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PROGRAM DOCUMENTATION
FOR SCIENCE B DATA TABULATION

report no.
rapport n°. 107-1

MARCH 31, 1976

Ministry of State — Ministère d'État

Science and Technology — Sciences et Technologie

Research and Information Services — Services de recherche et d'information

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PROGRAM DOCUMENTATION FOR SCIENCE DATA TABULATION

Description of Tabulation

These programs produce tabularized summaries of data gathered via the Federal Government Activities in the Natural and Human Sciences questionnaire circulated during Main Estimates.

These programs, and related graphics programs documented in Report #110, are used to update Report 100 published by MOSST.

General Description of Programs

1. Source of Data

The summaries used are extracted from the B77ME.VCA files entered into the computer system by the Science Statistics Centre.

2. Data Reorganized into 18 Tabulation Formats

The program BSUM produces a total of 48 files with the prefix BSUM, a two digit table number, and an extension indicating natural, human, or total.

The data is stored in an array which corresponds to the format in which the data is to be tabulated. For tabulation types 5, 6, and 9, the department or agency totals are ranked by average of the 3 years. The grouping for the programs or activities is similar to that of the questionnaire.

3. Table Printout Programs

Five programs: TABLEØ, TABLE2, TABLE5, TABLE6, and TABLE9 print out the tables according to the type of tabulation. TABLE programs provide 4 options:

1) keyboard or print file
2) English or French titles
3) number of departments to be listed (types 5, 6, and 9)
4) number of departments for each performer or activity (type 6 only)

4. Utility Programs

The program TITLEY updates all the year values in the titles and TITLEU changes individual titles.

Operation Procedure

1. File Updating

The files DEPTAB.D77 and DFPTAB.D77 must be changed each time a new department or agency reports scientific expenditures. The PROGCV.DAT file contains the conversion list for summarizing department programs into department totals.

2. Production of BSUM Arrays

QUE BA: BACHTA=BACHTA.CTL will cause all tabulation arrays to be produced and for titles to reflect the current year value. The BACHTA.CTL file must be edited to contain the year value (77 = 1977-78) after the $DATA statements.

3. Production of Tables

QUE BA: TABACE = TABACE.CTL and QUE BA: TABACF = TABACF.CTL will cause all table printouts to occur for both English and French versions. TABACE must be terminated before TABACF can be run.

PROGRAM TYPE B Data Summary

NAME BSUM SIZE

PURPOSE Create data files for tabulation

FILE DESCRIPTIONS

NAME	INPUT OUTPUT	CONTENT	VIRTUAL DIMENSIONS
B77ME.VCA [120,10]	I	B data virtual array	(7956,5)
PROGCV.DAT [30,15]	2	program to department conversion vector	(110)
BSUM??.COM BSUM??.NAT BSUM??.HUM	0	tabulation arrays organized by science types	

PROGRAM VARIABLES

Y9% - current year value
R9% - max. number of departments
S9% - max. number of programs
S% - tabulation type
T% - science type: 1 = natural; 2 = human
P% - program number (1-102)
Y% - year number (1-3)
A% - activity (1-13)
R% - performer (0 to 5)
I% - summary matrix row number
K% - summary matrix column number
S() - natural or human summary matrix
S1() - sum of natural and human

