

# 1980 Census of Population and Housing CENSPAC Report Generating Guide.

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CENSPAC Report Generation Guide

Systems and Programming Branch  
Data User Services Division  
Bureau of the Census  
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## CENSPAC Report Generation

### I. Introduction

CENSPAC was developed as a basic data retrieval and reporting system to be used primarily with the summary tape files from the 1980 Census. The system handles characteristics of census files such as segmented records and large input record sizes. Data dictionary files containing machine-readable record layout information and labeling are used to facilitate access to data files.

Because summary data files contain aggregated tabular population and housing counts, it is anticipated the majority of users will focus on generating printed reports from the data with some basic data manipulations such as computing percentages or aggregating data to school districts or similar areas. Rather than provide only a few printed page formats for reports, CENSPAC allows the user to specify the structure of the output. There is considerable flexibility in report formatting. For example, the user can determine which tables are to be printed, the page layout, and the labeling.

Because of the flexibility built into the system, the user must specify in the command sequence of a run the particular parameters of the report format. This document is to aid users in formatting reports in a variety of ways. For those without the time to develop a detailed understanding of CENSPAC, the runs illustrated here will provide the skeleton commands for similar reports and can be used for printing data from any table with minor modifications.

The example runs in this supplement illustrate basic report generation capabilities as well as more complex applications which demonstrate particular features of CENSPAC and census data tapes. Runs are generally presented in order of increasing complexity. The first set of runs (Runs 1-5) illustrate basic report generation procedures in CENSPAC. The next three runs exemplify characteristics of data dictionary labels. The last section of runs explain more advanced applications of CENSPAC considering such things as suppression of data, selective page ejection, and calculation of medians. In the discussion presented with each report, details of program structure and logic are pointed out to familiarize users with various aspects of CENSPAC report generation.

## II. Report Generation Features of CENSPAC

It is assumed the user has a working knowledge of CENSPAC operation; that is, knows the basic structure and syntax of commands and understands the sequential processing of input records. The discussion that follows highlights features of CENSPAC particularly applicable to report generation.

### Separate Print Lines for Each ITEM Command

As CENSPAC processes an input record through the command sequence, each ITEM command encountered generates a new line of print. Therefore, the user constructs the commands for a report essentially on a line-by-line basis. Multiple lines, however, can be printed with a single ITEM command when the C operator is used in table subscript notation, indicating data to be printed in column notation.

### Command Sequence Defining Reports

The REPORT and ITEM commands define the printed output of a run, but the records can be selectively processed and manipulated either before or during the description of a report. For example, IF and COMPUTE commands can be inserted to be processed at their point of occurrence within the run.

The IF command, in particular, is useful in selectively generating different report formats depending on certain conditions. Within a report, records can be processed through different sets of ITEM commands depending on the qualifying expressions of IF commands. For example, a certain set of data may be printed for county records, while other data are printed for tract records.

The IF command can also be used to specify whether a report should be generated. Here the IF condition would be tested before a report was initiated. One type of report might be generated for records satisfying one condition while other reports could be generated in the same run for other records.

### Page Size Control and Page Eject

A user may want to adjust the size of the report page to conform to typed page standards or to insure page breaks between printed tables. This can be done using the PAGESIZE parameter with the REPORT command. PAGESIZE specifies the number of lines of print, while page width is controlled by the accumulated widths of fields referenced in the ITEM commands.

The default pagesize is 58 lines, allowing at least one line for a report heading. If no HEAD command is associated with a report, 57 lines of print will appear per page.

A system variable, \$LCTR001, is a line counter which is incremented each time a line is printed. The value of this variable is checked both when a REPORT command is encountered and after each line is printed. If the value is equal to or greater than the maximum page size, a new print page is initiated with the appropriate heading. \$LCTR001 can be used to force a page eject by computing the value of this variable to something greater than the pagesize in the command sequence. For example, "COMPUTE \$LCTR001 = 100" at the end of the report definition will initiate a new print page when the REPORT command is encountered in processing the next input record. Computing the \$LCTR001 variable in the middle of a report command sequence will cause the next line of print to occur on the current page and then when the \$LCTR001 value is checked and found to be greater than the pagesize, the printer will eject to a new page.

#### HEAD Command Processing

HEAD commands are used to define print lines to appear at the top of each report page. Like the ITEM command, each defines a separate line of print and multiple commands can be used in a single report. When a REPORT command is encountered, and a new page is to be initiated, the heading information is automatically printed on the page. Therefore, a HEAD command cannot be processed selectively, that is, put subordinate to an IF condition. The implication of this is that page headings will be identical in format throughout a printed report.

Variable names and dictionary labels can be referenced in the HEAD command, as well as specifications of alphanumeric literal strings. Any data names referenced will take on the value from the current record being processed when starting a new page.

#### Labeling

The runs in this document illustrate the labeling conventions of CENSPAC. Machine-readable dictionary labels can be accessed for table headings, universe identification, stratifier and category labels. Group labels which are subgroup identifiers for one or more data cells, such as "1 person" and "2 or more persons" in Table 16 of STF1, cannot be retrieved in a CENSPAC run but must be provided as literal character strings. Another consideration in labeling categories of a stratifier is the accessing of all category labels of a dimension. Individual labels, such as "65 years and over" cannot be selectively printed. CENSPAC retrieves and prints all the category labels of a stratifier for the dimension subscripted with an array operator, \* or C.

For newly derived category counts in a CENSPAC run, labels must be provided as literal strings not to exceed 40 characters, enclosed in quotes. Alphanumeric literals are left justified in the print field, whereas numeric data are right justified in the field. Therefore, the character literal will appear in the print line beginning in the left-most print position of its field width as defined relative to other data names or literals referenced in the command.

Dictionary labels are stored as literal character strings up to 40 characters in length and as such are treated the same as user-supplied labels. Some labels, such as universe identifiers, are stored as multiple strings, each not exceeding 40 characters. Format codes specify the type of label and field width and are followed by the table identification. Again, the character string is left justified in the field. A field width shorter than the stored label will cause truncation of the string while field widths larger will pad the label with blanks.

#### Data Suppression

Data cells which are suppressed due to confidentiality requirements are filled with zeros and a series of flags on the record indicate the presence or absence of suppression in particular tables. The user has the option of ignoring suppression by processing the zero-filled cells as any others, or of checking the flags for the presence of suppression and processing these tables separately. For example, the user might want to eliminate printing of tables with suppressed data or may want to print the table with a message indicating the cells or universe affected.

There is no automatic handling of suppression by CENSPAC. Therefore, the user must decide how to handle these data cells and code into the run the appropriate commands to exclude the affected cells or print an appropriate suppression indicator. An example run in this document illustrates one way of processing suppressed data and should suggest to the user the considerations in handling suppression.

Run 1

## Run 1 - Printing a Two Dimensional Table

This run illustrates basic report production features to print a two dimensional table and identify the geographic area. A page heading is provided. The structure of this run could be used to print out values for any table with a minimal number of commands.

Commands:

```

FILEIN STF1
IF SUMRYLVL = '11' INCLUDE
REPORT
HEAD 'REPORT GENERATION - RUN 1' X10.0 'PAGE' $PAGE
HEAD 'TABLE 27'
ITEM
ITEM 'COUNTY: ' COUNTY
ITEM
ITEM TAB27 (X,C)

```

Printout:

```

REPORT GENERATION - RUN 1          PAGE    1
TABLE 27

COUNTY: 041

      36475      8121
      3213      1179
         59         22
         197        58
         48         23

COUNTY: 087

      54515      17810
      7564       3151
         118         38
         322        200
         107         54

COUNTY: 760

      48136      23018
      35524      20849
         135         87
         315        225
         159        108

```

---

FILEIN STF1

Summary Tape File 1 is identified as the input file to be processed.

IF SUMRYLVL = '11' INCLUDE

Only records with a summary level code of 11 will be included in the processing. Code 11 identifies county level summary records.

## REPORT

A printed report is to be produced.

HEAD 'REPORT GENERATION - RUN 1' X10.0 'PAGE' \$PAGE

At the top of each page a heading line will appear with the literal string. After skipping 10 spaces (X10.0), the word "PAGE" with the page number (\$PAGE) will be printed.

HEAD 'TABLE 27'

A second line of heading information will be printing containing the literal string of characters.

## ITEM

A blank line will be printed.

ITEM 'COUNTY: ' COUNTY

As a record is processed through the command sequence, each ITEM command specifies a new line of print for that record. This specifies a line beginning with the literal string followed by the county code.

## ITEM

A blank line will be printed.

ITEM TAB27 (\*,C)

Values of Table 27 will be printed with values for the first stratifier, tenure, printed across the page, and categories of the second stratifier, race, printed in columns. The asterisk, a horizontal print indicator, in the first position of the subscript references the first stratifier. The second subscript, for the second stratifier, is a C indicating the values for different races are to be printed in a column.

## Run 2 - Use of Data Dictionary Labels

Labeling of tables using data dictionary information is illustrated in this application. The table title, universe identification and category labels are all printed providing a completely documented table for each geographic area.

Commands:

```

FILEIN STF1
IF SUMRYLVL = '11' INCLUDE
REPORT
HEAD 'REPORT GENERATION - RUN 2' X20.0 $PAGE
ITEM H40.0 TAB27
ITEM U40.0 TAB27 ITEM
ITEM 'COUNTY: ' COUNTY
ITEM X48.0 2C16.0 TAB27 (*,1)
ITEM C40.0 TAB27 (1,C) 2F15.0 TAB27 (*,C)
ITEM ITEM

```

Printout:

REPORT GENERATION - RUN 2	1		
TENURE (2) BY RACE OF HOUSEHOLDER (5)			
UNIVERSE: OCCUPIED HOUSING UNITS			
COUNTY: 041			
	TOTAL:	RENTER	OCCUPIED:
WHITE	36475	8121	
BLACK	3213	1179	
AMERICAN INDIAN, ESKIMO, AND ALEUT	59	22	
ASIAN AND PACIFIC ISLANDER	197	58	
OTHER	48	23	
TENURE (2) BY RACE OF HOUSEHOLDER (5)			
UNIVERSE: OCCUPIED HOUSING UNITS			
COUNTY: 087			
	TOTAL:	RENTER	OCCUPIED:
WHITE	54515	17810	
BLACK	7564	3151	
AMERICAN INDIAN, ESKIMO, AND ALEUT	118	38	
ASIAN AND PACIFIC ISLANDER	322	200	
OTHER	107	54	
TENURE (2) BY RACE OF HOUSEHOLDER (5)			
UNIVERSE: OCCUPIED HOUSING UNITS			
COUNTY: 760			
	TOTAL:	RENTER	OCCUPIED:
WHITE	48136	23018	
BLACK	35524	20849	
AMERICAN INDIAN, ESKIMO, AND ALEUT	135	87	
ASIAN AND PACIFIC ISLANDER	315	225	
OTHER	159	108	

## FILEIN STF1

Summary Tape File 1 is identified as the input file to be processed.

## IF SUMRYLVL = '11' INCLUDE

Only records with a summary level code of 11 will be included in the processing. Code 11 identifies county level summary records.

## REPORT

A printed report is to be produced.

## HEAD 'REPORT GENERATION - RUN 2' X20.0 \$PAGE

At the top of each page a heading line will appear with the literal string and, after skipping 20 spaces (X20.0), the page number (\$PAGE) will be printed.

## ITEM H40.0 TAB27

As a record is processed through the command sequence, each ITEM command specifies a new line of print for that record. Here the 40 character heading label for Table 27, "TENURE (2) BY RACE OF HOUSEHOLDER (5)," will be printed in a field of 40 characters (H40.0). The H is the format type code to access a table heading.

## ITEM U40.0 TAB27 ITEM

The universe label for Table 27, "Universe: Occupied Housing Units," is to be printed in a field of 40 characters (U40.0). This is to be followed by printing of a blank line (ITEM).

## ITEM 'COUNTY: ' COUNTY

A line beginning with the literal string followed by the value of COUNTY, the county code, will be printed.

ITEM X48.0 2C16.0 TAB27 (\*,1)

On this line, 48 spaces will be skipped, followed by 2 category labels indicated by a C format type, in fields of 16 characters each (2C16.0) for Table 27. The labels will be printed across the page for the first stratifier ((\*,1)). A field width of 16 allows for the length of the second label, "Renter occupied." The first label, "Total," will be left-justified and padded with blanks in a field of 16 characters. The array operator identifies the stratifier for which category labels will be printed. The user cannot access individual labels within a stratifier but must print all labels, using a linear (\*) or columnar (C) operator.

ITEM C40.0 TAB27 (1,C) 2F15.0 TAB27 (\*,C)

Category labels will be printed in fields of 40 characters each (C40.0) for Table 27. The labels will be printed in a column, one label per line, for the second stratifier ((1,C)). The labels will be followed by data cells from Table 27. Two fields of 15 characters each will be printed across the page containing values for the first stratifier. Data defined as numeric in the data dictionary, which includes all table cells in STF1, are right-justified in the output field. To space the data in columns of comparable width to the column labels, fields of 15 characters are specified. Values for the second stratifier will be listed in columns ((\*,C)).

ITEM ITEM

Two blank lines will be printed.

## Run 3 - Separate Page for Each Geographic Area

Data for each geographic area are printed on a separate page in this run with the page heading providing the table and geographic identification. Although this run illustrates printing of only one table per geographic area, the command structure could be expanded to include printing of multiple tables with table specifications in additional ITEM commands.

Commands:

```

FILEIN STF1
IF SUMRYLVL NOT = '11' EXCLUDE
REPORT
HEAD 'REPORT GENERATION - RUN 3' X20.0 'PAGE ' $PAGE
HEAD 'TABLE 27: ' H40.0 TAB27
HEAD X20.0 'FOR ' AREANAME
HEAD HEAD U40.0 TAB27
ITEM ITEM X48.0 2C16.0 TAB27 (*,1)
ITEM C40.0 TAB27 (1,C) 2F15.0 TAB27 (*,C)
ITEM COMPUTE $LCR001 = 100

```

Printout:

```

REPORT GENERATION - RUN 3                PAGE      1
TABLE 27: TENURE (2) BY RACE OF HOUSEHOLDER (5)
                FOR CHESTERFIELD

```

UNIVERSE: OCCUPIED HOUSING UNITS

	TOTAL:	RENTER OCCUPIED:
WHITE	36475	8121
BLACK	3213	1179
AMERICAN INDIAN, ESKIMO, AND ALEUT	59	22
ASIAN AND PACIFIC ISLANDER	197	58
OTHER	48	23

```

REPORT GENERATION - RUN 3                PAGE      2
TABLE 27: TENURE (2) BY RACE OF HOUSEHOLDER (5)
                FOR HENRICO

```

UNIVERSE: OCCUPIED HOUSING UNITS

	TOTAL:	RENTER OCCUPIED:
WHITE	54515	17810
BLACK	7564	3151
AMERICAN INDIAN, ESKIMO, AND ALEUT	118	38
ASIAN AND PACIFIC ISLANDER	322	200
OTHER	107	54

```

REPORT GENERATION - RUN 3                PAGE      3
TABLE 27: TENURE (2) BY RACE OF HOUSEHOLDER (5)
                FOR RICHMOND CITY

```

UNIVERSE: OCCUPIED HOUSING UNITS

	TOTAL:	RENTER OCCUPIED:
WHITE	48136	23018
BLACK	35524	20849
AMERICAN INDIAN, ESKIMO, AND ALEUT	135	87
ASIAN AND PACIFIC ISLANDER	315	225
OTHER	159	108

## FILEIN STF1

Summary Tape File 1 is identified as the input file to be processed.

IF SUMRYLVL NOT = '11' EXCLUDE

Only records with a summary level code of 11 will be included in the processing.

## REPORT

A printed report is to be produced.

HEAD 'REPORT GENERATION - RUN 3' X20.0 'PAGE ' \$PAGE

At the top of each page, a heading line will be printed with the literal string, 20 blank spaces, the word "PAGE," and the page number.

HEAD 'TABLE 27: ' H40.0 TAB27

A page heading line will be printed with the literal string identifying the table by number, followed by the heading for table 27 from the data dictionary in a field of 40 characters (H40.0).

HEAD X20.0 'FOR ' AREANAME

This heading line continues the table identification with the literal "FOR" printed after skipping 20 spaces, followed by the value of the item, AREANAME.

HEAD HEAD U40.0 TAB27

A blank heading line will be printed. The next heading line will print the universe label from Table 27 in a field of 40 characters.

ITEM ITEM X48.0 2C16.0 TAB27 (\*,1)

A blank line is printed. On the next line, 48 spaces will be skipped, followed by 2 category labels in fields of 16 characters each (2C16.0) for Table 27. The labels will be printed across the page for the first stratifier ((\*,1)). A field width of 16 allows for the length of the second label, "Renter occupied." The first label, "Total," will be left-justified and padded with blanks in a field of 16 characters. The array operator identifies the stratifier for which category labels will be printed. The user cannot access individual labels within a stratifier but must print all labels, using a linear (\*) or columnar (C) operator.

ITEM C40.0 TAB27 (1,C) 2F15.0 TAB27 (\*,C)

Category labels will be printed in fields of 40 characters each (C40.0) for Table 27. The labels will be printed in a column, one label per line, for the second stratifier ((1,C)). The labels will be followed by data cells from Table 27. Two fields of 15 characters each will be printed across the page containing values for the first stratifier. Data defined as numeric in the data dictionary, which includes all table cells in STF1, are right-justified in the output field. To space the data in columns of comparable width to the column labels, fields of 15 characters are specified. Values for the second stratifier will be listed in columns ((\*,C)).

