AFTER POSITIONING 2.                        IRG09390
    ADD 1 TO P-CTR                                                    IRG09400
    WRITE LPAR FROM HDG-0 AFTER POSITIONING 0.                        IRG09410
    WRITE LPAR FROM END-HD-1 AFTER POSITIONING  3.                    IRG09420
    WRITE LPAR FROM END-HD-2 AFTER POSITIONING  1.                    IRG09430
    WRITE LPAR FROM END-HD-1 AFTER POSITIONING  1.                    IRG09440
    MOVE SPACES TO LPAR WRITE LPAR AFTER POSITIONING 1.               IRG09450
EN. IF NNK > 0 PERFORM EN-1 THRU EN-X                                 IRG09460
    VARYING J FROM 1 BY 1 UNTIL J > NNK.                              IRG09470
    MOVE N-CASES TO E-VALUE                                           IRG09480
    MOVE  'NO. OF ACCESSIONS SATISFYING QUERY  = ' TO E-LIT.          IRG09490
    WRITE LPAR FROM END-HD-4 AFTER POSITIONING 1.                     IRG09500
    MOVE 'NO. OF ACCESSIONS IN THE DATA BANK  = ' TO E-LIT.           IRG09510
    MOVE T-NO  TO E-VALUE                                             IRG09520
    WRITE LPAR FROM END-HD-4 AFTER POSITIONING 1.                     IRG09530
    MOVE 'LAST ACCESSION NO. IN THE DATA BANK = ' TO E-LIT.           IRG09540
    MOVE EACC TO E-VALUE.                                             IRG09550
    WRITE LPAR FROM END-HD-4 AFTER POSITIONING 1.                     IRG09560
    WRITE LPAR FROM END-HD-1 AFTER POSITIONING 2.                     IRG09570
    CLOSE GERMPLASM-FILE.                                             IRG09580
    GO TO START-HERE.                                                 IRG09590
EN-1. MOVE N-UNK (J) TO K  MOVE DESC (K) TO W-DESC                    IRG09600
    MOVE K-UNK (J) TO W-UNK                                           IRG09610
    WRITE LPAR FROM END-HD-3  AFTER POSITIONING 1.                    IRG09620
EN-X. EXIT.                                                           IRG09630
SZ-1. MOVE SPACES TO LPR1 (J) LPR2 (J) W-R (J).                       IRG09640
SZ-X. EXIT.                                                           IRG09650
SZ-2.  MOVE 0 TO K-UNK (J).                                           IRG09660
SZ-X.  EXIT.                                                          IRG09670
ERROR-RTN. MOVE ' EXECUTION TERMINATING DUE TO AN IRRECOVERABLE EIRG09680
-    'ERROR'  TO ERROR-SYSOUT DISPLAY ERROR-SYSOUT.                   IRG09690
CLOSE-FILE. CLOSE PRINT-FILE CONTROL-CARD.                            IRG09700
    STOP RUN.                                                         IRG09710
                                                                      IRG09720
```

**Appendix II: Procedures for the Preparation of the Retrieval Control Cards**

1. QUERY card. The format of a QUERY card is as follows:

| | | |
|---|---|---|
| Columns 1 - 5 | : | coded with the keyword QUERY |
| Columns 8 - 80 | : | coded with the criterion descriptors, logical operators and criterion values. |

As many QUERY cards as needed are allowed. The keywords for the criterion descriptors must follow exactly those listed in Fig. 1. The logical operators allowed are EQ = equal to ; LT = less than ; GE = greater than ; LE = less than or equal to ; GE = greater than or equal to ; NE = not equal to. The logical connectors could only be either "AND" or "OR ß" (ß refers to blank).

One space is the delimiter between criterion descriptor, logical operator, criterion value and logical connector. When more than one QUERY cards is required, every card except the last must end with a logical operator

An example of QUERY cards, used to retrieve accessions in the germplasm bank that are Indica (coded as 1; IRRI, 1970), that have culm length greater than 150 cm, grain length greater than 6.5 mm, with maturity of more than 160 days and are resistant to Blast and Bacterial leaf blight, is shown below:

QUERY VG EQ 1 AND CULT GT 150 AND GRLT GT 65 AND MAT GT 160 AND GBB LE 4 AND

QUERY GBL LE 4

2. LIST? card. The format of a LIST? card is as follows:

| | | |
|---|---|---|
| Columns 1 - 6 | : | coded with the keyword LIST? |
| Columns 8 - 80 | : | coded with the list of descriptors that need to have their "unknowns" counted. |

As many LIST? cards as needed are allowed. The same keywords for criterion descriptors used for QUERY cards are used here.

Descriptors in the LIST? card are separated from one another by a blank space. The name of one descriptor cannot be separated in more than one card. For example, to count the unknowns for variety group, culm length, grain length, maturity, bacterial blight, and blast, a LIST? card is as follows:

LIST ? VG CULT GRLT MAT GBB GBL

3. OUTPUT card. The keyword OUTPUT is coded in columns 1-6. For columns 8-80, the rules and format are the same as those described earlier for LIST? card. Accession number and accession name of the retrieved accessions are printed automatically and need not be specified in the OUTPUT card. For example, to print values for variety group, culm length, grain length, maturity, bacterial blight, and blast of the retrieved accessions, the OUTPUT card is prepared as follows:

OUTPUT VG CULT GRLT MAT GBB GBL

The sequence that the descriptors appear in the OUTPUT card is the same as that in the printout. If the desired output is a subfile instead of a printout, " x " should be placed in column 7 of the OUTPUT card.

4. TITLE card. Up to 3 lines of title can be specified. The keyword TITLE is coded in columns 1 - 5 of each card. The desired title is coded in columns 8 - 80 exactly as desired. If more than one line is needed, use one card per line and code nos. 1, 2 or 3 in column 7 of each card to indicate line number.

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