PROGRAM FUNCTION

FNS1%(S1%) - Determine appropriate row number in summary matrix
FNS2%(S2%) - Determine appropriate column number in summary matrix
FNTØ(I1%, I9%) - Totals two preceeding columns into each third column from rows I1% to I9%
FNT1(I1%, I2%, I3%, J9%) - Totals 0 to J9% columns from rows I1% to I2% into row I3%.

```
10      ! THIS PROGRAM FORMS 18 B DATA TABULATION TYPES USED IN REPORT 100
110     I$="REPORT 100 DATA ARRAYS": &: &I$:&
130     F$="B.VCA[120,10]"
300     ! OPEN FILES, DIM ARRAYS
310     OPEN F$ FOR INPUT AS FILE 10
320     OPEN"PROGCV.DAT[30,15]" FOR INPUT AS FILE 11
340     DIM#1,M1%(3%),U1(9%,8%)
345     DIM#2,M2%(3%),W2%(75%),U2(75%,8%)
350     DIM#3,M3%(1%,7%),U3%(75%,7%),U3(525,2%)
365     DIM#10,V(7956,5)
370     DIM#11,D%(110%)
375     DIM R(75%),E%(75%)
380     DIM S(75%,8%),S1(75%,8%)
385     DIM S0%(2%,18%)
390     DIM S1%(5%,18%),S2%(2%,18%)
395     !
400     ! CREATE PROGRAM DATA ARRAYS
405     READ S0%(I%,J%) FOR J%=1% TO 18% FOR I%=0% TO 2%        !       TABULATION CHARACTERISTICS
410     DATA 0,0,0,0,0,0,0,0,1,1,1,1,3,3,2,2,2,2
412     DATA 3,3,2,7,7,2,2,1,7,8,2,1,2,2,7,9,2,1
415     DATA 2,2,8,2,8,8,8,2,2,2,8,2,5,5,2,2,8,2
416     !
420     READ S1%(I%,J%) FOR J%=1% TO 13% FOR I%=0% TO 3%        !       ACTIVITY SELECTION
422     DATA 9,2,1,9,9,9,9,9,9,9,9,9,9
425     DATA 2,3,4,5,7,0,0,0,0,0,0,6,0
430     DATA 0,0,0,0,0,1,2,3,4,5,7,0,6
435     DATA 1,1,1,1,1,2,2,2,2,2,2,1,2
445     !
450     READ S2%(I%,J%) FOR J%=1% TO 18% FOR I%=0% TO 2%        !       OUTPUT FILE NUMBERS
455     DATA 1,2,3,10,15,22,16,19,11,13,17,20,23,24,12,14,18,21
460     DATA 0,0,0,30,35,42,36,39,31,33,37,40,43,44,32,34,38,41
465     DATA 0,0,0,50,55,62,56,59,51,53,57,60,63,64,52,54,58,61
470     F$="########"
475     E$(0%)=".COM": E$(1%)=".NAT": E$(2%)=".HUM"
480     S$="[30,15]BSUM"
485     INPUT"LAST YEAR OF SURVEY ( 77 = 1977-78 )",Y9%
490     R9%=75% !       MAXIMUM NUMBER OF ROWS
500     S9%=103%
995     !
1000    ! CYCLE VCA FILES & FORM 15 TYPES OF OUTPUT FILES
1050    FOR S%=1% TO 18%
1055            &S%
1060            A1%=S0%(0%,S%)
1070    IF S%=8% OR S%=12% THEN GOTO 1500 ELSE GOTO1080
1080    IF S%=18% THEN GOTO 1700 ELSE GOTO 1100
1100    FOR T%=1% TO 2%
1105            &T%
1110            T1%=T%
1150    FOR P%=1% TO 102%
1160            V1=V(FNV(P%,T%,1%,1%),0%)
1170            IF V1<0 THEN 1340%
1180            P1%=D%(P%)
1190    FOR Y%=1% TO 3%
1200    FOR A%=1% TO 13%
1210            A2%=S1%(A1%,A%) ! EITHER R&D OR RSA : TABLES 9-12,15-18
1220            A3%=S1%(3%,A%) ! R&D OR RSA IN COLUMNS : TABLES 3,5,6
1230            A4%=S1%(0%,A%) ! TABLES 13,14
1240    FOR R%=0% TO 5%
1250            V=V(FNV(P%,T%,Y%,A%),R%)
1260    J1%=1%: J1%=2% IF R%>0%
1270            IF V=0 THEN 1310
1280            I%=FNS1%(S%)
1290            K%=FNS2%(S%)
1300    S(I%,K%)=S(I%,K%)+V
```

```
1310    NEXT R%
1320    NEXT A%
1330    NEXT Y%
1340    NEXT P%
1400    ON S0%(1%,S%) GOSUB 3000,2500,2000,2000,2000,2000,2000,2000,2000
1410    NEXT T%
1420            GOSUB 5100
1440    NEXT S%
1450    CLOSE 10,11
1460    STOP
        !
1500    !       PERFORMER BY FUNDING DEPT
1510    FOR R%=0% TO 5%
1515    FOR T%=1% TO 2%
1517    T1%=T%
1520    FOR P%=1% TO 102%
1530            IF V(FNV(P%,T%,1%,1%),0%)<0 THEN 1650
1540            P1%=D%(P%)
1550    FOR Y%=1% TO 3%
1560    FOR A%=1% TO 13%
1565            V=V(FNV(P%,T%,Y%,A%),R%): GOTO 1610 IF V=0
1570            A2%=S1%(A1%,A%)
1580            I%=FNS1%(S%): K%=FNS2%(S%)
1590            S(I%,K%)=S(I%,K%)+V
1610    NEXT A%: NEXT Y%
1650    NEXT P%: GOSUB 3000
1655    NEXT T%
1660     GOSUB 5100
1665    NEXT R%
1690    GOTO 1440
1700    !       ACTIVITY BY FUNDING DEPT
1710    FOR A%=1% TO 13%
1712            A2%=S1%(A1%,A%)
1714            IF A2%=0% THEN 1825
1715            A2%=S1%(A1%,A%)
1716    FOR T%=1% TO 2%
1717            T1%=T%
1720    FOR P%=1% TO 102%
1730            IF V(FNV(P%,T%,1%,1%),0%)<0 THEN 1820
1740            P1%=D%(P%)
1750    FOR Y%=1% TO 3%
1760    FOR R%=0% TO 5%
1770            V=V(FNV(P%,T%,Y%,A%),R%): GOTO 1810 IF V=0
1790            I%=FNS1%(S%): K%=FNS2%(S%)
1800            S(I%,K%)=S(I%,K%)+V
1810    NEXT R%: NEXT Y%
1820    NEXT P%: GOSUB 3000
1822    NEXT T%: GOSUB 5100
1825    NEXT A%
1830    GOTO 1440
        !
2000    ! ARRAYS NOT CARRYING SUMS BY DEPARTMENT
2003    I1%=1%: J1%=0%
2005    I2%=S0%(1%,S%): J2%=S0%(2%,S%)
2010    IF I2%=8% THEN I1%=2%: K=FNT1(2%,6%,1%,2%)
2015    IF I2%=9% THEN I1%=2%: K=FNT1(2%,7%,1%,2%)
2020    K=FNT0(1%,6%)  IF J2%=8%
2025      K=FNT1(I1%,I2%-1%,I2%,J2%)
2027            I1%=1%
2030            GOSUB 5000
2040    IF S%<4% THEN 2160
2060    O$=S$+CV$T$$(NUM$(S2%(T1%,S%)),2%)+E$(T1%)
2065    &O$
2070    OPEN O$ FOR OUTPUT AS FILE 1,RECORDSIZE 512
```

```
2080            M1%(0%)=Y9%: M1%(1%)=I2%: M1%(2%)=J2%
2100    FOR I%=I1% TO I2%: FOR J%=J1% TO J2%
2110            U1(I%,J%)=S1(I%,J%) IF T1%=0%
2115            U1(I%,J%)=S(I%,J%) IF T1%>0%
2120            &USING F$,U1(I%,J%);
2130    NEXT J%: &: NEXT I%
2150    CLOSE 1
2160            GOSUB 5050
2170            GOTO 2200 IF T1%=0%
2180            IF T%=2% THEN T1%=0%: GOTO 2060
2200    RETURN
        !
2500    ! 75 BY 8 ,BY DEPARTMENT ARRAYS
2510    I1%=1%: I2%=R9%: J1%=0%: J2%=S0%(2%,S%)
2520    K=FNT1(I1%,I2%-1%,I2%,J2%)
2530    K=FNT0(I1%,I2%) IF J2%=8%
2540            GOSUB 5000
2550    IF T1%>0% AND S%=3% THEN 2720
2560            GOSUB 6000
2570    O$=S$+CVT$$(NUM$(S2%(T1%,S%)),2%)+E$(T1%)
2585    &O$
2590    OPEN O$ FOR OUTPUT AS FILE 2
2600    M2%(0%)=Y9%: M2%(1%)=I3%: M2%(2%)=J2%: M2%(3%)=R9%
2610    FOR I0%=I1% TO I3%
2620            I%=E%(I0%)
2630            I%=R9% IF I0%=I3%
2640            W2%(I0%)=E%(I0%)
2650    FOR J%=J1% TO J2%
2660            U2(I0%,J%)=S1(I%,J%) IF T1%=0%
2670            U2(I0%,J%)=S(I%,J%) IF T1%>0%
2680            &USING F$,U2(I0%,J%);IF I0%=I3%
2690    NEXT J%: NEXT I0%
2695    &
2710    CLOSE 2
2720            GOSUB 5050
2730            IF T1%=0 THEN 2750
2740    IF T%=2% THEN T1%=0%: GOTO 2560
2750    RETURN
        !
3000    ! PERFORMERS OR ACTIVITIES BY FUNDING DEPARTMENT
3010            J1%=0%: J2%=S0%(2%,S%)
3015    I1%=1%: I2%=R9%
3020    K=FNT1(I1%,I2%-1%,I2%,J2%)
3040            GOSUB 5000
3060            GOSUB 6000
3070    O$=S$+CVT$$(NUM$(S2%(T1%,S%)),2%)+E$(T1%)
3080    &O$
3090    OPEN O$ AS FILE 3
3094    IF S%<>18% THEN I5%=R%*R9%+1%: I6%=I5%+I3%-1%
3096    IF S%=18%  THEN I5%=(A2%-1%)*R9%+1%: I6%=I5%+I3%-1%
3100            M3%(0%,0%)=R9%: M3%(1%,0%)=J2%
3105    IF S%<>18% THEN M3%(0%,R%+1%)=I5%: M3%(1%,R%+1%)=I6%
3107    IF S%=18% THEN M3%(0%,A2%)=I5%: M3%(1%,A2%)=I6%
3110    FOR I4%=I5% TO I6%
3115            I0%=I4%-I5%+1%
3120            I%=E%(I0%)
3130            I%=R9% IF I4%=I6%
3140    IF S%<>18% THEN U3%(I0%,R%+1%)=E%(I0%)
3145    IF S%=18% THEN U3%(I0%,A2%)=E%(I0%)
3150    FOR J%=J1% TO J2%
3160            U3(I4%,J%)=S1(I%,J%) IF T1%=0%
3170            U3(I4%,J%)=S(I%,J%) IF T1%>0%
3180            &USING F$,U3(I4%,J%); IF I4%=I6%
3190    NEXT J%: NEXT I4%
```

```
3200    &
3220            GOSUB 5050
3225    CLOSE 3
3230            IF T1%=0 THEN 3250
3240    IF T%=2% THEN T1%=0%: GOTO 3060
3250    RETURN
        !
5000    ! ADD S() TO S1()
5010    S1(I%,J%)=S1(I%,J%)+S(I%,J%) FOR J%=J1% TO J2% FOR I%=I1% TO I2%
5020    RETURN
        !
5050    ! ZERO S()
5060    S(I%,J%)=0 FOR J%=J1% TO J2% FOR I%=I1% TO I2%
5070    RETURN
        !
5100    ! ZERO S1()
5110    S1(I%,J%)=0 FOR J%=J1% TO J2% FOR I%=I1% TO I2%
5120    RETURN
        !
6000    ! RANKING SUBROUTINE
6010            FOR I%=I1% TO I2%-1%
6015    S=0
6016    IF J2%>2% THEN 6020
6017    S=S+S(I%,J%) FOR J%=J1% TO J2% IF T1%>0%
6018    S=S+S1(I%,J%) FOR J%=J1% TO J2% IF T1%=0%
6020            S=S+S(I%,J%) FOR J%=2% TO J2% STEP 3% IF J2%=8% IF T1%>0
6025            S=S+S1(I%,J%) FOR J%=2% TO J2% STEP 3% IF J2%=8% IF T1%=0%
6030            S=S+S(I%,J%) FOR J%=J1% TO J2% IF T1%>0% IF J2%=5%
6035            S=S+S1(I%,J%) FOR J%=J1% TO J2% IF T1%=0% IF J2%=5%
6037    R(I%)=S
6040    E%(I%)=I%
6045            NEXT I%
6050            FOR I%=1% TO I2%-1%
6060    FOR K%=1% TO I2%-1%-I%
6070            IF R(K%)>R(K%+1%) THEN 6110
6080    R1=R(K%):       E1%=E%(K%)
6090    R(K%)=R(K%+1%): E%(K%)=E%(K%+1%)
6100    R(K%+1%)=R1:    E%(K%+1%)=E1%
6110            NEXT K %: NEXT I%
6120    I3%=I% IF R(I%)>0 FOR I%=I1% TO I2%-1%
6130            I3%=I3%+1%
6140            E%(I3%)=I2%
6200    RETURN
        !
7600    DEF FNS1%(S1%)   ! DETERMINE ROW NO
7610    ON S1% GOTO 7620,7640,7630,7650,7650,7630,7630,7660,7650,7670,7630,7660,7630,7630,7650,7675,7630,7680
7620    I%=T%: GOTO 7690
7630    I%=P1%: I%=0% IF A2%=0%: GOTO 7690
7640    I%=A3%:         GOTO 7690
7650    I%=R%+1%: I%=0% IF A2%=0%: GOTO 7690
7660    I%=P1%: I%=0% IF A2%=0%: GOTO 7690
7670    I%=A2%:         GOTO 7690
7675    I%=A2%+1% : I%=0% IF A2%=0%: GOTO 7690
7680    I%=P1%: I%=0% IF A2%=0%
7690    FNS1%=I%
7695    FNEND
        !
7700    DEF FNS2%(S2%)   ! DETERMINE COL. NO.
7710    ON S2% GOTO 7720,7720,7730,7720,7740,7740,7750,7720,7720,7720,7750,7720,7760,7765,7720,7720,7750,7720
7720    K%=Y%-1%:                   GOTO 7780
7730    K%=(Y%-1%)*3%+T%-1%:        GOTO 7780
7740    K%=(Y%-1%)*3%+A3%-1%:       GOTO 7780
7750    K%=(Y%-1%)*3%+(J1%-1%):     GOTO 7780
7760    IF R%<2% OR R%>3% THEN K%=8%: GOTO 7780
```

```
7762    K%=(Y%-1%)*2%+A4%-1%: K%=8% IF A4%=9%: GOTO 7780
7765    IF R%<>1% OR A4%=9% THEN K%=8% ELSE K%=(Y%-1%)*2%+A4%-1%
7780            FNS2%=K%
7790    FNEND
        !
7800    DEF FNT0(I1%,I9%)       ! COLUMN TOTALS
7810    FOR I%=I1% TO I9%: FOR K%=0% TO 6%STEP 3
7820    S(I%,K%+2%)=S(I%,K%+2%)+S(I%,J%) FOR J%=K% TO K%+1%
7840    NEXT K%: NEXT I%
7850    FNEND
        !
7860    DEF FNT1(I1%,I2%,I3%,J9%)       !       ROW TOTALS
7870    FOR I%=I1% TO I2%: FOR J%=0% TO J9%
7880    S(I3%,J%)=S(I3%,J%)+S(I%,J%)
7890    NEXT J%: NEXT I%
7895    FNEND
        !
7900    DEF FNV(I1%,I2%,I3%,I4%)=(I1%-1%)*78+(I2%-1%)*39+(I3%-1%)*13+I4%        !       CONVERSION FROM B.VCA FILE
32000   END
```