ITEM COMPUTE \$LCTR001 = 100

A blank line will be printed and then the line counter will be set equal to 100. When a REPORT command is encountered, the value of the line counter (\$LCTR001) is checked. When the value is greater than the report pagesize (here equal to the default value of 58), a new report page is initiated. By computing the value of the line counter to be greater than 58 at the end of the set of commands, a new page of print will be forced for the report of each record.

Run 4

## Run 4 - Deriving Category Counts by Subtraction

The derivation and printing of implied category counts from the input data is illustrated. In Table 27, the counts of owner occupied units must be derived by subtraction. Often tables in the summary tape files leave one category of counts to be computed to save space on the file. Therefore, this run has applicability to a number of tables and illustrates the formatting and labeling of derived counts.

Commands:

```

FILEIN STF1
IF SUMRYLVL = '11' INCLUDE
COMPUTE TABOWN (1,*) = TAB27 (1,*) - TAB27 (2,*)
REPORT
HEAD 'REPORT GENERATION - RUN 4' X20.0 'PAGE ' $PAGE
HEAD HEAD X15.0 H40.0 TAB27
HEAD X15.0 U40.0 TAB27
ITEM ITEM 'COUNTY: ' AREANAME
ITEM X54.0 'RENTER OWNER'
ITEM X44.0 'TOTAL: OCCUPIED: OCCUPIED:'
ITEM C40.0 TAB27 (1,C) 3F10.0 TAB27 (*,C) TABOWN (1,C)
ITEM

```

Printout:

```

REPORT GENERATION - RUN 4 PAGE 1
TENURE (2) BY RACE OF HOUSEHOLDER (5)
UNIVERSE: OCCUPIED HOUSING UNITS

COUNTY: CHESTERFIELD
TOTAL: RENTER OWNER
OCCUPIED: OCCUPIED:
WHITE 36475 8121 28354
BLACK 3213 1179 2034
AMERICAN INDIAN, ESKIMO, AND ALEUT 59 22 37
ASIAN AND PACIFIC ISLANDER 197 58 139
OTHER 48 23 25

COUNTY: HENRICO
TOTAL: RENTER OWNER
OCCUPIED: OCCUPIED:
WHITE 54515 17810 36705
BLACK 7564 3151 4413
AMERICAN INDIAN, ESKIMO, AND ALEUT 118 38 80
ASIAN AND PACIFIC ISLANDER 322 200 122
OTHER 107 54 53

COUNTY: RICHMOND CITY
TOTAL: RENTER OWNER
OCCUPIED: OCCUPIED:
WHITE 48136 23018 25118
BLACK 35524 20849 14675
AMERICAN INDIAN, ESKIMO, AND ALEUT 135 87 48
ASIAN AND PACIFIC ISLANDER 315 225 90
OTHER 159 108 51

```

FILEIN STF1

Summary Tape File 1 is identified as the input file to be processed.

IF SUMRYLVL = '11' INCLUDE

Only records with a summary level code of 11 will be included in the processing. Code 11 identifies county level summary records.

COMPUTE TABOWN (1,\*) = TAB27 (1,\*) - TAB27 (2,\*)

The number of owners, by race, is calculated by subtracting counts of renters by race (TAB27 (2,\*)) from total householders by race (TAB27 (1,\*)). The new values are put in TABOWN (1,\*). The asterisks indicate the calculation is to be performed for each category of race.

REPORT

A printed report is to be produced.

HEAD 'REPORT GENERATION - RUN 4' X20.0 'PAGE ' \$PAGE

At the top of each page, a heading line will be printed with the literal string, 20 blank spaces, the word "PAGE," and the page number.

HEAD HEAD X15.0 H40.0 TAB27

A blank heading line is to be printed. The next heading line will print the heading label for Table 27 in a field of 40 characters (H40.0), after skipping 15 spaces (X15.0).

HEAD X15.0 U40.0 TAB27

A heading line will print the universe label for Table 27 in a field of 40 characters (U40.0) after skipping 15 spaces (X15.0).

ITEM ITEM 'COUNTY: ' AREANAME

After printing a blank line, a line will be printed with the literal string followed by the value of the item, AREANAME.

ITEM X54.0 'RENTER OWNER'

A line will be printed with the literal labels, after skipping 54 spaces. In this example column labels are provided by the user. Because the data cells are being printed in 9 character fields, the long "renter occupied" and "owner occupied" labels are split onto two print lines to keep the headings aligned over the columns of data.

ITEM X44.0 'TOTAL: OCCUPIED: OCCUPIED:'

This provides the rest of the column labels with a literal string, after skipping 44 spaces.

ITEM C40.0 TAB27 (1,C) 3F10.0 TAB27 (\*,C) TABOWN (1,C)

Category labels are printed in fields of 40 characters (C40.0) in a column, for the second stratifier of Table 27 ((1,C)). Data values for Table 27 are then printed. Three 10 character fields of data will appear across the page. The first two fields are the tenure categories of Table 27, with race categories listed in a column (TAB27 (\*,C)). The last column of data will be the newly calculated owner counts, with race categories again appearing in column form (TABOWN (1,C)).

ITEM

A blank line will be printed.

Run 5

## Run 5 - Calculation of Sum Totals

As a space saver, summary tape files do not provide totals across categories of a stratifier. The user may want to compute and display these sums in the table. This run illustrates derivation of a set of category counts by subtraction and calculation of sum totals with labeling and formatting for display.

Commands:

```

FILEIN STF1
IF SUMRYLVL = '11' INCLUDE
COMPUTE TABOWN (1,*) = TAB27 (1,*) - TAB27 (2,*)
COMPUTE TOTALHU = 0
COMPUTE TOTRENT = 0
COMPUTE TOTOWN = 0
COMPUTE TOTALHU = SUM(TAB27(1,*))
COMPUTE TOTRENT = SUM(TAB27(2,*))
COMPUTE TOTOWN = SUM(TABOWN(1,*))
REPORT
HEAD 'REPORT GENERATION - RUN 5' X20.0 'PAGE ' $PAGE
HEAD HEAD X15.0 H40.0 TAB27
HEAD X15.0 U40.0 TAB27
ITEM ITEM 'COUNTY: ' AREANAME
ITEM X54.0 'RENTER OWNER'
ITEM X44.0 'TOTAL: OCCUPIED: OCCUPIED:'
ITEM C40.0 TAB27 (1,C) 3F10.0 TAB27 (*,C) TABOWN (1,C)
ITEM X45.0 '-----'
ITEM 'TOTAL' X35.0 3F10.0 TOTALHU TOTRENT TOTOWN

```

Printout:

```

REPORT GENERATION - RUN 5                                PAGE 1
TENURE (2) BY RACE OF HOUSEHOLDER (5)
UNIVERSE: OCCUPIED HOUSING UNITS

COUNTY: CHESTERFIELD

TOTAL: RENTER OWNER
OCCUPIED: OCCUPIED:
WHITE 36475 8121 28354
BLACK 3213 1179 2034
AMERICAN INDIAN, ESKIMO, AND ALEUT 59 22 37
ASIAN AND PACIFIC ISLANDER 197 58 139
OTHER 48 23 25
-----
TOTAL 39992 9403 30589

COUNTY: HENRICO

TOTAL: RENTER OWNER
OCCUPIED: OCCUPIED:
WHITE 54515 17810 36705
BLACK 7564 3151 4413
AMERICAN INDIAN, ESKIMO, AND ALEUT 118 38 80
ASIAN AND PACIFIC ISLANDER 322 200 122
OTHER 107 54 53
-----
TOTAL 62626 21253 41373

COUNTY: RICHMOND CITY

TOTAL: RENTER OWNER
OCCUPIED: OCCUPIED:
WHITE 48136 23018 25118
BLACK 35524 20849 14675
AMERICAN INDIAN, ESKIMO, AND ALEUT 135 87 48
ASIAN AND PACIFIC ISLANDER 315 225 90
OTHER 159 108 51
-----
TOTAL 84269 44287 39982

```

FILEIN STF1

Summary Tape File 1 is identified as the input file to be processed.

IF SUMRYLVL = '11' INCLUDE

Only records with a summary level code of 11 will be included in the processing. Code 11 identifies county level summary records.

COMPUTE TABOWN (1,\*) = TAB27 (1,\*) - TAB27 (2,\*)

The number of owners, by race, is calculated by subtracting counts of renters by race (TAB27 (2,\*)) from total householders by race (TAB27 (1,\*)). The new values are put in TABOWN (1,\*).

COMPUTE TOTALHU = 0

The value of total housing units is set to zero. This initialization is necessary whenever the SUM keyword is to be used to derive a total across categories of a table for individual records. The value of a newly computed item is only set to zero at the beginning of a run and thus SUM would continue to add values across records unless set to zero at the beginning of record processing.

COMPUTE TOTRENT = 0

The value of total renter occupied units is set to zero, before deriving a sum total of renters.

COMPUTE TOTOWN = 0

The value of total owner occupied units is set to zero, before deriving a sum total of owners.

COMPUTE TOTALHU = SUM(TAB27 (1,\*))

The total number of housing units is calculated by summing across all categories of the second stratifier, race.

COMPUTE TOTRENT = SUM(TAB27 (2,\*))

The total number of renter occupied housing units is calculated by summing across all categories of the second stratifier, race.

COMPUTE TOTOWN = SUM(TABOWN (1,\*))

The total number of owner occupied housing units is calculated by summing across all categories of the second stratifier, race.

REPORT

A printed report is to be produced.

HEAD 'REPORT GENERATION - RUN 5' X20.0 'PAGE '

At the top of each page, a heading line will be printed with the literal string, 20 blank spaces, the word "PAGE," and the page number.

HEAD HEAD X15.0 H40.0 TAB27

A blank heading line is to be printed. The next heading line will print the heading label for Table 27 in a field of 40 characters (H40.0), after skipping 15 spaces (X15.0).

HEAD X15.0 U40.0 TAB27

A heading line will print the universe label for Table 27 in a field of 40 characters (U40.0) after skipping 15 spaces (X15.0).

ITEM ITEM 'COUNTY: ' AREANAME

For each record, after printing a blank line, a line will be printed with the literal string followed by the value of the item, AREANAME.

ITEM X54.0 'RENTER OWNER'

A line will be printed with the literal labels, after skipping 54 spaces. In this example, column labels are provided by the user. Because the data cells are being printed in 9 character fields, the long "renter occupied" and "owner occupied" labels are split onto two print lines to keep the headings aligned over the columns of data.

ITEM X44.0 'TOTAL: OCCUPIED: OCCUPIED:'

This provides the rest of the column labels with a literal string, after skipping 44 spaces.

ITEM C40.0 TAB27 (1,C) 3F10.0 TAB27 (\*,C) TABOWN (1,C)

Category labels are printed in fields of 40 characters (C40.0) in a column, for the second stratifier of Table 27 ((1,C)). Data values for Table 27 are then printed. Three 10 character fields of data will appear across the page. The first two fields are the tenure categories of Table 27, with race categories listed in a column (TAB27 (\*,C)). The last column of data will be the newly calculated owner counts, with race categories again appearing in column form (TABOWN (1,C)).

ITEM X45.0 '-----        -----        -----'

To delineate the derived sums from the tabular data, this literal string is printed after skipping 45 spaces.

ITEM 'TOTAL' X35.0 3F10.0 TOTALHU TOTRENT TOTOWN

The literal label "TOTAL" is printed and 35 spaces are skipped. Three fields of 10 characters each are then printed containing the new sum totals of all, renter occupied, and owner occupied housing units.

Run 6

## Run 6 - Printing of Multiple Line Universe Label

The next series of runs works with a one dimensional table and illustrates derivation and display of totals. It exemplifies Bureau conventions in abbreviated presentation of tables on tapes and discusses some constraints of dictionary labeling.

This first run reports the data from the input record using dictionary labeling. With the format of the labels and the presence of only three data cells, the table appears incomplete. The next two runs demonstrate the complete structuring of the table for a report. The formatting for printing a two-line universe label is discussed.

Commands:

```

FILEIN STF1
IF SUMRYLVL = '11' INCLUDE
REPORT
HEAD 'REPORT GENERATION - RUN 6' X20.0 'PAGE ' $PAGE
ITEM      ITEM
ITEM 'TABLE 21 FOR COUNTY: ' AREANAME ITEM
ITEM H40.0 TAB21
ITEM U40.0 TAB21
ITEM U40.041 TAB21 ITEM
ITEM C25.0 TAB21 (C) TAB21 (C)

```

REPORT GENERATION - RUN 6 PAGE 1

Printout:

TABLE 21 FOR COUNTY: CHESTERFIELD

PERSONS IN HOUSEHOLD AND HOUSEHOLD TYPE  
UNIVERSE: HOUSEHOLDS WITH ONE OR MORE  
PERSONS 60 YEARS AND OVER

1 PERSON	1346
FAMILY HOUSEHOLD	4832
NONFAMILY HOUSEHOLD	97

TABLE 21 FOR COUNTY: HENRICO

PERSONS IN HOUSEHOLD AND HOUSEHOLD TYPE  
UNIVERSE: HOUSEHOLDS WITH ONE OR MORE  
PERSONS 60 YEARS AND OVER

1 PERSON	4259
FAMILY HOUSEHOLD	11115
NONFAMILY HOUSEHOLD	262

TABLE 21 FOR COUNTY: RICHMOND CITY

PERSONS IN HOUSEHOLD AND HOUSEHOLD TYPE  
UNIVERSE: HOUSEHOLDS WITH ONE OR MORE  
PERSONS 60 YEARS AND OVER

1 PERSON	10401
FAMILY HOUSEHOLD	16838
NONFAMILY HOUSEHOLD	1331

Run 6

FILEIN STF1

Summary Tape File 1 is identified as the input file to be processed.

IF SUMRYLVL = '11' INCLUDE

Only records with a summary level code of 11 will be included in the processing. Code 11 identifies county level summary records.

REPORT

A printed report is to be produced.

HEAD 'REPORT GENERATION - RUN 6' X20.0 'PAGE ' \$PAGE

At the top of each page, a heading line will be printed with the literal string, 20 blank spaces, the word "PAGE," and the page number.

ITEM ITEM

Two blank lines will be printed.

ITEM 'TABLE 21 FOR COUNTY: ' AREANAME ITEM

The literal character string identifying the table number will be printed followed by the value of AREANAME. A blank line will then be printed.

ITEM H40.0 TAB21

The heading label for Table 21, "PERSONS IN HOUSEHOLD AND HOUSEHOLD TYPE," will be printed in a field of 40 characters (H40.0).

ITEM U40.0 TAB21

The universe label for Table 21 is greater than 40 characters in length, as noted in the printed data dictionary. The label is actually stored as two strings up to 40 characters in length, each string defining the separate printed lines. This ITEM command will print the first character string in a field of 40 characters, i.e., Universe: Households with One or More. The number following the decimal point in the format statement (here 0) specifies the beginning position in the label. A zero or one to the right of the decimal both indicate printing beginning with the first character of the label.

ITEM U40.041 TAB21 ITEM

On the next line, another field of 40 characters of the universe label for Table 21 will be printed beginning with character 41 of the label. The second string of 40 characters is actually stored with leading blanks to indent the second line of the label as it appears in the printed dictionary. Therefore, the first 12 characters of this print line will be blanks. The second ITEM command will print a blank line.

Note: When specifying a beginning position other than 0 to the right of the decimal point, a 3-digit number must be used.

ITEM C25.0 TAB21 (C) TAB21 (C)

Category labels will be printed in a column of 25 character fields (C25.0 TAB21 (C)). The labels will be followed by the data cells of Table 21 printed in a column (TAB21 (C)).

Run 7

## Run 7 - Printing Extended Universe Label and Subgroup Label

The output from the previous run is modified to include a subgroup label and to print the universe label on one line. Universe labels over 40 characters in length require special formatting in CENSPAC since the labels are stored as multiple strings of maximum 40 characters. In addition, the insertion of a label between category labels of a stratifier, as illustrated here, causes the loss of the ability to use dictionary labels for that stratifier. All category labels of a stratifier from the data dictionary must be accessed and printed consecutively.

Commands:

```

FILEIN STF1
IF SUMRYLVL = '11' INCLUDE
REPORT
HEAD 'REPORT GENERATION - RUN 7' X20.0 'PAGE ' $PAGE
ITEM
ITEM 'TABLE 21 FOR COUNTY: ' AREANAME ITEM
ITEM H40.0 TAB21
ITEM U39.0 TAB21 U30.053 TAB21 ITEM
ITEM '1 PERSON:' X16.0 TAB21 (1)
ITEM '2 OR MORE PERSONS:'
ITEM ' FAMILY HOUSEHOLD' X7.0 TAB21 (2)
ITEM ' NONFAMILY HOUSEHOLD' X4.0 TAB21 (3)

```

Printout:

```

REPORT GENERATION - RUN 7                                PAGE      1
TABLE 21 FOR COUNTY: CHESTERFIELD
PERSONS IN HOUSEHOLD AND HOUSEHOLD TYPE
UNIVERSE: HOUSEHOLDS WITH ONE OR MORE PERSONS 60 YEARS AND OVER
1 PERSON:                                                1346
2 OR MORE PERSONS:
  FAMILY HOUSEHOLD                                       4832
  NONFAMILY HOUSEHOLD                                    97
TABLE 21 FOR COUNTY: HENRICO
PERSONS IN HOUSEHOLD AND HOUSEHOLD TYPE
UNIVERSE: HOUSEHOLDS WITH ONE OR MORE PERSONS 60 YEARS AND OVER
1 PERSON:                                                4259
2 OR MORE PERSONS:
  FAMILY HOUSEHOLD                                       11115
  NONFAMILY HOUSEHOLD                                    262
TABLE 21 FOR COUNTY: RICHMOND CITY
PERSONS IN HOUSEHOLD AND HOUSEHOLD TYPE
UNIVERSE: HOUSEHOLDS WITH ONE OR MORE PERSONS 60 YEARS AND OVER
1 PERSON:                                                10401
2 OR MORE PERSONS:
  FAMILY HOUSEHOLD                                       16838
  NONFAMILY HOUSEHOLD                                    1331

```

## FILEIN STF1

Summary Tape File 1 is identified as the input file to be processed.

IF SUMRYLVL = '11' INCLUDE

Only records with a summary level code of 11 will be included in the processing. Code 11 identifies county level summary records.

## REPORT

A printed report is to be produced.

HEAD 'REPORT GENERATION - RUN 7' X20.0 'PAGE ' \$PAGE

At the top of each page, a heading line will be printed with the literal string, 20 blank spaces, the word "PAGE," and the page number.

## ITEM

A blank line will be printed.

ITEM 'TABLE 21 FOR COUNTY: ' AREANAME      ITEM

The literal character string identifying the table number will be printed followed by the value of AREANAME. A blank line will then be printed.

ITEM H40.0 TAB21

The heading label for Table 21, "PERSONS IN HOUSEHOLD AND HOUSEHOLD TYPE," will be printed in a field of 40 characters (H40.0).

ITEM U39.0 TAB21 U30.053 TAB21        ITEM

The universe label is to be printed on one line. The first 39 characters of the first universe label string is to be printed for Table 21 (U39.0). The string of the universe label corresponds to the line in the printed data dictionary, "Universe: Households with One or More." A field of 39 allows for the alphabetic string and one blank for spacing. The next format code specifies a character string of 30 characters beginning in position of 53 of the universe label. Because the continuation of the label is to be printed on the same line, the 12 leading blanks of the second character string are eliminated and printing begins with character 53 (U30.053).

Note: When specifying a beginning position other than 0 to the right of the decimal point, a 3-digit number must be used.

ITEM '1 PERSON:' X16.0 TAB21 (1)

Category labels for this table are provided as literal strings in order to print the group label, "2 or more persons:." Group labels cannot be accessed and category labels from the data dictionary cannot be printed individually, but must be referenced to print for all categories either across or down the page. This ITEM command prints the first category label, skips 16 spaces, and then prints cell 1 of Table 21.

ITEM '2 OR MORE PERSONS:'

The literal string will be printed providing the group label for the subtotals which will follow on subsequent print lines.

ITEM ' FAMILY HOUSEHOLD' X7.0 TAB21 (2)

This category label is indented two spaces because it is a subgroup under "2 or more persons." Seven spaces are skipped and cell 2 of Table 21 is printed.

ITEM ' NONFAMILY HOUSEHOLD' X4.0 TAB21 (3)

This category label is indented to indicate a subgroup. Four spaces are skipped and cell 3 of Table 21 is printed.

## Run 8 - Subtotal and Grand Total Calculations

This run extends the output of the previous run by calculating and printing a subtotal and a grand total, with labels. The universe label, over 40 characters in length, is printed on one line.

Commands:

```

FILEIN STF1
IF SUMRYLVL = '11' INCLUDE
COMPUTE TOT2PLUS = TAB21 (2) + TAB21 (3)
COMPUTE TOTALALL = 0
COMPUTE TOTALALL = SUM(TAB21(*))
REPORT
HEAD 'REPORT GENERATION - RUN 8' X20.0 'PAGE ' $PAGE
ITEM
ITEM 'TABLE 21 FOR COUNTY: ' AREANAME ITEM
ITEM H40.0 TAB21
ITEM U39.0 TAB21 U30.053 TAB21 ITEM
ITEM '1 PERSON:' X16.0 TAB21 (1)
ITEM '2 OR MORE PERSONS:' X7.0 F9.0 TOT2PLUS
ITEM ' FAMILY HOUSEHOLD' X7.0 TAB21 (2)
ITEM ' NONFAMILY HOUSEHOLD' X4.0 TAB21 (3)
ITEM 'TOTAL:' X19.0 F9.0 TOTALALL

```

REPORT GENERATION - RUN 8 PAGE 1

## TABLE 21 FOR COUNTY: CHESTERFIELD

Printout:

PERSONS IN HOUSEHOLD AND HOUSEHOLD TYPE  
UNIVERSE: HOUSEHOLDS WITH ONE OR MORE PERSONS 60 YEARS AND OVER

1 PERSON:	1346
2 OR MORE PERSONS:	4929
FAMILY HOUSEHOLD	4832
NONFAMILY HOUSEHOLD	97
TOTAL:	6275

## TABLE 21 FOR COUNTY: HENRICO

PERSONS IN HOUSEHOLD AND HOUSEHOLD TYPE  
UNIVERSE: HOUSEHOLDS WITH ONE OR MORE PERSONS 60 YEARS AND OVER

1 PERSON:	4259
2 OR MORE PERSONS:	11377
FAMILY HOUSEHOLD	11115
NONFAMILY HOUSEHOLD	262
TOTAL:	15636

## TABLE 21 FOR COUNTY: RICHMOND CITY

PERSONS IN HOUSEHOLD AND HOUSEHOLD TYPE  
UNIVERSE: HOUSEHOLDS WITH ONE OR MORE PERSONS 60 YEARS AND OVER

1 PERSON:	10401
2 OR MORE PERSONS:	18169
FAMILY HOUSEHOLD	16838
NONFAMILY HOUSEHOLD	1331
TOTAL:	28570

FILEIN STF1

Summary Tape File 1 is identified as the input file to be processed.

IF SUMRYLVL = '11' INCLUDE

Only records with a summary level code of 11 will be included in the processing. Code 11 identifies county level summary records.

COMPUTE TOT2PLUS = TAB21 (2) + TAB21 (3)

A total number of households with 2 or more persons is calculated by adding cells 2 and 3 of Table 21.

COMPUTE TOTALALL = 0

The value of total households in table 21 is set to zero, before deriving a sum total. See discussion of initialization for Run 5.

COMPUTE TOTALALL = SUM(TAB21 (\*))

The total number of households is calculated by summing across all categories of Table 21.

REPORT

A printed report is to be produced.

HEAD 'REPORT GENERATION - Run 8 ' X20.0 'PAGE ' \$PAGE

At the top of each page, a heading line will be printed with the literal string, 20 blank spaces, the word "PAGE," and the page number.

ITEM

A blank line will be printed.

ITEM 'TABLE 21 FOR COUNTY: ' AREANAME      ITEM

The literal character string identifying the table number will be printed followed by the value of AREANAME. A blank line will then be printed.

ITEM H40.0 TAB21

The heading label for Table 21, "PERSONS IN HOUSEHOLD AND HOUSEHOLD TYPE," will be printed in a field of 40 characters (H40.0).

ITEM U39.0 TAB21 U30.053 TAB21 ITEM

The universe label is to be printed on one line. The first 39 characters of the first universe label string is to be printed for Table 21 (U39.0). This string of the universe label corresponds to the line in the printed data dictionary, "Universe: Households with One or More." A field of 39 allows for the alphabetic string and one blank for spacing. The next format code specifies a character string of 30 characters beginning in position 53 of the universe label. Because the continuation of the label is to be printed on the same line, the 12 leading blanks of the second character string are eliminated and printing begins with character 53 (U30.053).

Note: When specifying a beginning position other than 0 to the right of the decimal point, a 3-digit number must be used.

ITEM '1 PERSON: ' X16.0 TAB21 (1)

Category labels for this table are provided as literal strings in order to print the group label, "2 or more persons:." Group labels cannot be accessed and category labels from the data dictionary cannot be printed individually, but must be referenced to print for all categories either across or down the page. This ITEM command prints the first category label, skips 16 spaces, and then prints cell 1 of Table 21.

ITEM '2 OR MORE PERSONS:' X7.0 F9.0 TOT2PLUS

The literal string will be printed providing the group label. Seven spaces are skipped and the value of the subtotal is printed in a field of 9 characters (F9.0).

ITEM ' FAMILY HOUSEHOLD' X7.0 TAB21 (2)

This category label is indented two spaces because it is a subgroup under "2 or more persons." Seven spaces are skipped and cell 2 of Table 21 is printed.

ITEM ' NONFAMILY HOUSEHOLD' X4.0 TAB21 (3)

This category label is indented to indicate a subgroup. Four spaces are skipped and cell 3 of Table 21 is printed.

ITEM 'TOTAL: ' X19.0 F9.0 TOTALALL

The literal string will label the newly computed total which will be printed in a field of 9 characters (F9.0) after skipping 19 spaces.

## Run 9 - Geographic Area Summary Followed by Component Area Summaries

Population counts are printed for places followed by summaries for tracts or part tracts within the place. Part tract summaries are identified. This processing could be modified for printing of any tables of records nested by geographic area. The ordering of the print lines is dependent on the sort sequence of records in the file.

The records are processed through the command sequence and the report lines are printed in the order in which the records occur in the file. Because of the hierarchical sequencing of the summary tape files, a place summary record is followed by summary records for its smaller units of geography, including tracts. Since summaries respect the boundaries of the larger units in which they are nested, part tract totals appear when the tract is split by place boundaries. These part tract summaries are indicated in the printout.

Commands:

```

FILEIN STF1
IF SUMRYLVL = '13' OR SUMRYLVL = '14' INCLUDE
*
* CALCULATE TOTAL POPULATION USING SUM
COMPUTE TOTPOP = 0
COMPUTE TOTPOP = SUM(TAB6(*))
REPORT HEAD 'REPORT GENERATION - RUN 9' X20.0 'PAGE ' $PAGE
HEAD 'POPULATION COUNTS FOR PLACES' ' AND THEIR TRACTS'
HEAD
HEAD X40.0 ' TOTAL: MALE: FEMALE:'
*
* IF PLACE SUMMARY, LABEL PLACE
IF SUMRYLVL = '13' ITEM
ITEM 'PLACE: ' A33.0 AREANAME 3F9.0 TOTPOP TAB6(*)
*
* IF TOTAL TRACT SUMMARY, LABEL TRACT
IF SUMRYLVL = '14' AND PARTTRCT = '2'
ITEM ' TRACT-' TRACT X25.0 3F9.0 TOTPOP TAB6(*)
*
* IF PART TRACT SUMMARY, LABEL AS PART TRACT
IF SUMRYLVL = '14' AND PARTTRCT = '1'
ITEM ' TRACT-' TRACT ' (PART) ' X15.0
3F9.0 TOTPOP TAB6 (*)

```

Run 9

Printout:

REPORT GENERATION - RUN 9		PAGE		
POPULATION COUNTS FOR PLACES AND THEIR TRACTS		1		
		TOTAL:	MALE:	FEMALE:
PLACE: CHESTER				
TRACT-100408	(PART)	5214	2565	2649
TRACT-100502	(PART)	189	91	98
TRACT-100503		4195	2059	2136
		830	415	415
PLACE: BALANCE OF BERMUDA				
TRACT-100403		17071	8572	8499
TRACT-100404		2474	1263	1211
TRACT-100406		1159	617	542
TRACT-100407		1441	718	723
TRACT-100408	(PART)	3210	1577	1633
TRACT-100501		3442	1713	1729
TRACT-100502	(PART)	2858	1458	1400
TRACT-100504		1818	880	938
TRACT-100811		669	346	323
PLACE: BALANCE OF CLOVER HILL				
TRACT-100204		36433	17862	18571
TRACT-100205		1252	594	658
TRACT-100206		5185	2448	2737
TRACT-100207		2537	1235	1302
TRACT-100208		4033	1954	2079
TRACT-100703		1552	763	789
TRACT-100808		3584	1794	1790
TRACT-100909		5909	2885	3024
TRACT-100910		3325	1658	1667
TRACT-100911		1944	952	992
TRACT-100912		1672	845	827
TRACT-100913		1016	507	509
TRACT-101000		4424	2227	2197

Run 9

FILEIN STF1

Summary Tape File 1 is identified as the input file to be processed.

IF SUMRYLVL = '13' OR SUMRYLVL = '14' INCLUDE

Only records with a summary level code of 13 or 14 will be included in the processing. Code 13 identifies place or part place level summary records. Tract or part tract summaries are identified by code 14.

\*

\*CALCULATE TOTAL POPULATION USING SUM

These comment cards indicate the purpose of the computation to follow.

COMPUTE TOTPOP = 0

The value of total population is set to zero, before deriving a sum total. See discussion of initialization in Run 5.

COMPUTE TOTPOP = SUM(TAB6 (\*))

The total population is calculated by summing across the stratifier, sex.

REPORT HEAD 'REPORT GENERATION - RUN 9' X20.0 'PAGE ' \$PAGE

A printed report is to be produced. At the top of each page, a heading line will be printed with the literal string, 20 blank spaces, the word "PAGE," and the page number.

HEAD 'POPULATION COUNTS FOR PLACES' ' AND THEIR TRACTS'

Another heading line will be printed with the title provided here. The title is split into two literal strings because it exceeds 40 characters.

HEAD

A blank heading line will be printed.

HEAD X40.0 ' TOTAL: MALE: FEMALE:'

This heading line will provide column labels for data to be printed down the page. Forty spaces will be skipped (X40.0) and then the literal string will appear.

\*

\* IF PLACE SUMMARY, LABEL PLACE

These comment cards indicate the purpose of the record selection and labeling to follow.

IF SUMRYLVL = '13' ITEM  
ITEM 'PLACE: ' A33.0 AREANAME 3F9.0 TOTPOP TAB6(\*);

If the record is a place summary, first a blank line will be printed. The next line will print the literal string, the value of AREANAME in a field of 33 characters (A33.0), and three data values in 9 character fields containing total population and the two data cells of Table 6. The width of AREANAME was calculated to allow for the largest name associated with a record. The IF condition is terminated with a semi-colon (;).

\*

\*IF TOTAL TRACT SUMMARY, LABEL TRACT

These comment cards indicate the purpose of the record selection and labeling to follow.

IF SUMRYLVL = '14' AND PARTTRACT = '2'  
ITEM ' TRACT-' TRACT X25.0 3F9.0 TOTPOP TAB6(\*);

If the record is a tract summary and the tract is not split, then a line will be printed with the literal string followed by the tract code. After skipping 25 spaces, three data values in 9 character fields will be printed containing total population and the two data cells of Table 6. The IF condition is terminated with a semicolon (;).

\*

\* IF PART TRACT SUMMARY, LABEL AS PART TRACT

These comment cards indicate the purpose of the record selection and labeling to follow.

```
IF SUMYRLVL = '14' AND PARTTRACT = '1'  
ITEM '   TRACT-' TRACT '   (PART)   ' X15.0  
    3F9.0 TOTPOP TAB6 (*)
```

If the record is a tract summary and the tract is split, then a line will be printed with the literal string followed by the tract code and another literal string identifying the summaries as part totals. After skipping 15 spaces, three data values in 9 character fields will be printed containing total population and the two data cells of Table 6. The IF condition is terminated with the end of the run.

## Run 10 - Selective Page Ejection

The user may want to create a separate report for a geographic unit and its component areas such as for a county and places within it. This run uses this example and initiates a print page whenever data for a new county are to be printed. Place summaries for that county follow on the same or additional pages. As in Run 9, the sort sequence of the file is central to the ordering of printed tables. Because place summaries are nested within counties in the file, all place records for a county appear in sequence. Only when the next county code is detected is a page eject forced.