PROGRAM TYPE Printout Program

NAME TABLEØ SIZE

PURPOSE Prints out Tables 1 or 2 on terminal or print file

FILE DESCRIPTIONS

NAME	INPUT OUTPUT	CONTENT	VIRTUAL DIMENSIONS
BSUM1.COM	I	Total natural, human	
BSUM2.COM	I	Total R&D, RSA	
TITLEØ	I	Title files in English or French	
TITLFØ	I		
T.1	O	Printout file	
T.2	O		

PROGRAM VARIABLES

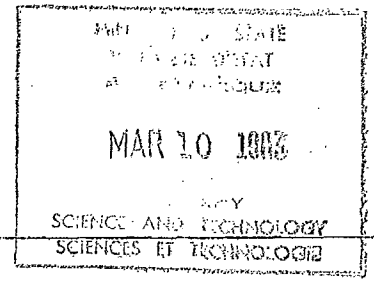
L9% - 0 = English; -1 = French
A() - Title selection vector
TO$() - page numbers
N% - table numbers
L% - line of input matrix containing totals
W%, WØ% - tab variables

PROGRAM FUNCTION

FNP(I%) - Calculates the average annual increase

This program prints two tables. The Titles are formulated and printed. The values and per cent figures follow. The table number and print option must be entered manually. The program recycles until N%>3
Required terminal input: 1. Table number (N%) 2. Terminal or Print File (Q%) (0,3)

Table widths: 95 characters



```
10      !       THIS PROGRAM TABLULATES ARRAYS 1 AND 2 PRODUCED BY BSUM
100 INPUT"ENGLISH='0' FRENCH='-1' ",L9%
110 L7$="TITLE0":L8$="TABLE ":L9$="NATURAL AND HUMAN SCIENCES"
120 IF L9% THEN L7$="TITLF0":L8$="TABLEAU ":L9$="SCIENCES NATURELLES ET HUMAINES"
130 PRINT:PRINT"THIS PROGRAM PRINTS":PRINT"THESE TABLES-- 01  02":PRINT
140  INPUT"INDICATE WHICH TABLE",N%
150  GOTO 640 IF N%>3%
160 DIM A%(3%,15%)
170     READ A%(I%,J%) FOR J%=0% TO 11% FOR I%=1% TO 2%
180 DATA 1,0,2,0,4,0,5,6,7,9,5,0
190 DATA 1,0,3,0,4,0,5,6,8,9,5,0
200     OPEN"BSUM1.COM" AS FILE 1% IF N%=1%
210     OPEN"BSUM2.COM" AS FILE 1% IF N%=2%
220     DIM#1%,M%(3%),V(9%,8%)
230     !       PRINT TITLES FROM TITLE0.DAT FILE
240OPEN L7$ AS FILE 2
250 DIM#2%,T$(25%)=128%
260     INPUT"TERMINAL 0 * PRINT FILE 3",Q%
270     OPEN"T.0"+CHR$(48%+N%) AS FILE 3 IF Q%=3%
280 W%=0%:W%=18% IF Q%=3%
290 W1%=W%+26%
295 T0$(1)="12":T0$(2)="13"
300     PRINT#Q%,CHR$(12%)
305     PRINT#Q%,CHR$(10%)
307     PRINT#Q%,TAB(5%);T0$(N%)+"."
310     PRINT#Q%FOR I%=1% TO 6%
320     PRINT#Q%,TAB(W%);L8$;N%
330     PRINT#Q%,CHR$(10%)
340     PRINT#Q%,TAB(W%);L9$
350     PRINT#Q%,STRING$(5%,10%)
360 FOR J%=0% TO 11%
370     B%=A%(N%,J%)
380     P$=T$(B%)
390     P$=CHR$(10%) IF B%=0%
400     P$=" " IF J%=1%
410     PRINT#Q%,TAB(W%);P$
420 NEXT J%
430     F$="#,###.#   (###.#)    "
440     F1$="    ###.# %"
450     L%=M%(1%)
460     DEF FNP(I%)=100*(SQR(V(I%,2%)/V(I%,0%))-1)      !       CALCULATE PERCENT CHANGE
470     !       PRINT OUT ARRAY VALUES AND CALCULATE PERCENTAGES
480     FOR I%=1% TO 3%
490     PRINT#Q%,TAB(W%);T$(10%*N%+I%-1);TAB(W1%);IF I%<3%
500 IF I%=3% THEN PRINT#Q%,TAB(W%);T$(5):PRINT#Q%:
        PRINT#Q%,TAB(W%);"TOTAL";TAB(W1%);
510     FOR J%=0% TO 2%
520     P1=V(I%,J%)/1000
530     P2=V(I%,J%)/V(L%,J%)*100
540     PRINT#Q%,USING F$,P1;P2;
550     NEXT J%
560     PRINT#Q%,USING F1$,FNP(I%):PRINT#Q%
570 NEXT I%
580     PRINT#Q%,TAB(W%);T$(5%)
590     P$="** THESE FIGURES DO NOT INCLUDE NON-PROGRAM COSTS"
600     P$="** N'Y SONT PAS COMPRIS LES COUTS AUTRES QUE LES PROGRAMMES" IF L9%
610     PRINT#Q%:PRINT#Q%,TAB(W%);P$
620 CLOSE 1%,2%,3%
630 RESTORE:GOTO 130
640 END
```

PROGRAM TYPE

NAME TABLE2 SIZE

PURPOSE

FILE DESCRIPTIONS

NAME	INPUT OUTPUT	CONTENT	VIRTUAL DIMENSIONS
BSUM??.COM BSUM??.NAT BSUM??.HUM	I	Summaries produced by BSUM listing data by activity or performer, T$(J) contains file number	
TITLE2 TITLF2	I	Titles file in English or French	
T.??	O	Output file for printed table	

PROGRAM VARIABLES

A$, B$, C$, D$ - titles for performers or activities
E$ - table numbers for report #100
W%, W1%, W2% - TAB variables
T$ - print string for titles
P$ - print string for performer/activity titles
P(9, 8) - print matrix for re-arranged performer/activity groups
A(17, 8) - ranking and grouping matrix

PROGRAM FUNCTION

This program prints 17 tables. Table 14 is omitted. The program repeats itself until a table number greater than 17 input. The DATA statements for A(17, 8) matrix indicate the ranking and grouping for each performer or activity list. Example - For Table 10, "Universities" and "Non-Profit Institutions" are grouped together and rank 2nd. Re-order the groups by changing the appropriate data statement. Required Terminal Input: 1. Table number (N%) (0-17); 2. Terminal or Print File (Q%) (0,2)