Commands:

```

FILEIN STFI
IF SUMRYLVL = '11' OR SUMRYLVL = '13' INCLUDE
REPORT PAGESIZE(45)
HEAD 'REPORT GENERATION - RUN 10' X20.0 'PAGE ' $PAGE
HEAD 'TABLE 14 FOR COUNTIES AND THEIR PLACES'
HEAD
HEAD H40.0 TAB14
HEAD U40.0 TAB14
IF SUMRYLVL = '11' AND $LCR001 > 6 COMPUTE $LCR001 = 60 ITEM;
IF SUMRYLVL = '11'
ITEM      ITEM 'COUNTY: ' AREANAME;
IF SUMRYLVL = '13' ITEM      ITEM 'PLACE: ' AREANAME;
ITEM X34.0 2C9.0 TAB14 (*,1)
ITEM C30.0 TAB14 (1,C) TAB14 (*,C)

```

Printout:

```

REPORT GENERATION - RUN 10                PAGE      1
TABLE 14 FOR COUNTIES AND THEIR PLACES

SEX (2) BY MARITAL STATUS (5)
UNIVERSE: PERSONS 15 YEARS AND OVER

COUNTY: CHESTERFIELD
      MALE:      FEMALE:
SINGLE                11035      9690
NOW MARRIED, EXCEPT SEPARATED 30757      30679
SEPARATED              771      1080
WIDOWED                 559      3194
DIVORCED                1655      2457

PLACE: CHESTER
      MALE:      FEMALE:
SINGLE                484      396
NOW MARRIED, EXCEPT SEPARATED 1271      1267
SEPARATED              30      51
WIDOWED                 29      175
DIVORCED                77      110

PLACE: BALANCE OF BERMUDA
      MALE:      FEMALE:
SINGLE                1457      1079
NOW MARRIED, EXCEPT SEPARATED 4183      4149
SEPARATED              166      173
WIDOWED                 99      473
DIVORCED                361      391

PLACE: BALANCE OF CLOVER HILL
      MALE:      FEMALE:
SINGLE                2628      2387
NOW MARRIED, EXCEPT SEPARATED 9371      9389
SEPARATED              172      237
WIDOWED                 124      775
DIVORCED                344      588

PLACE: BALANCE OF DALE
      MALE:      FEMALE:
SINGLE                2129      1612
NOW MARRIED, EXCEPT SEPARATED 6247      6159
SEPARATED              215      267
WIDOWED                 97      644
DIVORCED                454      650

```

REPORT GENERATION - RUN 10  
TABLE 14 FOR COUNTIES AND THEIR PLACES

PAGE 2

REPORT GENERATION - RUN 10  
TABLE 14 FOR COUNTIES AND THEIR PLACES

PAGE 3

SEX (2) BY MARITAL STATUS (5)  
UNIVERSE: PERSONS 15 YEARS AND OVER

SEX (2) BY MARITAL STATUS (5)  
UNIVERSE: PERSONS 15 YEARS AND OVER

PLACE: ETRICK

MALE:  
SINGLE 960  
NOW MARRIED, EXCEPT SEPARATED 362  
SEPARATED 8  
WIDOWED 19  
DIVORCED 29

FEMALE:  
SINGLE 1328  
NOW MARRIED, EXCEPT SEPARATED 375  
SEPARATED 29  
WIDOWED 122  
DIVORCED 57

PLACE: MATOACA

MALE:  
SINGLE 138  
NOW MARRIED, EXCEPT SEPARATED 409  
SEPARATED 9  
WIDOWED 14  
DIVORCED 20

FEMALE:  
SINGLE 114  
NOW MARRIED, EXCEPT SEPARATED 408  
SEPARATED 16  
WIDOWED 89  
DIVORCED 36

PLACE: BALANCE OF MATOACA

MALE:  
SINGLE 1020  
NOW MARRIED, EXCEPT SEPARATED 2584  
SEPARATED 56  
WIDOWED 80  
DIVORCED 116

FEMALE:  
SINGLE 816  
NOW MARRIED, EXCEPT SEPARATED 2594  
SEPARATED 99  
WIDOWED 338  
DIVORCED 184

PLACE: BON AIR

MALE:  
SINGLE 1485  
NOW MARRIED, EXCEPT SEPARATED 4026  
SEPARATED 84  
WIDOWED 35  
DIVORCED 154

FEMALE:  
SINGLE 1268  
NOW MARRIED, EXCEPT SEPARATED 4032  
SEPARATED 126  
WIDOWED 332  
DIVORCED 278

PLACE: BALANCE OF MIDLOTHIAN

MALE:  
SINGLE 734  
NOW MARRIED, EXCEPT SEPARATED 2304  
SEPARATED 31  
WIDOWED 62  
DIVORCED 100

FEMALE:  
SINGLE 690  
NOW MARRIED, EXCEPT SEPARATED 2306  
SEPARATED 82  
WIDOWED 246  
DIVORCED 163

COUNTY: HENRICO

MALE:  
SINGLE 15274  
NOW MARRIED, EXCEPT SEPARATED 42306  
SEPARATED 1250  
WIDOWED 1182  
DIVORCED 2404

FEMALE:  
SINGLE 14577  
NOW MARRIED, EXCEPT SEPARATED 42390  
SEPARATED 2109  
WIDOWED 8361  
DIVORCED 5152

PLACE: LAKESIDE

MALE:  
SINGLE 696  
NOW MARRIED, EXCEPT SEPARATED 2345  
SEPARATED 48  
WIDOWED 62  
DIVORCED 123

FEMALE:  
SINGLE 767  
NOW MARRIED, EXCEPT SEPARATED 2352  
SEPARATED 86  
WIDOWED 661  
DIVORCED 351

PLACE: BALANCE OF BROOKLAND

MALE:  
SINGLE 2314  
NOW MARRIED, EXCEPT SEPARATED 5894  
SEPARATED 190  
WIDOWED 147  
DIVORCED 428

FEMALE:  
SINGLE 2363  
NOW MARRIED, EXCEPT SEPARATED 5914  
SEPARATED 344  
WIDOWED 1036  
DIVORCED 907

PLACE: HIGHLAND SPRINGS

MALE:  
SINGLE 83  
NOW MARRIED, EXCEPT SEPARATED 223  
SEPARATED 16  
WIDOWED 14  
DIVORCED 18

FEMALE:  
SINGLE 59  
NOW MARRIED, EXCEPT SEPARATED 224  
SEPARATED 14  
WIDOWED 89  
DIVORCED 22

PLACE: LAKESIDE

MALE:  
SINGLE 212  
NOW MARRIED, EXCEPT SEPARATED 586  
SEPARATED 12  
WIDOWED 31  
DIVORCED 47

FEMALE:  
SINGLE 193  
NOW MARRIED, EXCEPT SEPARATED 588  
SEPARATED 25  
WIDOWED 322  
DIVORCED 85

REPORT GENERATION - RUN 10  
TABLE 14 FOR COUNTIES AND THEIR PLACES

PAGE 4

SEX (2) BY MARITAL STATUS (5)  
UNIVERSE: PERSONS 15 YEARS AND OVER

PLACE: BALANCE OF FAIRFIELD

SINGLE	MALE:	2878	FEMALE:	2951
NOW MARRIED, EXCEPT SEPARATED	7371	7399		
SEPARATED	298	494		
WIDOWED	206	1560		
DIVORCED	455	861		

PLACE: BALANCE OF THREE CHOPT

SINGLE	MALE:	2694	FEMALE:	2543
NOW MARRIED, EXCEPT SEPARATED	7217	7218		
SEPARATED	209	321		
WIDOWED	242	1744		
DIVORCED	419	911		

PLACE: BALANCE OF TUCKAHOE

SINGLE	MALE:	3338	FEMALE:	3197
NOW MARRIED, EXCEPT SEPARATED	9556	9578		
SEPARATED	192	370		
WIDOWED	184	1173		
DIVORCED	391	983		

PLACE: HIGHLAND SPRINGS

SINGLE	MALE:	619	FEMALE:	491
NOW MARRIED, EXCEPT SEPARATED	1880	1883		
SEPARATED	63	98		
WIDOWED	64	390		
DIVORCED	106	267		

PLACE: BALANCE OF VARINA

SINGLE	MALE:	2440	FEMALE:	2013
NOW MARRIED, EXCEPT SEPARATED	7234	7234		
SEPARATED	222	357		
WIDOWED	232	1386		
DIVORCED	417	765		

REPORT GENERATION - RUN 10  
TABLE 14 FOR COUNTIES AND THEIR PLACES

PAGE 5

SEX (2) BY MARITAL STATUS (5)  
UNIVERSE: PERSONS 15 YEARS AND OVER

COUNTY: RICHMOND CITY

SINGLE	MALE:	29119	FEMALE:	30119
NOW MARRIED, EXCEPT SEPARATED	39068	39068		
SEPARATED	3591	5688		
WIDOWED	2882	16120		
DIVORCED	5049	8334		

PLACE: RICHMOND

SINGLE	MALE:	29119	FEMALE:	30119
NOW MARRIED, EXCEPT SEPARATED	39068	39068		
SEPARATED	3591	5688		
WIDOWED	2882	16120		
DIVORCED	5049	8334		

FILEIN STF1

Summary Tape File 1 is identified as the input file to be processed.

IF SUMRYLVL = '11' OR SUMRYLVL = '13' INCLUDE

Only records with a summary level code of 11 or 13 will be included in the processing. Code 11 identifies county level summary records. Code 13 identifies place or part place summary level records within county.

REPORT PAGESIZE (45)

A printed report is to be produced with 45 lines of print per page. This value was calculated to cause a break between tables. It is the sum of a multiple of the number of lines of print per record and the number of lines of heading. In this run, there are 5 lines of heading per page, and 8 lines of print per record. Allowing 5 record reports per page (40 lines), the pagesize is calculated to be  $5+40$ , or 45. To allow one more record report on the page, the pagesize would be  $6 \times 8 = 48$ , plus the 5 heading lines, or 53 lines.

HEAD 'REPORT GENERATION - RUN10'X20.0 'PAGE ' \$PAGE

At the top of each page, a heading line will be printed with the literal string, 20 blank spaces, the word "PAGE," and the page number.

HEAD 'TABLE 14 FOR COUNTIES AND THEIR PLACES '

The literal string will be printed as a heading line.

HEAD

A blank heading line will be printed.

HEAD H40.0 TAB14

The heading label for Table 14, "SEX (2) BY MARITAL STATUS (5)," will be printed in a field of 40 characters (H40.0).

HEAD U40.0 TAB14

The universe label for Table 14, "Universe: Persons 15 years and over," will be printed in a field of 40 characters (U40.0).

Run 10

```
IF SUMRYLVL = '11' AND $LCTR001 > 6 COMPUTE $LCTR001 = 60 ITEM;
```

A page eject is to be forced, that is, begun before 45 lines have been printed, only when the next table to be printed contains county data. In order to achieve this selective new page, the line counter is computed to a value greater than the page size only when a county level record is being processed.

When a REPORT command is encountered, the value of the line counter is checked and if greater than or equal to the pagesize, the heading lines are printed on a new page. In Run 3, the line counter was set at the end of record processing to force a new page for the next input record. Here, we want to first be sure the next record being processed is a county level record before beginning a new page. While it may seem that testing the summary level and setting the line counter for the current record before the REPORT would selectively force a page ejection, LCTR001 cannot be referenced before REPORT in the command sequence. The value of the line counter will automatically be tested when REPORT is encountered, but the printing of ITEMS for county records can be placed on a new page.

The line counter is set equal to 60 for county records after the REPORT command, and the value of LCTR001 will be checked again after the next line of the report is printed. When the first ITEM command is printed (here a blank line), the value is tested and a new page is initiated. A blank line is actually printed at the end of a page before the next ITEM command is printed on the new page.

The "\$LCTR001 > 6" is included to prevent skipping to a new page when only heading lines have been printed. For example, on page 1 of the report, the heading will be printed. If the line counter were set to 60, without this extra qualifier, the next ITEM line would be printed and another page would be started with the rest of the ITEMS for the county. To prevent a page with only heading information, LCTR001 is tested to see if at least one record has been printed on the page.

IF SUMRYLVL = '11'  
ITEM ITEM 'COUNTY: ' AREANAME;

If the record is a county level summary, a blank line will be printed followed by the identification of the area as a county and its areaname.

IF SUMRYLVL = '13' ITEM ITEM 'PLACE: ' AREANAME;

If the record is a place or part place level summary, a blank line will be printed followed by the identification of the area as a place and its areaname.

ITEM X34.0 2C9.0 TAB14 (\*,1)

On this line, 34 spaces will be skipped, followed by 2 category labels in fields of 9 characters each (2C9.0) for Table 14. The labels will be printed across the page for the first stratifier ((\*,1)).

ITEM C30.0 TAB14 (1,C) TAB14 (\*,C)

Category labels will be printed in fields of 30 characters each (C30.0) for Table 14. The labels will be printed in a column, one label per line, for the second stratifier ((1,C)). The labels will be followed by data cells from Table 14. The values of the first stratifier, sex, will be printed across the page while values of the second stratifier, marital status, are printed down the page in columns ((\*,C)).

Run 11

Run 11 - Deriving Category Counts by Subtraction and Indicating Data  
Suppression

Deriving implied categories on the input record and indicating suppression of data are discussed in this application. Both are general considerations which apply to printing of many tables in the summary tape files.

Data which are suppressed are flagged in the report. In the two-dimensional table, category counts are derived by subtraction for each stratifier and calculated data cells are set equal to zero when affected by suppression.

The following table diagrams the table being constructed and indicates the source of the data cells.

RACE				
TENURE	TOTAL	WHITE	BLACK	OTHER
TOTAL	TAB28 (1,1) No suppression	TAB28 (1,2) No suppression	TAB28 (1,3) No suppression	TABOTHER (1,1) No suppression
RENTER	TAB28 (2,1) Supflg 19	TAB28 (2,2) Supflg 20	TAB28 (2,3) Supflg 21	TABOTHER (2,1) Supflg 19, 20, or 21
OWNER	TABOWNER (1,1) Supflg 19	TABOWNER (1,2) Supflg 20	TABOWNER (1,3) Supflg 21	OTHEROWN Supflg 19, 20, or 21

Printout:

REPORT GENERATION - SUPPRESSION EXAMPLE 1  
 TABLE 28: TENURE (2) BY RACE OF HOUSEHOLDER (3)  
 UNIVERSE: OCCUPIED HOUSING UNITS WITH  
 HOUSEHOLDER OF SPANISH ORIGIN

Commands:

```

FILEIN STFI
IF SUMRYLVL = '14' INCLUDE
* COMPUTE HOUSEHOLDERS OF OTHER RACES
  COMPUTE TABOTHER (*,1) = TAB28 (*,1) - (TAB28 (*,2) + TAB28 (*,3))
REPORT
HEAD 'REPORT GENERATION - SUPPRESSION EXAMPLE' X10.0 $PAGE
HEAD 'TABLE 28: ' H40.0 TAB28
HEAD U40.0 TAB28
HEAD U34.041 TAB28 U10.092 TAB28
ITEM 'TRACT - ' TRACT
* COMPUTE NUMBER OF OWNERS
  COMPUTE TABOWNER (1,*) = TAB28 (1,*) - TAB28 (2,*)
  COMPUTE OTHEROWN = TABOTHER (1,1) - TABOTHER (2,1)
*
* SET OWNER CELL = 0 IF SUPPRESSION OF RENTERS
IF SUPFLG19 = '1',
  COMPUTE TABOWNER (1,1) = 0
  COMPUTE TABOTHER (2,1) = 0
  COMPUTE OTHEROWN = 0;
*
IF SUPFLG20 = '1',
  COMPUTE TABOWNER (1,2) = 0
  COMPUTE TABOTHER (2,1) = 0
  COMPUTE OTHEROWN = 0;
*
IF SUPFLG21 = '1',
  COMPUTE TABOWNER (1,3) = 0
  COMPUTE TABOTHER (2,1) = 0
  COMPUTE OTHEROWN = 0;
*
* PRINT CATEGORY LABELS AND DATA CELLS
ITEM X22.0 3C9.0 TAB28 (1,*) 'OTHER'
ITEM C17.0 TAB28 (C,1) TAB28 (C,*) F9.0 TABOTHER (C,1)
ITEM 'OWNER OCCUPIED: ' 3F9.0 TABOWNER (1,*) F9.0 OTHEROWN
*
* PRINT SUPPRESSION INDICATION
IF SUPFLG19 = '1',
  ITEM 'SPANISH ORIGIN HOUSEHOLDER ' 'CHARACTERISTICS SUPPRESSED';
IF SUPFLG20 = '1',
  ITEM 'SPANISH-WHITE HOUSEHOLDER ' 'CHARACTERISTICS SUPPRESSED';
IF SUPFLG21 = '1',
  ITEM 'SPANISH-BLACK HOUSEHOLDER ' 'CHARACTERISTICS SUPPRESSED'
  
```

```

TRACT - 100408
TOTAL 2 WHITE 2 BLACK OTHER
RENTER OCCUPIED:
OWNER OCCUPIED:
SPANISH ORIGIN HOUSEHOLDER CHARACTERISTICS SUPPRESSED
SPANISH-WHITE HOUSEHOLDER CHARACTERISTICS SUPPRESSED

TRACT - 100502
TOTAL 25 WHITE 24 BLACK OTHER 1
RENTER OCCUPIED: 3
OWNER OCCUPIED: 22
SPANISH-WHITE HOUSEHOLDER CHARACTERISTICS SUPPRESSED

TRACT - 100503
TOTAL 9 WHITE 9 BLACK OTHER
RENTER OCCUPIED: 5
OWNER OCCUPIED: 4

TRACT - 100403
TOTAL 23 WHITE 19 BLACK 3 OTHER 1
RENTER OCCUPIED: 6
OWNER OCCUPIED: 17
SPANISH-BLACK HOUSEHOLDER CHARACTERISTICS SUPPRESSED

TRACT - 100404
TOTAL 17 WHITE 17 BLACK OTHER
RENTER OCCUPIED: 9
OWNER OCCUPIED: 8

TRACT - 100406
TOTAL 19 WHITE 15 BLACK 3 OTHER 1
RENTER OCCUPIED: 15
OWNER OCCUPIED: 4
SPANISH-BLACK HOUSEHOLDER CHARACTERISTICS SUPPRESSED

TRACT - 100407
TOTAL 27 WHITE 25 BLACK 1 OTHER 1
RENTER OCCUPIED: 7
OWNER OCCUPIED: 20
SPANISH-BLACK HOUSEHOLDER CHARACTERISTICS SUPPRESSED
  
```

FILEIN STF1

Summary Tape File 1 is identified as the input file to be processed.

IF SUMRYLVL = '14' INCLUDE

Only records with a summary level code of 14 will be included in the processing. Code 14 identifies tract or part tract level summary records.

\*

\* COMPUTE HOUSEHOLDERS OF OTHER RACES

These comment cards indicate the purpose of the computations to follow.

COMPUTE TABOTHER (\*,1) = TAB28 (\*,1) - (TAB28 (\*,2) + TAB28 (\*,3))

Total householders and renter householders of "other" race are calculated by subtracting the sum of white and black householders from householders of all races. The new values will be placed in TABOTHER. The asterisks indicate that "other" race counts are to be calculated for both categories of tenure.

REPORT

A printed report is to be produced.

HEAD 'REPORT GENERATION - SUPPRESSION EXAMPLE' X10.0 \$PAGE

At the top of each page will be printed the literal string, and after skipping 10 spaces, the page number.

HEAD 'TABLE 28: ' H40.0 TAB28

The literal string identifying the table number will be printed in this heading line followed by the table heading in a field of 40 characters (H40.0) for Table 28.

HEAD U40.0 TAB28

This line of the page heading will contain the first 40 characters of the universe label (U40.0) for Table 28.

HEAD U34.041 TAB28 U10.092 TAB28

The universe label for Table 28 consists of three 40 character literal strings, each represented as a separate line in the printed data dictionary. This line of the heading will print the last two character strings of the label. Each of the continuation lines of a universe label begins with a padding field of 12 blanks to indent the character string past the word "Universe." Beginning with position "041" of the universe label, the next 34 characters will be printed, including the 12 leading blanks and terminating with one blank after the last word. Of the last string, only the word "origin" is to be printed without the leading spaces, so the beginning position is  $80 + 12$ , or .092.

ITEM

A blank line is to be printed.

ITEM 'TRACT - ' TRACT

The literal string will be printed followed by the tract code.

\*

\* COMPUTE NUMBER OF OWNERS

These comments indicate the purpose of the next series of commands.

COMPUTE TABOWNER (1,\*) = TAB28 (1,\*) - TAB28 (2,\*)

Owner occupied households, by race, are calculated by subtracting renters from all occupied, for each of the three categories of the race dimension.

COMPUTE OTHEROWN = TABOTHER (1,1) - TABOTHER (2,1)

Owner occupied households for "other" races must be calculated from the counts in TABOTHER. Renters are subtracted from all occupied households and the value placed in OTHEROWN.

\*

\* SET OWNER CELLS = 0 IF SUPPRESSION OF RENTERS

These comments indicate the purpose of the next series of commands. If any of the suppression flags indicate that renter counts have been suppressed for that population group, then owner counts can not be calculated. Therefore, the owner counts are set to zero.

Run 11

```

IF SUPFLG19 = '1'
COMPUTE TABOWNER (1,1) = 0
COMPUTE TABOTHER (2,1) = 0
COMPUTE OTHEROWN = 0;

```

If data for all Spanish origin households are suppressed, then values for all owners (TABOWNER (1,1)) and for "other" race renters (TABOTHER (2,1)) and "other" race owners (OTHEROWN) cannot be derived. The values are set to zero.

```

*
IF SUPFLG20 = '1'
COMPUTE TABOWNER (1,2) = 0
COMPUTE TABOTHER (2,1) = 0
COMPUTE OTHEROWN = 0;

```

If data for Spanish-White households are suppressed, then values for Spanish-White owners (TABOWNER (1,2)) and for "other" race renters (TABOTHER (2,1)) and "other" race owners (OTHEROWN) cannot be derived. The values are set to zero.

```

*
IF SUPFLG21 = '1'
COMPUTE TABOWNER (1,3) = 0
COMPUTE TABOTHER (2,1) = 0
COMPUTE OTHEROWN = 0;

```

If data for Spanish-Black households are suppressed, then values for Spanish-Black owners (TABOWNER (1,3)) and for "other" race renters (TABOTHER (2,1)) and "other" race owners (OTHEROWN) cannot be derived. The values are set to zero.

```

*
* PRINT CATEGORY LABELS AND DATA CELLS

```

These comments indicate the purpose of the next series of commands.

```

ITEM X22.0 3C9.0 TAB28 (1,*) 'OTHER'

```

Column headings of the table are provided by this ITEM command. After skipping 22 spaces, the three category labels for the second stratifier of Table 28 are printed in fields of 9 characters across the page (3C9.0 TAB28 (1,\*)). The newly calculated category is labeled with a literal string.

ITEM C17.0 TAB28 (C,1) TAB28 (C,\*) F9.0 TABOTHER (C,1)

Category labels in fields of 17 characters (C17.0) will be printed for the first stratifier, tenure, in a column ((C,1)). This will be followed by the printing of the data cells. Values from Table 28 will be displayed with tenure categories down the page and race categories across the page ((C,\*)). "Other" race counts will be printed in fields of 9 characters with tenure categories in column format (F9.0 TABOTHER (C,1)).

ITEM 'OWNER OCCUPIED: ' 3F9.0 TABOWNER (1,\*) F9.0 OTHEROWN

The label and data values for owner occupied units will be printed on this line. The label must be supplied as a literal string since it is not part of the dictionary contents. The owner occupied counts by race, calculated from Table 28, will be displayed as three fields of 9 characters across the page (3F9.0 TABOWNER (1,\*)). Owner householders of "other" race (OTHEROWN) will be displayed in a 9 character field (F9.0).

\*

\* PRINT SUPPRESSION INDICATION

These comments indicate the purpose of the commands to follow.

IF SUPFLG19 = '1'

ITEM 'SPANISH ORIGIN HOUSEHOLDER ' 'CHARACTERISTICS SUPPRESSED';

Data cells which are suppressed will be blank when printed. In order to distinguish suppressed data cells from data cells with a zero count, the flag is checked and a message is printed if data are suppressed. Note that two literal strings are provided since the message exceeds 40 characters.

IF SUPFLG20 = '1'

ITEM 'SPANISH-WHITE HOUSEHOLDER ' 'CHARACTERISTICS SUPPRESSED';

The Spanish-White Householder flag is checked, and, if data are suppressed, a message is printed. Note that two literal strings are provided since the message exceeds 40 characters.

IF SUPFLG21 = '1'

ITEM 'SPANISH-BLACK HOUSEHOLDER ' 'CHARACTERISTICS SUPPRESSED';

The Spanish-Black Householder flag is checked, and, if data are suppressed, a message is printed. Note that two literal strings are provided since the message exceeds 40 characters.

## Run 12 - Calculating Cumulative Percentages

A table is produced in this run displaying population counts, percentages, and cumulative percentages for four populations. It illustrates recoding categories, here "other races," and describes how to compute cumulative percentages.

Commands:

```

FILEIN STF1
*
* CALCULATE "OTHER" RACES COUNTS BY AGE GROUP AND TOTAL ACROSS ALL AGES
*
COMPUTE TABOTHER (1,*) = TAB12 (1,*) - (TAB12 (2,*) + TAB12 (3,*))
COMPUTE OTHERSUM = 0
COMPUTE OTHERSUM = SUM(TABOTHER (1,*))
*
* CALCULATE RACE PERCENTAGES BY AGE
*
COMPUTE TABRACE (1,*) = TAB12 (1,*) / TAB1 (1) * 100 + 0.05
COMPUTE TABRACE (2,*) = TAB12 (2,*) / TAB7 (1) * 100 + 0.05
COMPUTE TABRACE (3,*) = TAB12 (3,*) / TAB7 (2) * 100 + 0.05
COMPUTE TABRACE (4,*) = TABOTHER (1,*) / OTHERSUM * 100 + 0.05
*
* CUMULATE PERCENTAGES BY RACE
*
COMPUTE TABCUMR (*,1) = TABRACE (*,1)
COMPUTE TABCUMR (*,2) = TABRACE (*,2) + TABCUMR (*,1)
COMPUTE TABCUMR (*,3) = TABRACE (*,3) + TABCUMR (*,2)
COMPUTE TABCUMR (*,4) = 100
*
REPORT
HEAD 'REPORT GENERATION - RUN 12'
HEAD X50.0 'AGE DISTRIBUTION BY RACE'
ITEM      ITEM
ITEM X39.0 'TOTAL' X15.0 'WHITE' X15.0 'BLACK' X15.0 'OTHER'
ITEM X33.0 '-----'
ITEM X61.0 '% OF' X16.0 '% OF' X16.0 '% OF'
ITEM X41.0 '% OF CUM      WHITE CUM' X10.0
      'BLACK CUM      OTHER CUM'
ITEM X22.0 'AGE          # TOTAL %      #'
      ' POP %          # POP %      #'
ITEM X15.0 '-----'
      '-----'
ITEM
ITEM X15.0 C18.0 TAB12 (1,C)
      F7.0 TAB12 (1,C) F6.1 TABRACE (1,C) F6.1 TABCUMR (1,C)
      F7.0 TAB12 (2,C) F6.1 TABRACE (2,C) F6.1 TABCUMR (2,C)
      F7.0 TAB12 (3,C) F6.1 TABRACE (3,C) F6.1 TABCUMR (3,C)
      F7.0 TABOTHER (1,C) F6.1 TABRACE (4,C) F6.1 TABCUMR (4,C)

```

Printout:

REPORT GENERATION - RUN 12

AGE DISTRIBUTION BY RACE

AGE	TOTAL			WHITE			BLACK			OTHER		
	#	% OF TOTAL	CUM %	#	% OF WHITE POP	CUM %	#	% OF BLACK POP	CUM %	#	% OF OTHER POP	CUM %

UNDER 5 YEARS	32594	6.3	6.3	21543	5.8	5.8	10565	7.3	7.3	486	10.1	10.1
5 TO 17 YEARS	108034	20.8	27.1	71708	19.4	25.3	35244	24.4	31.7	1082	22.5	32.6
18 TO 64 YEARS	326359	62.9	90.1	236166	63.9	89.2	87137	60.3	92.0	3056	63.5	96.1
65 YEARS AND OVER	51952	10.0	100.0	40100	10.9	100.0	11660	8.1	100.0	192	4.0	100.0

AGE	TOTAL			WHITE			BLACK			OTHER		
	#	% OF TOTAL	CUM %	#	% OF WHITE POP	CUM %	#	% OF BLACK POP	CUM %	#	% OF OTHER POP	CUM %

UNDER 5 YEARS	9182	7.3	7.3	8316	7.4	7.4	739	6.0	6.0	127	10.7	10.7
5 TO 17 YEARS	32831	26.0	33.4	29890	26.5	34.0	2626	21.4	27.5	315	26.4	37.2
18 TO 64 YEARS	78409	62.2	95.6	69572	61.8	95.8	8114	66.1	93.6	723	60.7	97.9
65 YEARS AND OVER	5712	4.5	100.0	4889	4.3	100.0	797	6.5	100.0	26	2.2	100.0

AGE	TOTAL			WHITE			BLACK			OTHER		
	#	% OF TOTAL	CUM %	#	% OF WHITE POP	CUM %	#	% OF BLACK POP	CUM %	#	% OF OTHER POP	CUM %

UNDER 5 YEARS	1526	6.8	6.8	1366	6.7	6.7	138	8.2	8.2	22	10.0	10.0
5 TO 17 YEARS	5756	25.8	32.7	5306	26.0	32.8	390	23.0	31.3	60	27.3	37.3
18 TO 64 YEARS	13845	62.1	94.9	12698	62.3	95.2	1013	59.9	91.2	134	60.9	98.3
65 YEARS AND OVER	1158	5.2	100.0	1003	4.9	100.0	151	8.9	100.0	4	1.8	100.0

AGE	TOTAL			WHITE			BLACK			OTHER		
	#	% OF TOTAL	CUM %	#	% OF WHITE POP	CUM %	#	% OF BLACK POP	CUM %	#	% OF OTHER POP	CUM %

UNDER 5 YEARS	311	6.0	6.0	293	5.9	5.9	11	5.2	5.2	7	13.2	13.2
5 TO 17 YEARS	1388	26.6	32.6	1325	26.8	32.7	43	20.3	25.5	20	37.7	51.0
18 TO 64 YEARS	3196	61.3	94.0	3037	61.4	94.2	134	63.2	88.8	25	47.2	98.2
65 YEARS AND OVER	319	6.1	100.0	294	5.9	100.0	24	11.3	100.0	1	1.9	100.0

Run 12

FILEIN STF1

Summary Tape File 1 is identified as the input file to be processed.

\*

\* CALCULATE "OTHER" RACES COUNTS BY AGE GROUP AND TOTAL ACROSS ALL AGES

\*

These comment cards indicate the purpose of the computations to follow.

COMPUTE TABOTHER (1,\*) = TAB12 (1,\*) - (TAB12 (2,\*) + TAB12 (3,\*))

Counts of persons by the four age groups is calculated for other races. TABOTHER is a table taking on the dimensions of TAB12 (5 X 4) and will contain the difference between the sum of Whites and Blacks and the total population.

This table is an example of subpopulation counts to be derived by subtraction. The total population is comprised of White; Black; American Indian, Eskimo, and Aleut; Asian and Pacific Islander; and additional persons classified in other races. The "missing" age categories in this table are the counts of those not classified in any of the specified categories. The "Other" races category to be displayed in the printed table is a recode of the original table to include American Indian, Eskimo, Aleut, Asian, Pacific Islander, and all others. Consequently, it is derived by subtracting the White and Black population from the total population.

COMPUTE OTHERSUM = 0

The value of total population of other races is set to zero, before deriving a sum total. See discussion of initialization in Run 5.

COMPUTE OTHERSUM = SUM(TABOTHER (1,\*))

The total population of other races is calculated by summing across the stratifier, age.

\*

\* CALCULATE RACE PERCENTAGES BY AGE

\*

These comment cards indicate the purpose of the computations to follow.

COMPUTE TABRACE (1,\*) = TAB12 (1,\*) / TAB1 (1) \* 100 + 0.05

Percentages by age category for the four populations to be displayed in the table are calculated and placed in TABRACE, a 5 X 4 table. This first statement calculates percentages of the total population for all four age categories in the second stratifier. Each total population age group (TAB12 (1,\*)) is divided by the total population (TAB1 (1)) and multiplied by 100. The 0.05 is added to the calculation to round the number when it is truncated at one decimal place for printing.

COMPUTE TABRACE (2,\*) = TAB12 (2,\*) / TAB7 (1) \* 100 + 0.05

Percentages by age category for the white population are calculated and placed in TABRACE. Each White age group (TAB12 (2,\*)) is divided by the White population (TAB7 (1)) and multiplied by 100. The 0.05 is added to allow for rounding when the printed number is truncated to one decimal place.

COMPUTE TABRACE (3,\*) = TAB12 (3,\*) / TAB7 (2) \* 100 + 0.05

Percentages by age category for the Black population are calculated and placed in TABRACE. Each Black age group (TAB12 (3,\*)) is divided by the Black population (TAB7 (2)) and multiplied by 100. The 0.05 is added to allow for rounding when the printed number is truncated to one decimal place.

COMPUTE TABRACE (4,\*) = TABOTHER (1,\*) / OTHERSUM \* 100 + 0.05

Percentages by age category for the other races population are calculated and placed in TABRACE. Each other races age group (TABOTHER (1,\*)) is divided by the other races population (OTHERSUM) and multiplied by 100. The 0.05 is added to allow for rounding when the printed number is truncated to one decimal place.

\*

\* CUMULATE PERCENTAGES BY RACE

\*

These comment cards indicate the purpose of the computations to follow.

```
COMPUTE TABCUMR (*,1) = TABRACE (*,1)
```

Percentages will be cumulated and stored in a table, TABCUMR, which will have the same dimensions as TABRACE (5 X 4). The first four categories of the first stratifier of TABRACE have the age percentages for the population groups. In this calculation, for each population group, we will set the first cumulated category equal to the percentage of the first age category.

```
COMPUTE TABCUMR (*,2) = TABRACE (*,2) + TABCUMR (*,1)
```

The next age category percentage is added on to the cumulated sum and placed in the second category of the second stratifier for all population groups of the first stratifier.

```
COMPUTE TABCUMR (*,3) = TABRACE (*,3) + TABCUMR (*,2)
```

The next age category percentage is added on to the cumulated sum and placed in the third category of the second stratifier for all population groups of the first stratifier.

```
COMPUTE TABCUMR (*,4) = 100
```

The last cumulated percentage equals 100. While this could be derived by adding the last age category percentage of TABRACE to the previous cumulated sum, setting the value equal to 100 avoids any possible deviation due to rounding of cumulated numbers.

```
REPORT
```

```
HEAD 'REPORT GENERATION - RUN 12'
```

```
HEAD X50.0 'AGE DISTRIBUTION BY RACE'
```

A printed report is to be produced. At the top of each page, a two line heading will appear. The first line will contain the literal string, "REPORT GENERATION - RUN 12." The next line will title the table, centered on the print page by skipping 50 spaces.

```
ITEM          ITEM
ITEM X39.0 'TOTAL' X15.0 'WHITE' X15.0 'BLACK' X15.0 'OTHER'
ITEM X33.0 '-----'
          '-----'
```

This series of commands provide the population group labels, underlining the column headings with a series of dashes.

Run 12

```

ITEM X61.0 '% OF' X16.0 '% OF' X16.0 '% OF'
ITEM X41.0 '% OF' CUM WHITE CUM' X10.0
'BLACK CUM OTHER CUM'
ITEM X22.0 'AGE # TOTAL % #'
' POP % # POP % #'
' POP %'
ITEM X15.0 '-----'
'-----'
'-----'
ITEM

```

This series of commands provide column headings, identifying the percentages.

```

ITEM X15.0 C18.0 TAB12 (1,C)
F7.0 TAB12 (1,C) F6.1 TABRACE (1,C) F6.1 TABCUMR (1,C)
F7.0 TAB12 (2,C) F6.1 TABRACE (2,C) F6.1 TABCUMR (2,C)
F7.0 TAB12 (3,C) F6.1 TABRACE (3,C) F6.1 TABCUMR (3,C)
F7.0 TABOTHER (1,C) F6.1 TABRACE (4,C) F6.1 TABCUMR (4,C)

```

With one ITEM command, all the tabular data are printed using the C array operator in the subscript notation. The category labels for the age groups are first printed in column notation (C18.0 TAB12 (1,C)). Then, for each population group, the population counts are printed in numeric fields of 7 characters, and the two percentages are printed in numeric fields of 6 characters each with one place to the right of the decimal point. Age category values are listed in column format for all three items.