Table width: 87 characters

```
100     !       THIS PROGRAM PRINTS ARRAYS 4,5,9,10,15,16 PRODUCED BY BSUM
110 INPUT"ENGLISH='0' FRENCH='-1' ",L9%
120 L8$="TITLE2":L9$="TABLE "
130 IF L9% THEN L8$="TITLF2":L9$="TABLEAU "
140 DIM T$(15%),T%(17%),P(9%,8%)
145     DIM T1%(17%)
150 DIM E$(20%),E0$(20%)
160 DIM A%(17%,8%),B%(14%),C%(6%,17%)
170     READ T%(J%) FOR J%=0% TO 17%    !       BSUM FILE NUMBERS
175     READ T1%(J%) FOR J%=0% TO 17%   !       BSUM ARRAY TYPES
180 DATA 10,11,12,13,14,15,30,31,32,33,34,35,50,51,52,53,54,55
185 DATA 04,09,15,10,16,05,04,09,15,10,16,05,04,09,15,10,16,05
190     PRINT
200     PRINT"THIS PROGRAM PRINTS THESE TABLES ------":PRINT
210     PRINT USING"###",T%(N%); FOR N%=0% TO 17%
212     PRINT
215     PRINT USING"###",T1%(N%); FOR N%=0% TO 17%
220     PRINT:PRINT
230     PRINT USING"###",N%;FOR N%=0% TO 17%
240     PRINT
250 INPUT"WHICH TABLE (0 TO 17)",N%
260 GOTO 1430 IF N%>17%
270 OPEN L8$ AS FILE 1
280 DIM#1,I$(25%)=128%,A$(10%)=64%,B$(8%)=32%,C$(9%)=32%,D$(9%)=32%
290     T1%=INT(T%(N%)/10%)
300     T2%=T%(N%)-T1%*10%
310     T0$=CHR$(48%+T1%)+CHR$(48%+T2%)
320     F$="T."+T0$
330     !       DETERMINE ORDER OF PERFORMERS OR ACTIVITIES
340     READ A%(I%,J%) FOR J%=1% TO 8% FOR I%=0% TO 17%
350 DATA 1,2,3,4,5,6,7,8
360 DATA 1,2,3,4,5,6,7,8
370 DATA 1,2,3,4,5,6,7,8
380 DATA 1,2,3,4,5,6,7,8
390 DATA 1,2,3,4,5,6,7,8
400 DATA 1,2,3,4,5,6,7,8
410 DATA 1,2,3,4,5,6,7,8
420 DATA 1,2,3,4,5,6,7,8
430 DATA 1,2,3,4,5,6,7,8
440 DATA 1,2,3,4,5,6,7,8
450 DATA 1,2,3,4,5,6,7,8
460 DATA 1,2,3,4,5,6,7,8
470 DATA 1,2,3,4,5,6,7,8
480 DATA 1,2,3,4,5,6,7,8
490 DATA 1,2,3,4,5,6,7,8
500 DATA 1,2,3,4,5,6,7,8
510 DATA 1,2,3,4,5,6,7,8
520 DATA 1,2,3,4,5,6,7,8
530!***DETERMINE WHICH TITLES*******
540     READ B%(I%) FOR I%=1% TO 14%
550 DATA 0,1,0,2,0,3,0,8,0,10,4,5,6,14
560     READ C%(I%,J%) FOR J%=0% TO 17% FOR I%=1% TO 6%
570 DATA 1,1,1,1,1,1,2,2,2,2,2,2,3,3,3,3,3,3
580 DATA 4,5,6,5,6,4,4,5,6,5,6,4,4,5,6,5,6,4
590 DATA 7,7,7,20,9,11,7,7,7,20,9,11,7,7,7,20,9,11
600 DATA 12,12,12,12,12,13,12,12,12,12,12,13,12,12,12,12,12,13
610 DATA 15,15,15,21,16,17,15,15,15,21,16,17,15,15,15,21,16,17
620 DATA 18,18,18,18,18,19,18,18,18,18,18,19,18,18,18,18,18,19
630!*****FORM THE TITLES*******
635     READ E0$(J%) FOR J%=0% TO 17%   !       PAGE NUMBERS
636 DATA 16,26,38,28,0,18,44,54,66,56,68,46,76,86,98,88,100,78
640     READ E$(J%) FOR J%=0% TO 17%    !       REPORT 100 TABLE NUMBERS
685     !               SELECT TITLES
650 DATA 4,9,15,10,0,5,17,22,28,23,29,18,32,37,43,38,44,33
```

```
660     T1$=E$(N%)
670 INPUT"TERMINAL 0   FILE 2",Q%
680 OPEN F$ AS FILE 2% IF Q%=2%
690 W%=0%:W%=22% IF Q%=2%
700 W1%=W%+31%:W2%=W%+14%
710 W1%=W%+32% IF N%=16%
720 PRINT#Q%,CHR$(12%)
725     PRINT#Q%,CHR$(10%)
727     PRINT#Q%,TAB(5%);E0$(N%)+"."
730     PRINT#Q% FOR I%=1% TO 6%
740 PRINT#Q%,TAB(W%);L9$+T1$:PRINT#Q%
750 FOR I%=1% TO 14%
760 B1%=B%(I%)
770     IF B1%<7% THEN C1%=C%(B1%,N%):T$(I%)=I$(C1%)
780     T$(I%)=CHR$(10%) IF B1%=0%
790     T$(I%)=" " IF I%=5%
800     T$(I%)=I$(I%) IF B1%>6%
810             PRINT#Q%,TAB(W%);T$(I%)
820 NEXT I%
830     !                   SELECT INPUT DATA FILES
840 E$=".COM":E$=".NAT" IF N%>5%
850 E$=".HUM" IF N%>11%
860 F$="BSUM"+T0$+E$
870     OPEN F$ AS FILE 3%
880     DIM#3,M%(3%),V(9,8)
890     A0%=M%(1%)
900 IF T2%=4% THEN A0%=9%:A%(N%,9%)=9%
910 C1$=CHR$(10%)+CHR$(13%)+TAB(W%)
920 FOR I%=1% TO 10%
930     L%=LEN(A$(I%))
940 IF L%>16% THEN A1$(I%)=LEFT(A$(I%),16%)+C1$+RIGHT(A$(I%),17%)
        ELSE A1$(I%)=A$(I%)
950 NEXT I%
960 IF A%(N%,3%)=A%(N%,4%) THEN IF T2%=5% THEN A1$(4%)=A1$(10%) ELSE A1$(4%)=A1$(9%)
970 IF A%(N%,5%)=A%(N%,6%) THEN A1$(5%)=A1$(6%)
980!***GROUP THE PERFORMER / ACTIVITY VALUES**
990     FOR I%=1% TO A0%
1000    K%=A%(N%,I%): K%=9% IF A%(N%,I%)=0%
1010    P$(K%)=A1$(I%)
1020    P$(K%)=B$(I%) IF T2%=3%
1030    P$(K%)=C$(I%) IF T1%=3% IF T2%=4%
1040    P$(K%)=D$(I%) IF T1%=5% IF T2%=4%
1050 IF T2%=5 THEN P(K%,J%)=P(K%,J%)+V(I%,J%) FOR J%=0% TO 8%: GOTO 1100
1060    FOR J%=0% TO 2%
1080    P(K%,J%)=P(K%,J%)+V(I%,J%)
1090            NEXT J%
1100 NEXT I%
1110    !               PRINT OUT 3 COLUMN ARRAYS
1255    !               PRINT OUT 9 COLUMN ARRAYS
1120    GOTO 1260 IF T2%=5%
1130 F0$="#,###.#  (###.#)    "
1140 F0$= "#####.#  (###.#)    "IF N%=16%
1160 FOR I%=1% TO A0%
1170    PRINT#Q%
1180    PRINT#Q%,TAB(W%);T$(14%),CHR$(10%) IF I%=A0%
1190    PRINT#Q%,TAB(W%);P$(I%);TAB(W1%);
1200            FOR J%=0% TO 2%
1205    J1%=J%*2%+1
1210    P1=P(I%,J%): P2=P(A0%,J%)
1220    P3=P1/P2*100
1230    PRINT#Q%,USING F0$,P1/1000;P3;
1240    NEXT J%:PRINT#Q%:NEXT I%
1250 GOTO 1350
1260 F0$="#,###.#  ###.# ##,###.#  "
```

```
1280 FOR I%=1% TO A0%
1290     PRINT#Q%
1300     PRINT#Q%,TAB(W%);T$(14%),CHR$(10%) IF I%=A0%
1310     PRINT#Q%,TAB(W%);P$(I%);TAB(W2%);
1320     FOR J%=0% TO 8% STEP 3%
1330 PRINT#Q%,USING F0$,P(I%,J%)/1000;P(I%,J%+1%)/1000;P(I%,J%+2%)/1000;
1340 NEXT J%:PRINT#Q%:NEXT I%
1350 PRINT#Q%:PRINT#Q%,TAB(W%);T$(14%)
1360     P$="** INTRAMURAL EXPENDITURES DO NOT INCLUDE NON-PROGRAM COSTS"
1370 IF L9% THEN P$="** DEPENSES INTRA-MUROS NE COMPRENNENT PAS LES COUTS AUTRE QUE LES PROGRAMMES"
1380     PRINT#Q%:PRINT#Q%,TAB(W%);P$
1390 CLOSE 1%,2%,3%
1400 P(I%,J%)=0 FOR J%=0% TO 8% FOR I%=0% TO 9%
1410     RESTORE
1420 GOTO 170
1430 END
```

PROGRAM TYPE

NAME TABLE5 SIZE

PURPOSE

FILE DESCRIPTIONS

NAME	INPUT OUTPUT	CONTENT	VIRTUAL DIMENSIONS
BSUM??.COM BSUM??.NAT BSUM??.HUM	I	Summaries produced by BSUM, ranked by department I$() determines file number	
TITLE5 TITLF5	I	Titles file	
DEPTAB.D77 DFPTAB.D77	I	Abbreviations for Department of Agency in English or French	
T.??	O	Output file for printed tables	

PROGRAM VARIABLES

A%(12,15) - data matrix which determines the titles for each table
W%, W1% - TAB variables
B$(15) - conversion list for Report 100 table numbers
D% - number of departments to be listed
O() - row matrix for calculation of "other"
D6% - line counter

PROGRAM FUNCTION

This program prints 13 tables. Table 03 is Natural and Human by Department, tables 22, 42, 62 are R&D and RSA by Department, and the others are Intramural and Extramural by Department. Required terminal input is 1. Table number (N%) (0 to 12), 2. Terminal or Print File (Q%) (0, 1), 3. No. of Departments (D%) (0 to 64)