Although it may seem that the statements for the first three population groups could be combined using an asterisk (\*) to indicate all categories of the first dimensions of TAB12, TABRACE, and TABCUMR, this is not the case. All of these tables have five categories in the first stratifier. Table 12 contains population counts for race groups while TABRACE and TABCUMR, also 5 X 4 tables, contain zero-filled data cells not utilized in the computations. Therefore, using the asterisk (\*) subscript would print five categories.

## Run 13 - Calculation of a Median

The calculation of a median is illustrated here in two sets of commands - one set using only CENSPAC commands and the other using the SOURCE command with COBOL statements. Both demonstrate computation of the same median housing value in a one-dimensional table and are based on the general formula:

$$\text{Median} = L + \left( \frac{\frac{1}{2}N - \text{cumf}}{f} \right) w$$

where: L is the lower limit of the category containing the median

N is the total number of cases

cumf is the cumulative frequency up to but not including the frequency in the median class

f is the frequency in the median category

w is the width of the median category

Since the widths and limits of categories are dependent on the particular table, these parameters must be set in the CENSPAC run. The primary difference between the two methods is the ability to do repetitive calculations with fewer statements using the SOURCE and COBOL code while each repeated calculation must be listed separately using only CENSPAC commands. Using COBOL statements, the subscript of the table can be a variable which is incremented, while subscripts in CENSPAC commands must be numbers.

Either of these runs could be easily modified to handle another one-dimensional table by changing the parameters of the table categories. Multi-dimensional tables would require more complex handling, but these runs should suggest the general approach.

Commands Using CENSPAC Statements Only:

```

FILEIN STF1
* MEDIAN CALCULATION WITH CENSPAC COMMANDS
* COMPUTE TOTAL NUMBER OF UNITS IN TABLE
COMPUTE TOTALNO = 0
COMPUTE TOTALNO = SUM(TAB38(*))
* COMPUTE MIDPOINT
COMPUTE MIDPOINT = TOTALNO / 2
* CUMULATE FREQUENCIES ACROSS CATEGORIES
IF TAB38(1) < MIDPOINT
COMPUTE LOWLIMIT = 0 COMPUTE WIDTH = 10000
COMPUTE CATTOTAL = TAB38 (1)
COMPUTE CUMFREQ = TAB38 (1);
IF CUMFREQ < MIDPOINT
COMPUTE LOWLIMIT = 10000 COMPUTE WIDTH = 5000
COMPUTE CATTOTAL = TAB38 (2)
COMPUTE CUMFREQ = CUMFREQ + TAB38 (2);
IF CUMFREQ < MIDPOINT
COMPUTE LOWLIMIT = 15000 COMPUTE WIDTH = 5000
COMPUTE CATTOTAL = TAB38 (3)
COMPUTE CUMFREQ = CUMFREQ + TAB38 (3);
IF CUMFREQ < MIDPOINT
COMPUTE LOWLIMIT = 20000 COMPUTE WIDTH = 5000
COMPUTE CATTOTAL = TAB38 (4)
COMPUTE CUMFREQ = CUMFREQ + TAB38 (4);
IF CUMFREQ < MIDPOINT
COMPUTE LOWLIMIT = 25000 COMPUTE WIDTH = 5000
COMPUTE CATTOTAL = TAB38 (5)
COMPUTE CUMFREQ = CUMFREQ + TAB38 (5);
IF CUMFREQ < MIDPOINT
COMPUTE LOWLIMIT = 30000 COMPUTE WIDTH = 5000
COMPUTE CATTOTAL = TAB38 (6)
COMPUTE CUMFREQ = CUMFREQ + TAB38 (6);
IF CUMFREQ < MIDPOINT
COMPUTE LOWLIMIT = 35000 COMPUTE WIDTH = 5000
COMPUTE CATTOTAL = TAB38 (7)
COMPUTE CUMFREQ = CUMFREQ + TAB38 (7);
IF CUMFREQ < MIDPOINT
COMPUTE LOWLIMIT = 40000 COMPUTE WIDTH = 10000
COMPUTE CATTOTAL = TAB38 (8)
COMPUTE CUMFREQ = CUMFREQ + TAB38 (8);
IF CUMFREQ < MIDPOINT
COMPUTE LOWLIMIT = 50000 COMPUTE WIDTH = 30000
COMPUTE CATTOTAL = TAB38 (9)
COMPUTE CUMFREQ = CUMFREQ + TAB38 (9);
IF CUMFREQ < MIDPOINT
COMPUTE LOWLIMIT = 80000 COMPUTE WIDTH = 20000
COMPUTE CATTOTAL = TAB38 (10)
COMPUTE CUMFREQ = CUMFREQ + TAB38 (10);
IF CUMFREQ < MIDPOINT
COMPUTE LOWLIMIT = 100000 COMPUTE WIDTH = 50000
COMPUTE CATTOTAL = TAB38 (11)
COMPUTE CUMFREQ = CUMFREQ + TAB38 (11);
IF CUMFREQ < MIDPOINT
COMPUTE LOWLIMIT = 150000 COMPUTE WIDTH = 50000
COMPUTE CATTOTAL = TAB38 (12)
COMPUTE CUMFREQ = CUMFREQ + TAB38 (12);
IF CUMFREQ < MIDPOINT
COMPUTE LOWLIMIT = 200000
COMPUTE WIDTH = 100000
COMPUTE CATTOTAL = TAB38 (13)
COMPUTE CUMFREQ = CUMFREQ + TAB38 (13);
* IF CUMULATED FREQUENCY EQUALS MIDPOINT
IF CUMFREQ = MIDPOINT
COMPUTE MEDIAN = LOWLIMIT + WIDTH - 1;
* WHEN MORE THAN HALF OF UNITS ARE ACCUMULATED,
* MAKE CORRECTION
IF CUMFREQ > MIDPOINT
COMPUTE CUMFREQ = CUMFREQ - CATTOTAL
* CALCULATE MEDIAN
COMPUTE MEDIAN =
LOWLIMIT + (MIDPOINT - CUMFREQ) / CATTOTAL * WIDTH;
REPORT
ITEM '*****'
ITEM 'CALCULATED MEDIAN = ' F9.2 MEDIAN
ITEM 'FILE MEDIAN = ' TAB39
ITEM 'TABLE 38-' H10.0 TAB38
ITEM C25.0 TAB38 (C) TAB38 (C)

```

Alternate Commands Using SOURCE Interface with COBOL Statements:

```

* MEDIAN CALCULATION WITH SOURCE COMMAND
* FILL TABLES WITH LOWER LIMITS OF CATEGORIES
  ARRAY TABLOWLT (13)
  COMPUTE TABLOWLT (1) = 0 COMPUTE TABLOWLT (2) = 10000
  COMPUTE TABLOWLT (3) = 15000 COMPUTE TABLOWLT (4) = 20000
  COMPUTE TABLOWLT (5) = 25000 COMPUTE TABLOWLT (6) = 30000
  COMPUTE TABLOWLT (7) = 35000 COMPUTE TABLOWLT (8) = 40000
  COMPUTE TABLOWLT (9) = 50000 COMPUTE TABLOWLT (10) = 80000
  COMPUTE TABLOWLT (11) = 100000 COMPUTE TABLOWLT (12) = 150000
  COMPUTE TABLOWLT (13) = 200000
* COMPUTE TOTAL NUMBER OF UNITS IN TABLE
  COMPUTE TOTALNO = 0
  COMPUTE TOTALNO = SUM(TAB38(*))
* COMPUTE MIDPOINT
  COMPUTE MIDPOINT = TOTALNO / 2
* SET COUNTERS
  COMPUTE PTR = 0 COMPUTE NEWPTR = 0
  COMPUTE CUMFREQ = 0 COMPUTE MEDIAN = 0
  SOURCE
  MEDCALC.
  IF CA-CUMFREQ < CA-MIDPOINT
    ADD 1 TO CA-PTR
    COMPUTE CA-CUMFREQ = CA-CUMFREQ + CA-TAB38 (CA-PTR)
    GO TO MEDCALC.
  IF CA-CUMFREQ = CA-MIDPOINT
    COMPUTE CA-NEWPTR = CA-PTR + 1
    COMPUTE CA-MEDIAN = CA-TABLOWLT (CA-NEWPTR) - 1.
  IF CA-CUMFREQ > CA-MIDPOINT
    COMPUTE CA-CUMFREQ = CA-CUMFREQ - CA-TAB38 (CA-PTR)
    COMPUTE CA-NEWPTR = CA-PTR + 1
    COMPUTE CA-WIDTH = CA-TABLOWLT (CA-NEWPTR)
      - CA-TABLOWLT (CA-PTR)
    COMPUTE CA-MEDIAN = CA-TABLOWLT (CA-PTR) +
      (CA-MIDPOINT - CA-CUMFREQ) /
      CA-TAB38 (CA-PTR) * CA-WIDTH.
  SOURCE

```

Printout:

```

*****
CALCULATED MEDIAN = 56173.00
FILE MEDIAN = 56173
TABLE 38-VALUE (13)
Less than $10,000 17
$10,000 to $14,999 35
$15,000 to $19,999 108
$20,000 to $24,999 199
$25,000 to $29,999 262
$30,000 to $34,999 132
$35,000 to $39,999 288
$40,000 to $49,999 495
$50,000 to $79,999 1990
$80,000 to $99,999 289
$100,000 to $149,000 69
$150,000 to $199,999 6
$200,000 or more 1

```

Commands Using CENSPAC Statement Only:

FILEIN STF1

Summary Tape File 1 is identified as the input file to be processed.

\* MEDIAN CALCULATION WITH CENSPAC COMMANDS

\* COMPUTE TOTAL NUMBER OF UNITS IN TABLE

COMPUTE TOTALNO = 0

COMPUTE TOTALNO = SUM(TAB38 (\*))

The first two comment cards document the run. The COMPUTE commands calculate the total number of housing units in the table by initializing the variable to zero and then summing across all categories of the table. Since new variables are set to zero only at the beginning of the run, TOTALNO must be reset equal to zero for each record before the cumulative sum is calculated.

\* COMPUTE MIDPOINT

COMPUTE MIDPOINT = TOTALNO / 2

The next step, as indicated by the comment card, is to calculate the number of cases in each half of the distribution.

\* CUMULATE FREQUENCIES ACROSS CATEGORIES

COMPUTE LOWLIMIT = 0 COMPUTE WIDTH = 10000

COMPUTE CATTOTAL = TAB38 (1)

COMPUTE CUMFREQ = TAB38 (1)

Category counts have to be cumulated up to the midpoint category, so a cumulative frequency will be stored in CUMFREQ. The approach to calculating the median is to continue to add on category counts to the cumulative frequency until the category including the median has been included ( $CUMFREQ > MIDPOINT$ ). A correction in the cumulative frequency and final calculations of the median are then performed. In this first set of commands, the value of CUMFREQ is set equal to the value of the first category, and values for the lower limit, the width, and the number of cases in the category are calculated.

If this category includes the median, the record will "fall through" to the final adjustment of cumulative frequency and calculation of the median otherwise the next category count will be accumulated.

```
IF CUMFREQ < MIDPOINT
COMPUTE LOWLIMIT = 10000 COMPUTE WIDTH = 5000
COMPUTE CATTOTAL = TAB38 (2)
COMPUTE CUMFREQ = CUMFREQ + TAB38 (2);
```

This series of COMPUTE commands is a repeated sequence for each cell of the table. If the cumulated frequency is less than the midpoint of the distribution, the next category total will be added to it. The values of the category limit, width and number of cases are set. The cumulative frequency will continue to be incremented until CUMFREQ includes the category with the midpoint value.

```
* IF CUMULATED REQUENCY EQUALS MIDPOINT
IF CUMFREQ = MIDPOINT
COMPUTE MEDIAN = LOWLIMIT + WIDTH - 1;
```

In the case where the cumulative frequency equals the midpoint value, the median is defined as the upper bound of the category. After testing for this condition with the IF command, the median is calculated by adding the width of the category to the lower bound, which will equal the lower limit of the next category, and then subtracting one to get the category upper bound.

```
* WHEN MORE THAN HALF OF UNITS ARE ACCUMULATED,
* MAKE CORRECTION
IF CUMFREQ < MIDPOINT
COMPUTE CUMFREQ = CUMFREQ - CATTOTAL
```

The general formula for calculating the median requires the cumulated frequency up to but not including the category with the median. Therefore, when the cumulative frequency contains the midpoint value, CUMFREQ will be recalculated by subtracting from it the number of cases in the current category.

Run 13

```
* CALCULATE MEDIAN
COMPUTE MEDIAN =
  LOWLIMIT + (MIDPOINT - CUMFREQ) / CATTOTAL * WIDTH;
```

Using the general formula in the introduction to this run, the median is calculated by adding to the lower limit of the midpoint category the proportion of the category width equaling the proportion of category cases below the midpoint.

## REPORT

```
ITEM '*****' '*****'
ITEM 'CALCULATED MEDIAN = ' F9.2 MEDIAN
ITEM 'FILE MEDIAN = ' TAB39
ITEM 'TABLE38-' H10.0 TAB38
ITEM C25.0 TAB38 (C) TAB38 (C)
```

A printed report is produced with both the calculated median and the file median displayed. Table 38 is also printed with heading and category labeling from the data dictionary-

### Alternate Commands Using SOURCE Interface with COBOL Statements:

The following command sequence, which inserts COBOL source code in the CENSPAC run, calculates a median using similar logic to that discussed in the above run. The primary difference is the ability with COBOL statements to create a looping procedure for the repeated pattern of calculations for each table category. The lower limits of each category must still be set with a series of COMPUTE commands since these parameters are dependent on the particular table.

A description of the SOURCE command is given in Appendix C of the CENSPAC manual and describes the conventions such as prefacing variable names with CA-.

```
* SET COUNTERS
COMPUTE PTR=0 COMPUTE NEWPTR = 0
COMPUTE CUMFREQ = 0 COMPUTE MEDIAN = 0
```

The items needed for the median calculation are set equal to zero. All variables referenced in the COBOL source statements must be defined in the CENSPAC run before their use in SOURCE.

```
SOURCE
MEDCALC.
  IF CA-CUMFREQ < CA-MIDPOINT
    ADD 1 TO CA-PTR
    COMPUTE CA-CUMFREQ = CA-CUMFREQ + CA-TAB38 (CA-PTR)
    GO TO MEDCALC.
```

The CENSPAC SOURCE command indicates COBOL source code will follow. These first lines cumulate categories until the total is greater than or equal to the midpoint.

```
IF CA-CUMFREQ = CA-MIDPOINT
COMPUTE CA-NEWPTR = CA-PTR + 1
COMPUTE CA-MEDIAN = CA-TABLOWLT (CA-NEWPTR) - 1.
```

If the cumulated frequency equals the midpoint, the median is calculated to be the upper bound of the last category of the cumulated sum.

Run 13

```
IF CA-CUMFREQ > CA-MIDPOINT
  COMPUTE CA-CUMFREQ = CA-CUMFREQ - CA-TAB38 (CA-PTR)
  COMPUTE CA-NEWPTR = CA-PTR + 1
  COMPUTE CA-WIDTH = CA-TABLOWLT (CA-NEWPTR)
    - CA-TABLOWLT (CA-PTR)
  COMPUTE CA-MEDIAN = CA-TABLOWLT (CA-PTR) +
    (CA-MIDPOINT - CA-CUMFREQ) /
    CA-TAB38 (CA-PTR) * CA-WIDTH.
```

If the cumulated frequency is greater than the midpoint, the first COMPUTE subtracts the last category total to derive the total frequency up to but not including the midpoint category. The category width is calculated with the next two COMPUTEs, and finally the median is determined using the general formula.

All of the above commands could be followed by the report commands discussed in the first run, or by further processing commands, to produce the desired output of the calculated median.

Run 14

## Run 14 - Narrative Profile

A paragraph of text is created using population and housing counts from STF1. The CENSPAC output is processed through a text editor which re-formats the output to be right and left-justified with proper spacing.

This application could be used to create a standard report for different geographic areas, provided a text editor is available.

Commands:

```

FILEIN STF1
IF COUNTY = '041' AND SUMRYLVL = '11' INCLUDE
* Calculate values to be inserted in text
COMPUTE POP70 = 77045
COMPUTE PCT7078 = TAB1 (1) / POP70 * 100
COMPUTE PCTWH = TAB7 (1) / TAB1(1) * 100 + 0.05
COMPUTE OTHPOP = TAB1 (1) - TAB7 (1)
COMPUTE PCTURB = TAB1 (3) / TAB1 (1) * 100 + 0.05
COMPUTE PCTURB = 100 - PCTURB
COMPUTE OWNOC = TAB26 (1) - TAB26 (2)
COMPUTE VACANT = 0
COMPUTE VACANT = SUM (TAB25(*))
* Create report, inserting editing codes in first HEAD and
* first ITEM commands
REPORT HEAD 'tuc'
HEAD ' CENSUS BUREAU REPORTS OFFICIAL ' ' 1978 POPULATION OF '
      A40.0 AREANAME ' COUNTY'
ITEM 't+2'
ITEM 'tf'
ITEM A40.0 AREANAME ' County's official population in '
      ' the 1978 Census was ' TAB1 (1)
IF TAB1 (1) > POP70 ITEM ',up ' ;
IF TAB1 (1) NOT > POP70 ITEM ',down ' ;
ITEM F6.2 PCT7078 ' percent from the 1970 figure of '
ITEM F6.0 POP70 ' , the Bureau of the Census, U.S. '
      ' Department of Commerce, reports. '
ITEM ' The 1978 Census counted ' TAB7 (1) ' white persons in the county, '
ITEM F6.1 PCTWH ' percent of the total; and '
      F8.0 OTHPOP ' persons of other races. The population '
ITEM ' was classified as ' F6.1 PCTURB ' percent urban, and '
      F6.1 PCTURB ' percent rural. '
ITEM ' Of the ' TAB5 (1) ' housing units, ' F6.0 OWNOC
      ' of them were occupied by owners, ' TAB26 (2)
ITEM ' occupied by tenants, and ' F6.0 VACANT ' were vacant. The median value
      of '
ITEM ' owner-occupied houses in ' A40.0 AREANAME
      ' County was ' $6.0 TAB39 (1)
ITEM ' while the median rent paid by '
      ' tenants was ' $5.0 TAB44 (1) ' per month. '
COMPUTE $LCTR001 = 100

```

Printout, after processing through editor:

## CENSUS BUREAU REPORTS OFFICIAL 1978 POPULATION OF CHESTERFIELD COUNTY

CHESTERFIELD County's official population in the 1978 Census was 126134, up 63.71 percent from the 1970 figure of 77045, the Bureau of the Census, U.S. Department of Commerce, reports. The 1978 Census counted 112667 white persons in the county, 89.3 percent of the total; and 13467 persons of other races. The population was classified as 62.0 percent urban, and 37.9 percent rural. Of the 42446 housing units, 30589 of them were occupied by owners, 9403 occupied by tenants, and 2454 were vacant. The median value of owner-occupied houses in CHESTERFIELD County was \$61957 while the median rent paid by tenants was \$217 per month.

FILEIN STF1

Summary Tape File 1 is identified as the input file to be processed.

IF COUNTY = '041' AND SUMRYLVL = '11' INCLUDE

Only the record for Chesterfield County will be processed.

\*CALCULATE VALUES TO BE INSERTED IN TEXT

This comment documents the purpose of the COMPUTE commands following.

```

COMPUTE POP70 = 77045
COMPUTE PCT7078 = TAB1 (1) / POP70 * 100
COMPUTE PCTWH = TAB7 (1) / TAB1 (1) * 100 + 0.05
COMPUTE OTHPOP = TAB1 (1) - TAB7 (1)
COMPUTE PCTRUR = TAB1 (3) / TAB1 (1) * 100 + 0.05
COMPUTE PCTURB = 100 - PCTRUR
COMPUTE OWNOC = TAB26 (1) - TAB26 (2)
COMPUTE VACANT = 0
COMPUTE VACANT = SUM (TAB25 (*))

```

These COMPUTE statements calculate values to be inserted in the text.

\* CREATE REPORT, INSERTING EDITING CODES IN FIRST HEAD AND  
\* FIRST ITEM COMMANDS

This documents the report to be produced.

REPORT HEAD 'tuc'

A printed report is to be produced. The first line to be printed at the top of the page is the literal string, "tuc." In the output to be entered in the editor, "tuc" will indicate the centering of the next heading line.

```

HEAD ' CENSUS BUREAU REPORTS OFFICIAL' ' 1978 POPULATION OF '
A40.0 AREANAME ' COUNTY'

```

The heading for the report is specified, inserting the name of the county with the value AREANAME in an alphanumeric field of 40 characters.

```

ITEM 't+2'
ITEM 'tf'

```

These two editing codes will be printed and will indicate the formatting of the report when processed through the editor.

Run 14

ITEM A40.0 AREANAME ' County's Official Population' in  
 ' the 1978 Census was ' TAB1 (1)

The first line of text will identify the area, print the literal strings,  
 and the total population from Table 1.

Note: A double quote must be used for an apostrophe within a literal  
 string.

IF TAB1 (1) POP70 ITEM ' up';  
 IF TAB1 (1) NOT >POP70 ITEM ' down';

With these two statements, the appropriate text is specified depending  
 on whether the population increased or decreased from 1970 to 1978.

ITEM F6.2 PCT7078 ' PERCENT from the 1970 figure of '  
 ITEM F6.0 POP70 ', the Bureau of the Census, U.S. ' Department of Commerce,  
 reports. '  
 ITEM 'The 1978 Census counted ' TAB7 (1)' white persons in the county,'  
 ITEM F6.1 PCTWH ' percent of the total; and ' F8.0 OTHPOP ' persons of other  
 races. The population'  
 ITEM ' was classified as ' F6.1 PCTURB ' percent urban, and ' F6.1 PCTRUR  
 ' percent rural. '  
 ITEM 'of the ' TAB5 (1) ' housing units,' F6.0 OWNOC ' of them were oc-  
 cupied by owners,' TAB26 (2)  
 ITEM ' occupied by tenants, and ' F6.0 VACANT ' were vacant. The median  
 value of'  
 ITEM ' owner-occupied houses in ' A40.0 AREANAME ' County was ' \$6.0 TAB39 (1)  
 ITEM ' while the median rent paid by ' 'tenants was ' \$5.0 TAB44 (1)  
 'per month.'

These ITEM commands describe the remainder of the body of the report.  
 Literal strings cannot exceed 40 characters. Input variables, such as  
 TAB1 (1), are printed in default format of F9.0, while calculated  
 ITEMS are reformatted from the default of an 18 character field with  
 6 places to the right of the decimal. Median house value and rent are  
 printed with the \$ format code which puts a floating \$ in front of the  
 number.

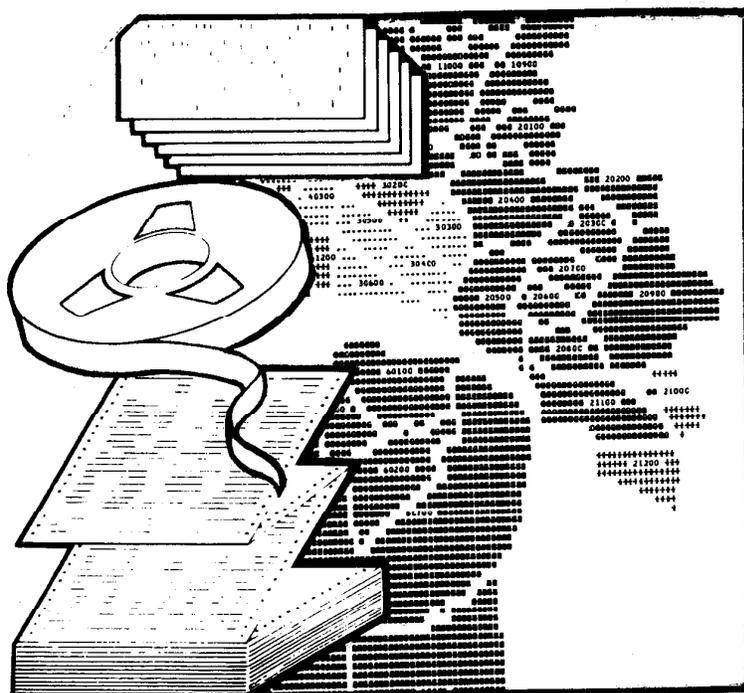
Since the editor will reformat the text to an appropriate number of  
 lines, the number and length of text in ITEM commands is not critical,  
 provided each does not define more than 132 characters of print.

The output with data values inserted is processed through the editor to produce the printed output shown above. The editor used to produce this example was the Madison Academic Computing Center TEXT program on a UNIVAC 1100 computer. This program is similar to the Administrative Terminal System (ATS) available on IBM systems. Other text editors could be used provided there is a mechanism to transfer a CENSPAC print output file to the text editor for formatting and printing.

Similar narrative profiles could be produced with CENSPAC without aid of an auxiliary text processor by carefully constructing the ITEM commands to represent the final report. The ITEM commands would define separate print lines of approximately equal length to produce the report without automatic spacing and right-justification of print lines.

# Comparing 1970 and 1980 Census Data

## *An Automated Approach*



U.S. Department of Commerce

Bureau of the Census

**MAY 1981**



BUREAU OF THE CENSUS  
Daniel Levine, Acting Director

Data User Services Division  
Michael G. Garland, Chief

### **ACKNOWLEDGMENTS**

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## INTRODUCTION

As the efficiency and availability of automated data processing equipment has increased, the Census Bureau has released more of its data resources in machine-readable form. The 1970 Census of Population and Housing was the first decennial census from which summary data were made readily available to the public on computer tape. The release of summary data files from the 1980 Census of Population and Housing allows data users to take an automated approach to comparing the results of the two censuses.

The primary purpose of this publication is to acquaint data users with the tools available for the automated comparison of 1970 and 1980 census summary data. Additionally, this publication illustrates a general data processing procedure for making these comparisons.

The demonstration of this data processing procedure produces tables and maps showing age distributions by census tract. The tables are designed to present comparable data showing changes in age groups between the two census years, and are produced in the format illustrated by the sample headings below. Maps produced by the procedure may display the values for any single column of data from the tables.

T R A C T	1970						1978						AGE
	0-5	6-17	18-24	25-44	45-64	65+	0-5	6-17	18-24	25-44	45-64	65+	
T R A C T	CHANGE, 1970-1978						PERCENT CHANGE, 1970-1978						AGE
	0-5	6-17	18-24	25-44	45-64	65+	0-5	6-17	18-24	25-44	45-64	65+	

The data in this demonstration are from the 1970 Census of Population and Housing and from the 1978 Dress Rehearsal Census of the Richmond, Virginia Area conducted in preparation for the 1980 Census of Population and Housing. <sup>1/</sup> Census tracts were chosen as the geographic units for display due to their wide applicability in the analysis of urban conditions. Computer software packages used in this demonstration include CENSPAC, EASYCORD and EASYMAP.

<sup>1/</sup> The 1978 dress rehearsal data are in a form directly comparable to that of the 1980 census summary data. Note that whenever an example refers to 1978 data, this should be interpreted as a direct example of 1980 data use.

The remainder of this publication describes the data and software products available from the Census Bureau for comparing 1970 and 1980 census summary data and also describes a procedure for making such comparisons and displaying the results. This procedure can be modified to compare other census summary data available in machine-readable form.

## THE DATA AND SOFTWARE COMPONENTS

The procedure for comparing the 1970 and 1980 censuses employs three data components and three computer software components. The three data components include summary tapes from the two censuses and a tract boundary file which contains tract boundary descriptions in latitude-longitude coordinates. The three software components include CENSAPAC, EASYCORD and EASYMAP, all of which were developed and are supported by the Census Bureau. These software packages are user-oriented in that they require only limited data processing expertise.

### 1970 Census Summary Tapes

The 1970 census summary tapes contain the results of the 1970 Census of Population and Housing as tabulations for various levels of census geography. The First, Second and Third Count Summary Tapes contain complete-count information collected on every person and housing unit. The Fourth, Fifth and Sixth Count Summary Tapes contain more detailed information estimated from a 20-percent sample of persons and housing units. File A of the Second Count Summary Tape was used to demonstrate the procedure. This file contains complete-count data summaries for census tracts.

### 1980 Census Summary Tapes

The 1980 census summary tapes contain the results of the 1980 Census of Population and Housing and have a nomenclature which differs from that used for the 1970 census summary tapes. Summary Tape Files 1 and 2 (STF 1 and STF 2) contain complete-count information and Summary Tape Files 3 and 4 (STF 3 and STF 4) contain information estimated from a sample. File A of STF 1 (STF 1A) was used to demonstrate the procedure, although STF 2 also provides complete-count age data for tracts in sufficient detail for this purpose. STF 1A contains complete-count data summaries for a number of levels of census geography including census tracts.

### The Tract Boundary Files

The tract boundary files (also know as "urban atlas" files) contain latitude-longitude descriptions of census tract boundaries. The boundaries of each tract are defined as the sides of a polygon, and the vertices at which the sides join are described by latitude and longitude coordinates. Tract

boundary files will be available for every standard metropolitan statistical area (SMSA) defined for the 1980 Census of Population and Housing and for about 100 additional tracted counties. 2/

#### CENSPAC (Census Software Package)

CENSPAC is a generalized data retrieval and display system that the Census Bureau developed for use with its public-use statistical data files. Suitable for use with both summary and microdata files, CENSPAC features the use of machine-readable data dictionaries, matching of two input files, computation, extract file creation and printed report (table) generation. CENSPAC is compatible with most computer systems having ANSI COBOL compilers.

#### EASYCORD

EASYCORD is a computer software package which the Census Bureau developed to produce coordinate boundary files from tract boundary files, GBF/DIME-Files, and DIMECO for input to EASYMAP and other computer mapping packages. In "raw" form, these files are not appropriate for direct input to EASYMAP; EASYCORD performs the necessary restructuring. EASYCORD is compatible with most computer systems having ANSI FORTRAN compilers.

#### EASYMAP

EASYMAP is a computer mapping package that the Census Bureau developed to create shaded area (choropleth) maps. Using standard line printer characters, a range of gray-tones can be produced with over-printing. As input, EASYMAP requires a geographic boundary file and a summary data file. Extensive default options allow the user to produce a map without specifying the complete range of possible map features and characteristics. EASYMAP is compatible with most computer equipment having line printers and ANSI FORTRAN compilers.

2/ Since tract boundary files containing 1980 census geography were not available in time for this demonstration, it was necessary to modify the 1970 file for the Richmond, Virginia SMSA to reflect 1980 census geography. This was a relatively simple task since there had been few revisions during the intervening years. These revisions are discussed in the section entitled "Geographic Comparability".

## THE PROCEDURE

The preceding section has provided an overview of the Census Bureau's products available for comparing summary data from the 1970 and 1980 censuses. This section describes the steps involved in using these products to prepare printed tables and maps showing census-to-census change. Technical issues involving the coding of computer commands are presented in technical appendices.

Subject and geographic comparability issues must be resolved in a preliminary step before beginning any computer processing. The remaining automated steps are depicted in the flowchart shown in figure 1. Step 1 produces local extract files containing records only for the desired geographic areas. Step 2 results in still smaller table extract files containing only the required data elements. Step 3 produces printed tables and Step 4 displays the data in map form. <sup>3/</sup>

### Preliminary Step: Resolving Subject and Geographic Comparability Issues.

Prior to any automated processing it must be confirmed that the data from the two sources are comparable. This involves checking the summary tape documentation for both years for subject comparability, and checking 1970 and 1980 census maps to determine whether any of the geographic areas were redefined in the interim.

### Subject Comparability

As stated earlier, the objective is to make 1970-1980 comparisons for age groups. Six age groups were chosen for the demonstration and include: under 6, 6-17, 18-24, 25-44, 45-64 and 65 years old and over. The documentation for the 1970 Second Count table 2 (illustrated on p 8) and for 1980 STF 1 table 10 (illustrated on p 9) indicates that these groups can be aggregated from both files.

<sup>3/</sup> It may be beneficial to combine the second and third steps in some applications, particularly where there is little computation necessary to establish comparability between 1970 and 1980 tabulations. In this demonstration, though, extensive computation was required and the two steps have been made separate.