Table width = 93

```
100     !       THIS PROGRAM PRINTS TABLES LISTING BY DEPARTMENT
105     !       INPUT DATA ARE IN BSUM ARRAY TYPES 3,17,12,6
110 DIM A%(12%,15%),I$(15%),B$(15%)
115 DIM B0$(15%)
120 INPUT"ENGLISH '0' FRENCH '-1'",L9%
130 L8$="TITLE5":L9$="TABLE ":O$="Other"
140 IF L9% THEN L8$="TITLF5":L9$="TABLEAU ":O$="Autres"
150 READ I$(J%) FOR J%=0% TO 12%
160 DATA 3,16,17,18,22,36,37,38,42,56,57,58,62
170 PRINT:PRINT"THIS PROGRAM PRINTS THESE TABLES----"
180 PRINT USING"\   \",I$(J%);FORJ%=0% TO 12%
190 PRINT
200 PRINT USING"##    ",J%:FOR J%=0% TO 12
210 PRINT
220     INPUT"WHICH TABLE (0 TO 12)",N%
230 GOTO 960 IF N%>12%
240 INPUT "TERMINAL=0 * PRINT FILE=1",Q
250 OPEN L8$ AS FILE 2
260 DIM#2,C$(30%)=128%
270     INPUT"LIST HOW MANY DEPARTMENTS",D%
280 F$=I$(N%):F0$="T."+F$
290 OPEN F0$ AS FILE 1 IF Q=1
300 E$=".COM":E$=".NAT" IF N%>4%:E$=".HUM" IF N%>8%
310     F2$="[30,15]BSUM"+I$(N%)+E$
320     OPEN F2$ AS FILE 3,RECORDSIZE 512
330             DIM#3,M%(3),T%(75%),T(75%,8%)
333             M3%=M%(3%)
334     IF D%>M%(1%)-1% THEN D%=M%(1%)-1%
335     F3$="DEPT": F3$="DFPT" IF L9% : F4$=F3$+"AB.D77[1,100]"
337     OPEN F4$ AS FILE 4
338             DIM#4,D$(75%)
340     READ A%(I%,J%) FOR J%=1% TO 15% FOR I%=0% TO 12%
350 DATA 0,0,3,0,20,22,0,8,0,10,24,25,26,10,9
360 DATA 0,0,3,0,5,6,0,8,0,10,11,12,13,14,15
370 DATA 0,0,3,0,18,6,0,8,0,10,11,12,13,14,15
380 DATA 0,0,3,0,19,6,0,8,0,10,11,12,13,14,15
390 DATA 0,0,3,0,20,21,0,8,0,10,24,25,27,10,9
400 DATA 0,0,16,0,5,6,0,8,0,10,11,12,13,14,15
410 DATA 0,0,16,0,18,6,0,8,0,10,11,12,13,14,15
420 DATA 0,0,16,0,19,6,0,8,0,10,11,12,13,14,15
430 DATA 0,0,16,0,20,21,0,8,0,10,24,25,27,10,9
440 DATA 0,0,17,0,5,6,0,8,0,10,11,12,13,14,15
450 DATA 0,0,17,0,18,6,0,8,0,10,11,12,13,14,15
460 DATA 0,0,17,0,19,6,0,8,0,10,11,12,13,14,15
470 DATA 0,0,17,0,20,21,0,8,0,10,24,25,27,10,9
475     READ B0$(J%)FOR J%=0% TO 12%    !       PAGE NUMBERS
476 DATA 14,22,30,40,20,50,58,70,48,82,90,102,80
480     READ B$(J%) FOR J%=0% TO 12%    !       REPORT 100 TABLE NUMBERS
490 DATA 3,7,11,16,6,20,24,30,19,35,39,45,34
500 W%=0%:W%=20% IF Q=1
510 W1%=W%+8%
520!***PRINT THE TITLES*****************
530 T1$=B$(N%)
540 PRINT#Q,CHR$(12)
545     PRINT#Q,CHR$(10%)
547     PRINT#Q,TAB(5%);B0$(N%)+"."
550     PRINT#Q,CHR$(10%)
560 PRINT#Q:PRINT#Q,TAB(W%);L9$+T1$
570 PRINT#Q,CHR$(10)
580 FOR J%=3% TO 15%
590     A1%=A%(N%,J%)
600 GOTO 660 IF A1%=9%
610     T$=C$(A1%)
620     T$=C$(10%) IF A1%=15%
```

```
630      T$=" " IF A1%=0%
640   PRINT#Q,TAB(W%);T$
650        PRINT#Q IF J%=5%
660 NEXT J%
670 !**FORM THE OTHER ROW AND PRINT****
680 Z%=M%(1%)
690 O(J%)=T(Z%,J%) FOR J%=0% TO 8%
700 O(J%)=O(J%)-T(I%,J%) FOR J%=0% TO 8% FOR I%=1% TO D%
710      D6%=20% :D7%=60%
720 FOR I%=1% TO D%+2%
725                D8%=T%(I%)
730      PRINT#Q,TAB(W%);
740      IF I%=D%+2% THEN PRINT#Q,TAB(W%);C$(10):PRINT#Q,TAB(W%);"TOTAL";
750      PRINT#Q,D$(D8%);IF I%<D%+1%
760      PRINT#Q,O$;IF I%=D%+1%
770      PRINT#Q," ";TAB(W1%);
780                FOR J%=0% TO 8%
790                X=T(I%,J%)/1000
800                X=O(J%)/1000 IF I%=D%+1%
810                X=T(Z%,J%)/1000 IF I%=D%+2%
820      PRINT#Q,USING"###,###.#",X;IF X>0.04999
830      PRINT#Q,       "       - -";IF X <0.050 IF X<>0
840      PRINT#Q,       "       ---";IF X=0
850                IF J%=2% OR J%=5% THEN PRINT#Q,"   ";
860 NEXT J%:PRINT#Q
870 D6%=D6%+1%:IF D6%>D7% THEN PRINT#Q,CHR$(12%):D7%=D7%+60%
880 NEXT I%
890 PRINT#Q,TAB(W%);C$(10%)
900      P$="** INTRAMURAL EXPENDITURES DO NOT INCLUDE NON-PROGRAM COSTS"
910 IF L9% THEN P$="**  DEPENSES INTRA-MUROS NE COMPRENNENT PAS LES COUTS AUTRES QUE LES PROGRAMMES"
920      PRINT#Q:PRINT#Q,TAB(W%);P$
930 CLOSE 1,2,3,4
940 RESTORE
950 GOTO 150
960 END
```

PROGRAM TYPE

NAME TABLE6 SIZE

PURPOSE

FILE DESCRIPTIONS

NAME	INPUT OUTPUT	CONTENT	VIRTUAL DIMENSIONS
BSUM??.COM BSUM??.NAT BSUM??.HUM	I	Summaries produced by BSUM listing data by performer or activity, and by funding department TØ%() contains file numbers	
TITLE6 TITLF6	I	Titles file in English or French	
DEPTAB.D77 DFPTAB.D77	I	Abbreviations for Department or Agency in English or French	
T.??	O	Output file containing printed table	

PROGRAM VARIABLES

A1%(10) - row matrix which determines grouping of performer/activities
M$(10) - performer/activity heading matrix
W%, W1%, W2% - TAB variables
T1$ - conversion matrix for report 100 table numbers
D6 - line count
P1, P2 - value and percent variables for printout
K% - index for each performer/activity group

PROGRAM FUNCTION

Using the grouping established in the SUMRA6.BAS program, this program list the department totals and percents for each performer/activity group. The user may specify the number of departments to be listed for each group. The number for each group may be changed by entering the group number and the revised number of departments. A group may be eliminated by entering 0 departments.

Required Terminal Input 1. Table number (N%) (0-8); 2. Terminal or print file (Q) (0,3); 3. Number of departments (N1%) (0-64); 4. changes for specific group (F%) (1-107) (0 if none)

```
100      !       THIS PROGRAM PRODUCES TABLES FROM BSUM ARRAY TYPES 8,12,18
110 INPUT"ENGLISH '0',FRENCH '-1' ",L9%
120 L7$="TITLE6":L8$="EXTRAMURAL  ##########  ":L9$="TABLE ":O$="Other"
130 IF L9% THEN L7$="TITLF6":L8$="EXTRA-MUROS ########### ":L9$="TABLEAU ":O$="Autres"
140      READ T0%(J%) FOR J%=0% TO 8%     !       INPUT FILE NUMBERS
150 DATA 19,20,21,39,40,41,59,60,61
160      PRINT
170 PRINT"THIS PROGRAM PRINTS THESE TABLES------":PRINT
180 PRINT USING"####",T0%(J%):FORJ%=0% TO 8%:PRINT
190      PRINT
200 PRINT USING"####",J%:FOR J%=0% TO 8%:PRINT
210 PRINT:PRINT"WHICH TABLE ( 0 TO 8 )",:INPUT N%
220 GOTO 1250 IF N%>8%
230 T%=T0%(N%):T1%=INT(T%/10%):T2%=T%-T1%*10
240 T$=CHR$(48%+T1%)+CHR$(48%+T2%)
250 E$=".COM":E$=".NAT" IF T1%>2%: E$=".HUM" IF T1%>4%
260      F1$="BSUM"+T$+E$
270      F3$="T."+T$
280 INPUT"TERMINAL=0 * PRINTER=3 ",Q
290      OPEN F1$ AS FILE 1
300      OPEN L7$ AS FILE 2
310      OPEN F3$ AS FILE 3 IF Q=3
320      DIM#1,M%(1%,7%),S%(75%,7%),S(525%,2%)
325      R9%=M%(0%,0%)
330 DIM#2,I$(15%)=128%,G$(30%)=64%
335      F4$="DEPT": F4$="DFPT" IF L9%
336      F4$=F4$+"AB.D77[1,100]"
337      OPEN F4$ AS FILE 4
338               DIM#4,S$(75%)
340 DIM M$(10%),A%(2%,17%)
350!*****DETERMINE TITLES AND HEADINGS*********
355      A1%(I%)=I% FOR I%=0% TO 9%
357               A9%=6% :A9%=7% IF T2%=1%
360 FOR K%=0% TO 7%
370      A2%=A1%(K%)
380      A3%=9% IF T1%>2%
390      A3%=16% IF T1%>4%
400      A3%=0% IF T2%<>1%
410      M$(A2%)=G$(A3%+K%)
420 NEXT K%
430      IF T2%=1% THEN M$(7%)=G$(16%):GOTO 470
440 IF A1%(2%)=A1%(3%) THEN A2%=A1%(3%):M$(A2%)=G$(9%)
450 IF A1%(4%)=A1%(5%) THEN A2%=A1%(5%):M$(A2%)=G$(6%)
460 M$(2%)=L8$ +M$(2%)
470      INPUT"FOR EACH PERF/ACT LIST HOW MANY DEPTS.",N1%
480      D%(J%)=N1% FOR J%=1% TO A9%
490      INPUT"CHANGE NO.DEPTS FOR WHICH PERF/ACT ( 0=NONE )",F%
500 IF F%=0% THEN 540
510      PRINT"HOW MANY DEPTS. FOR ---";M$(F%)::INPUT G%
520      D%(F%)=G%
530      GOTO 490
540 !****PRINT THE TITLES*******
550      W%=0%:W%=30% IF Q=3
560      W1%=W%+14%:W2%=W%+20%
570      READ A%(I%,J%) FOR J%=0% TO 16% FOR I%=0% TO 2%
580 DATA 0,0,0,0,13,0,1,4,0,6,0,7,8,9,11,7,12
590 DATA 0,0,0,0,13,0,2,4,0,6,0,7,8,9,11,7,12
600 DATA 0,0,0,0,13,0,3,5,0,6,0,7,8,10,11,7,12
610      I%=0%:I%=1% IF T2%=0%:I%=2% IF T2%=1%
615      READ T9$(J%) FOR J%=0% TO 8%     !       PAGE NUMBERS
616 DATA 24,32,0,52,60,72,84,92,104
618      T9$(10)="      "+T9$(N%)+"."
620      READ T1$(J%) FOR J%=0 TO 8%      !       REPORT 100 TABLE NUMBERS
630 DATA 8,12,0,21,25,31,36,40,46
```

```
640     T2$=T1$(N%)
650 FOR K%=0% TO 16%
660     A0%=A%(I%,K%)
670     P$=I$(A0%)
680     P$=" " IF A0%=0%
690     P$=CHR$(12)+CHR$(10)+T9$(10)+CHR$(10) IF K%=0%
700     P$=L9$+T2$ IF K%=2%
710     P$=I$(14%) IF T1%>2% IF K%=4%
720     P$=I$(15%) IF T1%>4% IF K%=4%
730             PRINT#Q,TAB(W%);P$ IF K%<16%
740             PRINT#Q IF K%=6%
750 NEXT K%
760 PRINT#Q
770!*****PRINT THE VALUES******
780 F0$="#,###.#   (###.#)   "
790 F1$="     - -   (  - -)   "
800 F2$="     ---   (  ---)   "
810     D2%=0%
820 D6%=22%+D%(1%)
830 D7%=60%
840     FOR K%=1% TO A9%
850 GOTO 1170 IF D%(K%)=0%              REM TOTALS OPTION
860     D2%=D%(K%)+2%
870     D3%=M%(0%,K%)
880     D4%=M%(1%,K%)
890     P(J%)=S(D4%,J%) FOR J%=0% TO 2%
900     FOR I%=1% TO D2%
905             I5%=S%(I%,K%)
910             I1%=I%
920             D5%=D3%+I1%-1%
930             I2%=(I1%-1%)*12%+1%
940     PRINT#Q,TAB(W%);
950     PRINT#Q,LEFT(M$(K%),12%);IF I1%=1%
960     PRINT#Q,TAB(W1%); IF K%<3% IF I1%=1%
970     PRINT#Q,MID(M$(K%),I2%,12%);IF I1%>1% IF I1%<7%
980     PRINT#Q,TAB(W1%);O$;TAB(W2%);IF I%=D2%-1%
990     PRINT#Q,TAB(W1%);I$(12%) IF I%=D2%
1000    PRINT#Q,TAB(W1%);S$(R9%);TAB(W2%);IF I%=D2%
1010    PRINT#Q,TAB(W1%);S$(I5%);TAB(W2%); IF I%<D2%-1%
1020            FOR J%=0% TO 2%
1030    P(J%)=P(J%)-S(D5%,J%) IF I%<D2%-1%
1040    P1=S(D5%,J%)
1050    P1=P(J%) IF I%=D2%-1%
1060    P2=S(D4%,J%)
1070    P1=P2 IF I%=D2%
1080    P3=P1/P2*100
1090    PRINT#Q,USING F0$,P1/1000;P3; IF P1>49.99
1100     PRINT#Q,F1$; IF P1<50 IF P1<>0
1110     PRINT#Q,F2$; IF P1=0
1120    NEXT J%:PRINT#Q:NEXT I%
1130     PRINT#Q,TAB(W1%);I$(12%)
1140     PRINT#Q,CHR$(10%)
1150    D6%=D6%+D%(K%+1%)+6%
1160    IF D6%>D7% AND K%<>A9% THEN PRINT#Q,CHR$(12%):PRINT#Q,CHR$(10) :D6%=D%(K%+1%)
1170 NEXT K%
1180    PRINT#Q,TAB(W%);I$(7%)
1190 P$="** INTRAMURAL EXPENDITURES DO NOT INCLUDE NON-PROGRAM COSTS"
1200 IF L9% THEN P$="** DEPENSES INTRA-MUROS NE COMPRENNENT PAS LES COUTS AUTRES QUE LES PROGRAMMES"
1210    PRINT#Q:PRINT#Q,TAB(W%);P$
1220 CLOSE 1,2,3,4
1230 RESTORE
1240 GOTO 140
1250 END
```

PROGRAM TYPE

NAME TABLE9 SIZE

PURPOSE

FILE DESCRIPTIONS

NAME	INPUT OUTPUT	CONTENT	VIRTUAL DIMENSIONS
BSUM??.COM BSUM??.NAT BSUM??.HUM	I	Summaries produced by BSUM listing contracts and grants by funding department or agency. A%() contains input file numbers.	
TITLE9 TITLF9	I	Titles file in English or French	
DEPTAB.D77 DFPTAB.D77	I	Abbreviations for Department or Agency in English or French	
T.??	O	Output file containing printed tables	

PROGRAM VARIABLES

B%(20) - selection matrix for titles
T1$ - conversion list for Report 100 book numbers
W% - TAB variable
M%(2) - number of departments for data type
T$(20) - actual titles to be printed

PROGRAM FUNCTION

This program prints 6 tables. The departments listed are ranked by the total of contracts and grants for the last year.

Required input: 1. Table number (N%), (0 to 5); 2. Terminal or line printer (Q) (0,3); 3. List number of departments (N1%) (0-64)

Table width: 72 characters

```
100     !       THIS PROGRAM PRODUCES TABLES FROM BSUM ARRAY TYPES 13 AND 14
110 DIM T$(20),B%(20%)
120 INPUT"ENGLISH '0' FRENCH '-1'",L9%
130 L8$="TITLE9":L9$="TABLE ":O$="Other"
140 IF L9% THEN L8$="TITLF9":L9$="TABLEAU ":O$="Autres"
150     READ A%(J%) FOR J%=0% TO 5%
160 DATA 23,24,43,44,63,64
170 PRINT:PRINT "THIS PROGRAM PRINTS THESE TABLES":PRINT
180 PRINT USING"###",A%(J%):FOR J%=0% TO 5%
190 PRINT
200 PRINT:PRINT USING"###",J%;FOR J%=0% TO 5%
210 PRINT:PRINT:PRINT"WHICH TABLE ( 0 TO 5 ) ",
220 INPUT N%
230 GOTO 650 IF N%>5%
240 T%=A%(N%)
250 T1%=INT(T%/10%):T2%=T%-T1%*10
260 T$=CHR$(48%+T1%)+CHR$(48%+T2%)
270 E$=".COM":E$=".NAT" IF T1%>2%:E$=".HUM" IF T1%>4%
280 F1$="[30,15]BSUM"+T$+E$
290 F2$="T."+T$
300     OPEN F1$ AS FILE 1
310     DIM#1,M%(3%),D%(75%),P(75%,8%)
320     OPEN L8$ AS FILE 2
330 DIM#2,I$(20%)=128%
335     F4$="DEPT":F4$="DFPT"IF L9%: F4$=F4$+"AB.D77[1,100]"
337     OPEN F4$ FOR INPUT AS FILE 4
338             DIM#4,D$(75%)
340     INPUT"TERMINAL = 0 * PRINTER = 3",Q
350     OPEN F2$ AS FILE 3 IF Q=3
360     INPUT"LIST HOW MANY DEPARTMENTS",N1%
370     READ B%(J%) FOR J%=1% TO 17%
380 DATA 0,0,0,0,13,0,1,2,3,0,5,0,8,9,10,11,12
390 !***PRINT THE TITLES**********************
400 I$(0%)=CHR$(10%)
410 B%(5%)=14% IF T1%>2%:B%(5%)=15% IF T1%>4%
420 B%(8%)=7% IF T2%=4%
425     READ T9$(J%) FOR J%=0% TO 5%    !       PAGE NUMBERS
426 DATA 34,36,62,64,94,96
427     T9$(6%)="       "+T9$(N%)+"."
430     READ T1$(J%) FOR J%=0% TO 5%    !       REPORT 100 TABLE NUMBERS
440 DATA 13,14,26,27,41,42
450     T2$=T1$(N%)
460 N%=N1%
470 FOR J%=1% TO 17%
480     K%=B%(J%)
490     T$(J%)=I$(K%)
500 NEXT J%
510     T$(1%)=CHR$(12%)+CHR$(10%)+T9$(6%)
520     T$(3%)=L9$+T2$
530     W%=0%
540     W%=30% IF Q=3
550 FOR I%=1% TO 17%
560     IF I%=8% OR I%=9% THEN PRINT#Q
570     PRINT#Q,TAB(W%);T$(I%)
580     PRINT#Q FOR J%=1% TO 3% IF I%=1%
590 NEXT I%
600     M2%=M%(1%)
610 O(J%)=P(M2%,J%) FOR J%=0% TO 5%
620 O(J%)=O(J%)-P(I%,J%) FOR J%=0% TO 5% FOR I%=1% TO N%
630 U$="####.#    "
640 U1$="    - -    "
650 U2$="    ---    "
660 !***PRINT THE VALUES**********************************
670 FOR 1%=1% TO N%+2%
```

```
675             I5%=D%(I%): P$=D$(I5%)
690     P$=O$ IF I%=N%+1%:P$="TOTAL" IF I%=N%+2%
700     IF I%=N%+2% THEN PRINT#Q,TAB(W%):T$(17%)
710     PRINT#Q,TAB(W%);P$;TAB(W%+13%);
720     FOR J%=0% TO 5%
730             X=P(I%,J%)/1000:X=O(J%)/1000 IF I%=N%+1%
740             X=P(M2%,J%)/1000 IF I%=N%+2%
750             PRINT#Q,USING U$,X; IF X>0.04999
760             PRINT#Q,U1$;IF X<0.05 IF X<>0
770             PRINT#Q,U2$;IF X=0
780             IF J%=1% OR J%=3% THEN PRINT#Q,"    ";
790     NEXT J%:PRINT#Q
800 NEXT I%
810     PRINT#Q,TAB(W%):T$(17%)
820 CLOSE 1,2,3,4
830 RESTORE
840 GOTO 150
850 END
```

PROGRAM TYPE Utility Program

NAME TITLEY.BAS SIZE 4K

PURPOSE To create and update TITLE files and TITLF files

FILE DESCRIPTIONS

NAME		INPUT OUTPUT	VIRTUAL DIMENSIONS
TITLEØ	15 titles, 95 characters wide	I/O	T$(15) = 128
TITLE2	25 titles, 87 characters wide	I/O	T$(25) = 128
TITLE5	30 titles, 93 characters wide	I/O	T$(30) = 128
TITLE6	15 titles, 72 characters wide	I/O	T$(15) = 128, G$(30)= 64
	30 titles, 64 characters wide		
TITLE9	20 titles, 72 characters wide	I/O	T$(20) = 128

PROGRAM VARIABLES

D%(I, J) = matrix used to describe title parameters
F% = number appended to "TITLE" to create file names
corresponds to TABLE program which prints titles
L% = length of title
N% = width of title
M3% value of current year (77 = 1977-78)

PROGRAM FUNCTION

FNR$: function to centre title on line when input specification ="C"

FNY$: function to create string from numeric values

FNE$: creates new string with revised year numbers.

```
10      ! THIS PROGRAM UPDATES YEAR VALUES APPEARING IN REPORT 100
        AND REPORT 113 TITLES. USE 'TITLEU.BAS' FOR UPDATING INDIVIDUALL
        TITLES.
20 DEF FNR$(B$)                 !       CENTERING FUNCTION
30 L1%=(N%-LEN(B$))/2%
40 FNR$=STRING$(L1%,32%)+B$
50 FNEND
60 DEF FNY$(Y%)                 !       CREATE YEAR NUMBER
70 Y0%=Y%/10%
80 Y1%=Y%-Y0%*10%
90 FNY$=CHR$(48%+Y0%)+CHR$(48%+Y1%)
100 FNEND
110 DEF FNE$(C$,Y1%,Y2%)        !       INSERT NEW YEAR NUMBER
120 E$=LEFT(C$,J%+1%)+FNY$(Y1%)+"-"+FNY$(Y2%)+RIGHT(C$,J%+7%) IF C%=1%
122 E$=LEFT(C$,J%+1%)+FNY$(Y1%)+"-"+"19"+FNY$(Y2%)+RIGHT(C$,J%+9%) IF C%=3%
126     FNE$=E$
130 FNEND
200     INPUT"CURRENT YEAR ('77'='1977-78')",M2%
210 READ D%(I%,J%) FOR J%=0% TO 2% FOR I%=1% TO 6%
220 DATA 0,25,95
230 DATA 2,25,87
240 DATA 5,30,93
250 DATA 6,15,72
260 DATA 9,20,72
270     DATA 8,40,102
275     READ D9%(I%) FOR I%=1% TO 6%
277             DATA 0,2,5,6,8,9
280     FOR I9%=1% TO 6%        !       DO 6 TABLES
285             F%=D9%(I9%)
290     FOR L9%=-1% TO 0%       !       BOTH FRENCH AND ENGLISH
300     FOR I%=1% TO 6%
310     I1%=I%
320     IF D%(I%,0%)=F% THEN 350
330     NEXT I%
340 INPUT"TITLE NO.,LENGTH, WIDTH",F%,D%(I1%,1%),D%(I1%,2%)
350     I$="TITLE"+CHR$(48%+F%)
355     I$="TITLF"+CHR$(48%+F%) IF L9%
360     I$="MPTITL.DAT" IF F%=8%
365     I$="MPTITF.DAT" IF L9% IF F%=8%
370     L%=D%(I1%,1%)
380     N%=D%(I1%,2%)
390 PRINT"MAX. LENGTH = ";L%
400     OPEN I$ AS FILE 1
410     DIM#1,T$(40%)=128%
470 T$(0%)="  "
480 T$(0%)=T$(0%)+STRING$(9%,45%)+CHR$(I%+48%) FOR I%=1% TO 7%
490     I%=84%
500 IF I%=0 GOTO 890
510 IF I%=84 GOTO 630   !       UPDATE YEAR OPTION
520 IF I%=99 GOTO 610
530 PRINT T$(I%)
540 INPUT"KEEP(K) NEW(N) CENTRE(C) DELETE(D)",A$
550 GOTO 490 IF A$="K"
560 IF A$="D" THEN T$(I%)=T$(0%): GOTO 490
570 INPUT LINE C$
580 T$(I%)=CVT$$(C$,4%)
590 IF A$="C" THEN T$(I%)=FNR$(T$(I%))
600 GOTO 490
610     PRINT I%;T$(I%) FOR I%=1% TO L%
620 GOTO 490
630!****THIS SEGMENT UPDATES THE YEAR***
640     M3%=M2%+1%
730 FOR I%=1% TO L%
740     N$=T$(I%)
```

```
750      W%=LEN(N$)-2%
760      FOR J%=1% TO W%
770              IF MID(N$,J%,2%)<>"19" THEN 840
780 A%=VAL(MID(N$,J%+2%,2%))
790 B%=VAL(MID(N$,J%+5%,2%))
795      IF B%=19% THEN B%=VAL(MID(N$,J%+7%,2%))
800 C%=B%-A%
810 IF C%=1% THEN K%=K%+1%:A%=M3%-(4%-K%):B%=A%+1%
820 IF C%=3% THEN A%=M3%-3%:B%=M3%
830 N$=FNE$(N$,A%,B%)
835      GOTO 850 IF C%=3%
840 NEXT J%
850 K%=0%
860 T$(I%)=N$
870 NEXT I%
890 CLOSE 1
900      RESTORE
910      NEXT L9%
920      NEXT I9%
1000 END
```

```
$!      PRODUCTION OF SUMS FOR B DATA TABULATION ARRAYS
$!      THE CURRENT DATA YEAR MUST BE INSERTED AFTER EACH $DATA STATEMENT IN THIS CONTROL AND THE BACHMP (MANPOWER - M DATA) CONTROL
 PROGRAM
$!      TITLEY UPDATES ALL TITLES USED IN THEN TABULATIONS AND HISTOGRAMS
$!      E.G.: 77 REFERS TO YEAR 1977-78
$!      THE DEPTAB.D77[1,100] AND DFPTAB.D77[1,100] MUST BE UPDATED WHEN NEW DEPARTMENTS OR AGENCIES ARE ADDED
$JOB/NAME=BACHTA/NOLIMIT
$BASIC/RUN BSUM
$DATA
77
$EOD
$BASIC/RUN TITLEY
$DATA
77
$EOD
$EOJ
```

```
$JOB/NAME=TABACE/NOLIMIT
$! ENGLISH TABULATION
$BASIC/RUN TABLE0[30,15]
$DATA
0
1
3
2
3
99
$EOD
$BASIC/RUN TABLE2[30,15]
$DATA
0
0
2
1
2
2
2
3
2
5
2
6
2
7
2
8
2
9
2
10
2
11
2
12
2
13
2
14
2
15
2
16
2
17
2
99
$EOD
```

```
$BASIC/RUN TABLE5[30,15]
$DATA
0
0
1
55
1
1
30
2
1
30
3
1
30
4
1
30
5
1
25
6
1
25
7
1
25
8
1
25
9
1
30
10
1
30
11
1
30
12
1
30
99
$EOD
```

```
$BASIC/RUN TABLE9[30,15]
$DATA
0
0
3
20
1
3
20
2
3
15
3
3
15
4
3
20
5
3
20
99
$EOD
```

```
$BASIC/RUN TABLE6[30,15]
$DATA
0
0
3
8
1
15
2
15
0
1
3
8
1
15
2
15
0
3
3
8
0
```

```
4
3
8
0
5
3
8
5
6
0
6
3
8
1
15
0
7
3
8
1
15
3
2
5
3
0
8
3
8
1
10
6
4
7
4
0
99
$EOD
$RUN $PIP
TAB.LST<T.*
T.*/DE
$EOD
$RUN $QUE
Q LP0:/MODE:128=TAB.LST/DE
$EOD
$EOJ
```

```
$JOB/NAME=TABACF/NOLIMIT
$! FRENCH TABULATION
$BASIC/RUN TABLE0[30,15]
$DATA
-1
1
3
2
3
99
$EOD
$BASIC/RUN TABLE2[30,15]
$DATA
-1
0
2
1
2
2
2
3
2
5
2
6
2
7
2
8
2
9
2
10
2
11
2
12
2
13
2
14
2
15
2
16
2
17
2
99
$EOD
$BASIC/RUN TABLE5[30,15]
$DATA
-1
0
1
55
1
1
30
2
1
30
3
1
30
4
1
30
5
1
25
6
1
25
7
1
25
8
1
25
9
1
30
10
1
30
11
1
30
12
1
30
99
$EOD
$BASIC/RUN TABLE9[30,15]
$DATA
-1
0
3
20
1
3
20
2
3
15
3
3
15
4
3
20
5
3
20
99
$EOD

$BASIC/RUN TABLE6[30,15]
$DATA
-1
0
3
8
1
15
2
15
0
1
3
0
1
15
2
15
0
3
3
0
0
4
3
3
0
5
3
3
0
6
3
3
0
8
1
15
0
7
3
8
1
15
3
2
5
3
0
8
3
8
1
10
6
4
7
4
0
99
$EOD
$RUN $PIP
TAB.LST<T.*
T.*/DE
$EOD
$RUN $QUE
Q LP0:/MODE:128=TAB.LST/DE
$EOD
$EOJ
```

TABULATION INDEX

Type of Tabulation	A	NAT & HUM B	NAT & HUM C	NATURAL B	NATURAL C	HUMAN B	HUMAN C
0.							
Totals, Human and Natural	SA	1	1				
Totals, Human and Natural, by Dept.	SA	3	3*				
Totals, by Activity	SA	2	2				
Totals, by Activity, by Dept.	SA	22	6*	42	19	62	34
2.							
Performer, % of Total	SA	10	4	30	17	50	32
Performer, % of Total	R&D	11	9	31	22	51	37
Performer, % of Total	RSA	12	15	32	28	52	43
Activity, % of Total	R&D	13	10	33	23	53	38
Activity, % of Total	RSA	14	-	34	29	54	44
Activity, % of Total	SA	15	5	35	18	55	33
5.							
Intramural & Extramural							
Performers by Department	SA	16	7	36	20	56	35
Performers by Department	R&D	17	11	37	24	57	39
Performers by Department	RSA	18	16	38	30	58	45
6.							
Performers by Department	SA	19	8	39	21	59	36
Performers by Department	R&D	20	12	40	25	60	40
Activity by Department	RSA	21	-	41	31	61	46
9.							
Performers (U&N-PI), by Type of Funding, by Department	R&D	23	13	43	26	63	41
Performers (Industry), by Type of Funding, by Department	R&D	24	14	44	27	64	42

A - Type of Activity
SA - Scientific Activities = R&D + RSA
R&D - Research and Development
RSA - Related Scientific Activities

B - Number system used by system programs

C - Numbers used in Report 100 (mini Green Book)

\- - Not Available

* - Type 0 for BSUM file, Type 5 for print out

PROG	CV	DEPT	DFPT	PROGRAM NAMES
1	1	Agr	Agr	Agriculture-Administration
2	1	Agr	Agr	Agriculture-Canadian Grains Commission
3	1	Agr	Agr	Agriculture-Health of Animals
4	1	Agr	Agr	Agriculture-Production & Marketing Board
5	1	Agr	Agr	Agriculture-Research
6	2	AIB	CICI	Anti-Inflation Board
7	3	AECB	CCEA	Atomic Energy Control Board
8	4	AECL	EACL	Atomic Energy of Canada Limited
9	5	BofC	BduC	Bank of Canada
10	6	CC	CCan	Canada Council
11	7	CAL	ACL	Canadian Arsenals Limited
12	8	CBC	R-C	Canadian Broadcasting Corporation
13	9	CDC	CCL	Canadian Dairy Commision
14	10	CIDA	ACDI	Canadian International Development Agency
15	11	CLFB	OCP	Canadian Livestock Feed Board
16	12	CPDL	SCBEL	Canada Patents & Development Limited
17	13	CRTC	CRTC	Canadian Radio Television Commission
18	14	CTC	CCT	Canadian Transport Commission
19	15	CMHC	SCHL	Central Mortgage and Housing Corporation
20	16	COL	CLO	Commissioner of Official Languages
21	17	DOC	MDC	Communications
22	18	CCA	C&C	Consumer and Corporate Affairs-Administration
23	18	CCA	C&C	Consumer and Corporate Affairs-Combines Investigations & Competition Policy
24	18	CCA	C&C	Consumer and Corporate Affairs-Consumer Affairs
25	18	CCA	C&C	Consumer and Corporate Affairs-Corporate Affairs
26	18	CCA	C&C	Consumer and Corporate Affairs-Intellectual Property
27	19	ECC	CEC	Economic Council of Canada
28	20	EMR	EMR	Energy, Mines and Resources-Earth Sciences
29	20	EMR	EMR	Energy, Mines and Resources-Mineral and Energy Resources
30	21	DOE	MDE	Environment-Administration
31	21	DOE	MDE	Environment-Environmental Services-A.E.S.
32	21	DOE	MDE	Environment-Environmental Services-E.M.S.
33	21	DOE	MDE	Environment-Environmental Services-E.P.S.
34	21	DOE	MDE	Environment-Fisheries and Marine
35	22	EA	AE	External Affairs-Canadian Interests Abroad
36	23	Fin	Fin	Finance-Financial & Economic Policies
37	24	FPRB	CSPA	Food Prices Review Board
38	25	FIRA	AEIE	Foreign Investment Review Agency
39	26	INA	AIN	Indian and Northern Affairs-Indian & Eskimo Affairs
40	26	INA	AIN	Indian and Northern Affairs-Northern Affairs
41	26	INA	AIN	Indian and Northern Affairs- Parks Canada
42	27	ITC	I&C	Industry, Trade and Commerce-Grain and Oil Seeds
43	27	ITC	I&C	Industry, Trade and Commerce-Tourism
44	27	ITC	I&C	Industry, Trade and Commerce-Trade-Industrial
45	28	IC	IC	Information Canada
46	29	IDRC	CRDI	International Developement Research Centre
47	30	Jus	Jus	Justice-Administration of Justice
48	30	Jus	Jus	Justice-Law Reform Commission
49	31	Lab	Trav	Labour

PROG	CV	DEPT	DFPT	PROGRAM NAMES
50	32	M&I	M&I	Manpower & Immigration-Manpower Utilization
51	32	M&I	M&I	Manpower & Immigration-Administration
52	32	M&I	M&I	Manpower & Immigration-Planning & Research
53	33	MRC	CRM	Medical Research Council
54	34	NCC	CCN	National Capital Commission
55	35	DND	DN	National Defence-Defence Service
56	36	NEB	ONE	National Energy Board
57	37	NFB	ONF	National Film Board
58	38	NHB	CPN	National Harbours Board
59	39	NHW	SNBS	National Health & Welfare-Administration
60	39	NHW	SNBS	National Health & Welfare-Fitness and Amateur Sport
61	39	NHW	SNBS	National Health & Welfare-Health Care
62	39	NHW	SNBS	National Health & Welfare-Health Protection
63	39	NHW	SNBS	National Health & Welfare-Income Security and Social Assistance
64	39	NHW	SNBS	National Health & Welfare-Medical Services
65	40	NL	BN	National Library
66	41	NM	MN	National Museums of Canada
67	42	NRC	CNR	National Research Council-Engineering and Natural Science
68	42	NRC	CNR	National Research Council-Scholarships & Grants
69	42	NRC	CNR	National Research Council-Scientific and Technical Information
70	43	NR	RC	National Revenue-Taxation
71	44	PO	MP	Post Office
72	45	PCO	BCP	Privy Council
73	46	PA	AP	Public Archives
74	47	PSC	CFP	Public Service Commission
75	48	DPW	MTP	Public Works-Professional and Technical Services
76	49	DREE	EER	Regional Economic Expansion
77	50	SLSA	VMSL	St. Lawrence Seaway Authority
78	51	MSST	MEST	Science and Technology-Ministry of State for
79	52	ScC	CSc	Science Council of Canada
80	53	SofS	SE	Secretary of State-Arts and Culture
81	53	SofS	SE	Secretary of State-Bilingualism Development
82	53	SofS	SE	Secretary of State-Citizenship
83	53	SofS	SE	Secretary of State-Education Support
84	53	SofS	SE	Secretary of State-Policy Div.
85	53	SofS	SE	Secretary of State-Translation
86	54	SG	MSG	Solicitor General-Administration
87	55	SC	SC	Statistics Canada
88	56	DSS	ASC	Supply and Services-Supply
89	57	MOT	MDT	Transport-Air Transportation
90	57	MOT	MDT	Transport-Administration
91	57	MOT	MDT	Transport-Marine Transportation
92	57	MOT	MDT	Transport-Surface Transportation
93	57	MOT	MDT	Transport-TDA
94	58	TBS	SCT	Treasury Board-Central Administration of the Public Services Program
95	59	UIC	CAC	Unemployment Insurance Commission
96	60	MUA	MEAU	Urban Affairs, Ministry of State for
97	61	DVA	AAC	Veterans Affairs
98	35	DND	DN	National Defence-Defence Research