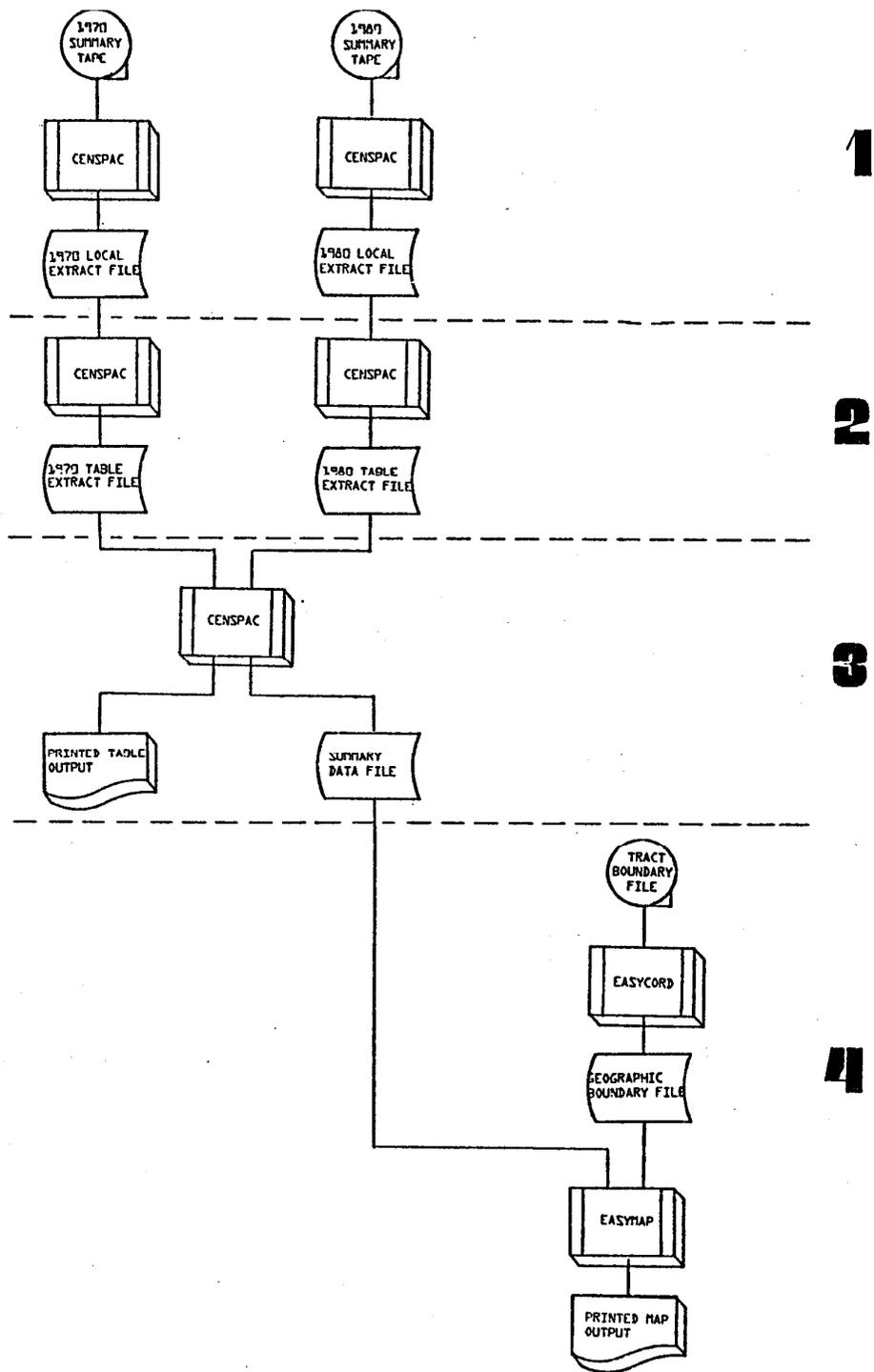


Figure 1: Flowchart of Automated Steps to Compare 1970 and 1980 Census Data

Another potential subject comparability problem is in definitions of data items for the two census years. Although "age" poses no such problem, some definitions were changed for the 1980 census and the corresponding data items are not directly comparable. A glossary published in the 1980 Census Users' Guide will highlight 1970-1980 comparability issues.

#### Geographic Comparability

In comparing the results of two decennial censuses, attention must be given to the comparability of geographic area definitions. Since census tracts are the principal geographic areas used in this demonstration, this discussion centers on these particular units.

Census tracts, the relatively small geographic units used for data tabulation, are defined with an overall goal of census-to-census comparability. Census tract definitions are related to population; each tract typically has a population of between 2,500 and 8,000 persons. In areas of population growth, tracts may be split for succeeding censuses; in areas of population decline, tracts may be combined for succeeding censuses. Also, in areas where significant new boundaries such as freeways have been introduced, tract boundaries may be revised to follow them.

The only way to detect changes in geographic areas is to compare detailed maps from the two censuses. Based on a comparison of 1970 and 1980 census maps, one can observe that there were no changes in the corporate boundaries of Richmond between 1970 and 1980, but there were some minor revisions to census tracts. Eight census tracts were renumbered, and two tracts were combined and then assigned a new number.

Where tract boundaries have changed, one approach to the definition of comparable areas for both censuses is to identify the smallest common units of geography. For example, where a 1970 tract has been split into two tracts for 1980, the 1980 tracts should be combined to match the 1970 tract. In Richmond, where two 1970 tracts were combined to form a single 1980 tract, the 1980 tract is the appropriate unit for comparison and the two 1970 tracts must be combined accordingly.

**TABLE 2  
(TAB2)**

**Single Years of Age, Race, and Sex  
UNIVERSE: Persons**

**THIS TABLE CONTAINS 606 DATA ITEMS WITHIN  
3 STRATIFIERS AND HAS S1 SUPPRESSION**

**THE STRATIFIERS ARE:**

Race BY  
Sex BY  
Age (Single Years)

Total  
Male  
Under 1 Year  
1 Year  
2 Years  
3 Years  
4 Years  
5 Years  
6 Years  
7 Years  
8 Years  
9 Years  
10 Years  
11 Years  
12 Years  
13 Years  
14 Years  
15 Years  
16 Years  
17 Years  
18 Years  
. . .  
95 Years  
96 Years  
97 Years  
98 Years  
99 Years  
100 Years and over

Female  
REPEAT Age (Single Years) (101)

White  
REPEAT Sex (202)  
Negro  
REPEAT Sex (202)

Figure 2: Contents of Table 2 of the 1970 2nd Count Summary Data File

**TABLE 10  
(TAB10)**

**SEX (2) BY AGE (26)**

SUPFLG01 applies to all cells

Universe: Persons

THIS TABLE CONTAINS 52 DATA ITEMS WITHIN  
2 STRATIFIERS

THE STRATIFIERS ARE:

Sex BY  
Age

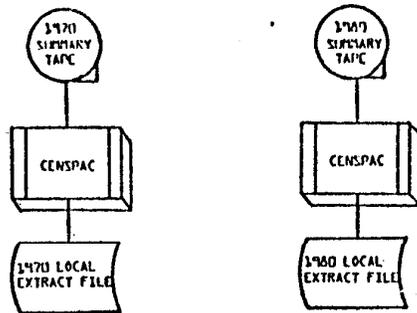
Total:

Under 1 year  
1 and 2 years  
3 and 4 years  
5 years  
6 years  
7 to 9 years  
10 to 13 years  
14 years  
15 years  
16 years  
17 years  
18 years  
19 years  
20 years  
21 years  
22 to 24 years  
25 to 29 years  
30 to 34 years  
35 to 44 years  
45 to 54 years  
55 to 59 years  
60 and 61 years  
62 to 64 years  
65 to 74 years  
75 to 84 years  
85 years and over

Female:  
REPEAT Age (26)

Figure 3: Contents of Table 10 of the 1980 STF 1 Summary Data File

## Step 1: Preparation of Local Extract Files



Summary data from the 1970 and 1980 censuses are available to the public through the purchase of computer tapes containing data for areas covering whole States. Since many data users require information on areas in only part of a State or on only certain types of areas, such as census tracts, this first step entails the creation of local extract files. The local extract files prepared in this demonstration contain data only for census tracts within the city of Richmond, Virginia. Geographic comparability problems due to census tract revisions for 1980 are also handled in this step. The processing of the two input data files is described below.

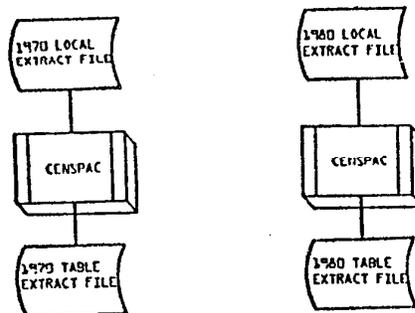
### 1970 Second Count Summary Tape, File A

The summary tape used for the 1970 census includes a data record for each census tract in the State of Virginia. The seventy census tracts delineated in Richmond for the 1970 census are a small portion of the total number of tracts in the State. Therefore, the preparation of a local extract file constitutes a substantial file reduction. To establish census tract comparability with the 1980 census data it was necessary to combine and renumber two tracts, and to simply renumber eight others. The CENSPAC commands for this operation are contained in Technical Appendix 1.A.

## 1980 Summary Tape File 1, File A

The summary tape used to demonstrate the processing of the 1980 census data is one prepared from the results of the 1978 Dress Rehearsal Census of the Richmond, Virginia Area. Since this file contains data for a number of levels of census geography and for geographic areas in addition to the city of Richmond, an extract was created containing only data for census tracts within Richmond. Had any census tracts crossed the boundaries of the city or census county division (coextensive entities in this case), it would also have been necessary to combine summaries for the tract parts to be comparable to the 1970 Second Count records for whole tracts. The GENSPAC commands for this operation are contained in Technical Appendix 1.B.

### Step 2: Preparation of Table Extract Files

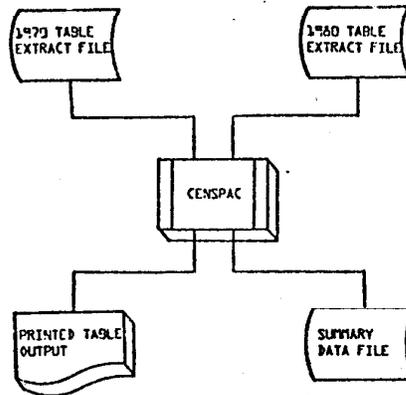


Once the first major processing step has been completed, the user has local extract files available for a variety of applications. Step 2 becomes necessary where the information in the local extract files requires extensive reorganization or combination to establish comparability for direct comparisons. In many instances, the categories in which the data are grouped for a particular variable, such as age or income, may not correspond. These categories must be collapsed or reorganized to make them the same for both census years.

In this example, the 1970 and 1980 local extract files are processed through CENSPAC to produce table extract files containing population counts in the six age groups of: under 6 years, 6-17 years, 18-24 years, 25-44 years, 45-64 years and 65 years old and over. As shown in figure 2, table 2 of the 1970 2nd count summary data contains 101 age groups within 606 race-sex-age categories, and as shown in figure 3, table 10 of the 1980 STF 1 summary data contains 26 age groups within 52 six-age categories.<sup>4/</sup> The CENSPAC commands to collapse each of these tables into the six age groups for the total population and produce table extract files are contained in Technical Appendix 2.A and Technical Appendix 2.B.

<sup>4/</sup> Although table 18 of the 1970 First County summary data contains age groups which approximate those in the 1980 STF 1, these data do not contain tract records. The block group records could be aggregated to derive tract data, but the more frequent occurrence of suppression at the block group level would tend to produce artificially small tract level counts. Therefore, it is better to use data with actual tract level counts whenever the data categories can be made comparable.

### Step 3: Preparation of Printed Tables



The preceding steps have resulted in table extract files which are comparable in both geographic organization and subject matter. Step 3 combines data from these files through CENSPAC and prints tables showing totals for 1970 and 1980, and measures of change between the two census years. At the same time, a summary data file is created for computer mapping in Step 4.

Figures 4 and 5 show the tables produced by CENSPAC. One contains population age group totals by census tract for both census years, and the other contains both numeric and percent change by tract between the two years. CENSPAC allows great flexibility in the formatting of tables; the formats of the examples are not strictly dictated by the software package. Both tables are produced by one CENSPAC run, as well as a summary data file which contains all information from both printed tables. The CENSPAC commands for producing the printed tables and summary data file are contained in Technical Appendix 3.

POPULATION AGE GROUPS, 1970 AND 1978  
 RICHMOND, VIRGINIA  
 CENSUS TRACTS

SOURCES: 1970 CENSUS OF POPULATION AND HOUSING  
 1978 RICHMOND DRESS REHEARSAL  
 (S)=DATA SUPPRESSION

T R A C T	1970						1978						AGE
	0-5	6-17	18-24	25-44	45-64	65+	0-5	6-17	18-24	25-44	45-64	65+	
010100	5	9	9	32	67	15	1	6	3	25	60	18	
010200	131	402	254	544	1186	586	117	209	181	645	864	2113	
010300	133	311	226	396	260	109	173	433	305	553	307	153	
010400	330	976	722	1137	1618	2127	335	705	890	1928	1197	1680	
010500	189	481	201	629	427	181	94	300	234	486	535	208	
010600	303	760	464	897	915	557	159	535	378	583	770	433	
010700	386	1124	409	1131	779	373	232	720	515	827	915	437	
010800	585	1463	561	1328	1062	672	423	1616	754	1535	1127	433	
010900	473	1127	402	918	815	585	371	1224	700	1066	843	432	
011000	291	680	453	884	758	453	387	882	488	1047	715	434	
011100	357	629	1178	933	966	412	209	512	1058	785	784	535	
020100	413	1137	279	573	315	92	286	880	357	518	382	96	
020200	928	2146	716	1440	679	235	539	1455	761	1034	835	277	
020300	374	1068	420	810	977	373	124	506	319	528	885	466	
020400	856	1962	773	1269	805	228	484	1600	993	1557	929	296	
020500	439	783	503	809	641	237	138	392	259	732	402	184	
020600	383	874	301	631	849	291	141	411	284	448	611	366	
020700	332	957	401	664	814	411	121	327	211	360	456	322	
020800	569	135	553	1052	763	326	255	552	377	721	616	306	
020900			711		427	385			578	853	995	526	
										426			

Figure 4: Example of Printed Table Produced by CENSPAC Showing Population Totals for Age Groups by Census Tract for Two Census Years

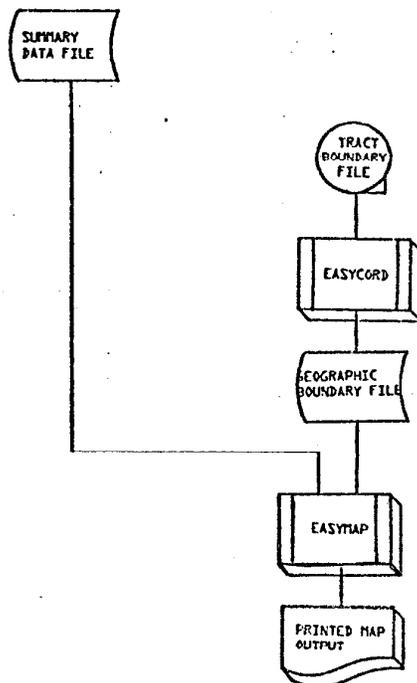
CHANGE IN POPULATION AGE GROUPS, 1970-1978  
 RICHMOND, VIRGINIA  
 CENSUS TRACTS

SOURCES: 1970 CENSUS OF POPULATION AND HOUSING  
 1978 RICHMOND DRESS REHEARSAL  
 (S)=DATA SUPPRESSION  
 CELL VALUE OF 999999.9 INDICATES DIVISION BY ZERO

TRACT	CHANGE, 1970-1978										PERCENT CHANGE, 1970-1978					AGE
	0-5	6-17	18-24	25-44	45-64	65+	0-5	6-17	18-24	25-44	45-64	65+				
010100	-4	-3	-6	-7	-7	3	-80.0	-33.3	-66.6	-21.8	-10.4	20.0				
010200	-14	-193	-73	101	-322	1127	-10.6	-48.0	-28.7	18.5	-27.1	114.3				
010300	40	122	79	167	47	44	30.0	39.2	34.9	42.1	18.0	40.3				
010400	5	-271	168	791	-421	-447	1.5	-27.7	23.2	69.5	-26.0	-21.0				
010500	-95	-181	33	-143	108	27	-50.2	-37.6	16.4	-22.7	25.2	14.9				
010600	-144	-225	-66	-314	-145	-124	-47.5	-29.6	-18.5	-35.0	-15.8	-22.2				
010700	-154	-404	106	-304	136	64	-39.8	-35.9	25.9	-26.8	17.4	17.1				
010800	-162	153	193	207	65	-239	-27.6	10.4	34.4	15.5	6.1	-35.5				
010900	-102	97	298	148	28	-153	-21.5	8.6	74.1	16.1	3.4	-26.1				
011000	96	202	35	163	-43	-19	32.9	29.7	7.7	18.4	-5.6	-4.1				
011100	-148	-117	-120	-148	-182	123	-41.4	-18.6	-10.1	-15.8	-18.8	29.8				
020100	-127	-257	78	-55	67	4	-30.7	-22.6	27.9	-9.5	21.2	4.3				
020200	-389	-691	43	-406	156	42	-41.9	-32.1	5.9	-28.1	22.9	17.8				
020300	-250	-562	-101	-282	-92	93	-66.8	-52.6	-24.0	-34.8	-9.4	24.9				
020400	-372	-362	220	288	124	68	-43.4	-18.4	28.4	22.6	15.4	29.8				
020500	-301	-391	-244	-77	-239	-53	-68.5	-49.9	-48.5	-9.5	-37.2	-22.3				
020600	-242	-463	-17	-183	-238	75	-63.1	-52.9	-5.6	0	-28.0	25.7				
020700	-211	-630	-190	-304	-358	-89	-63.5	-65.8	-47	-43.9	-21.6	-21.6				
020800	-314	583	-176	-331	-147	0	-55.1	-51.3				-F				
020900			-133	-358			-43.5									

Figure 5: Example of Printed Table Produced by CENSPAC Showing Change in Age Groups by Census Tract between Two Census Years

#### Step 4: Preparation of Maps



Step 4 produces choropleth tract maps from the contents of the summary data file. The map production is done by EASYMAP which requires the summary data file and a geographic boundary file as input. The geographic boundary file describes the boundaries of all census tracts within the city, and is produced from the tract boundary file by EASYCORD. It is necessary to process the tract boundary file through EASYCORD since the format of the file is not appropriate for direct input to EASYMAP.

One map produced in this demonstration is displayed in figure 6, although there are 24 possible maps corresponding to the 24 data items in the summary data file. Figure 6 is a photographic reduction of the original line-printer map which occupied 4 standard printer pages. The EASYCORD commands for producing the geographic boundary file are contained in Technical Appendix 4.A, and the EASYMAP commands for producing the map shown in figure 6 are contained in Technical Appendix 4.B.

CITY OF RICHMOND, VIRGINIA  
 1970-1978 PERCENT CHANGE FOR AGE GROUP 0-5  
 SOURCE: 1970 CENSUS OF POPULATION AND HOUSING  
 NOTE: 1970 CENSUS OF POPULATION AND HOUSING

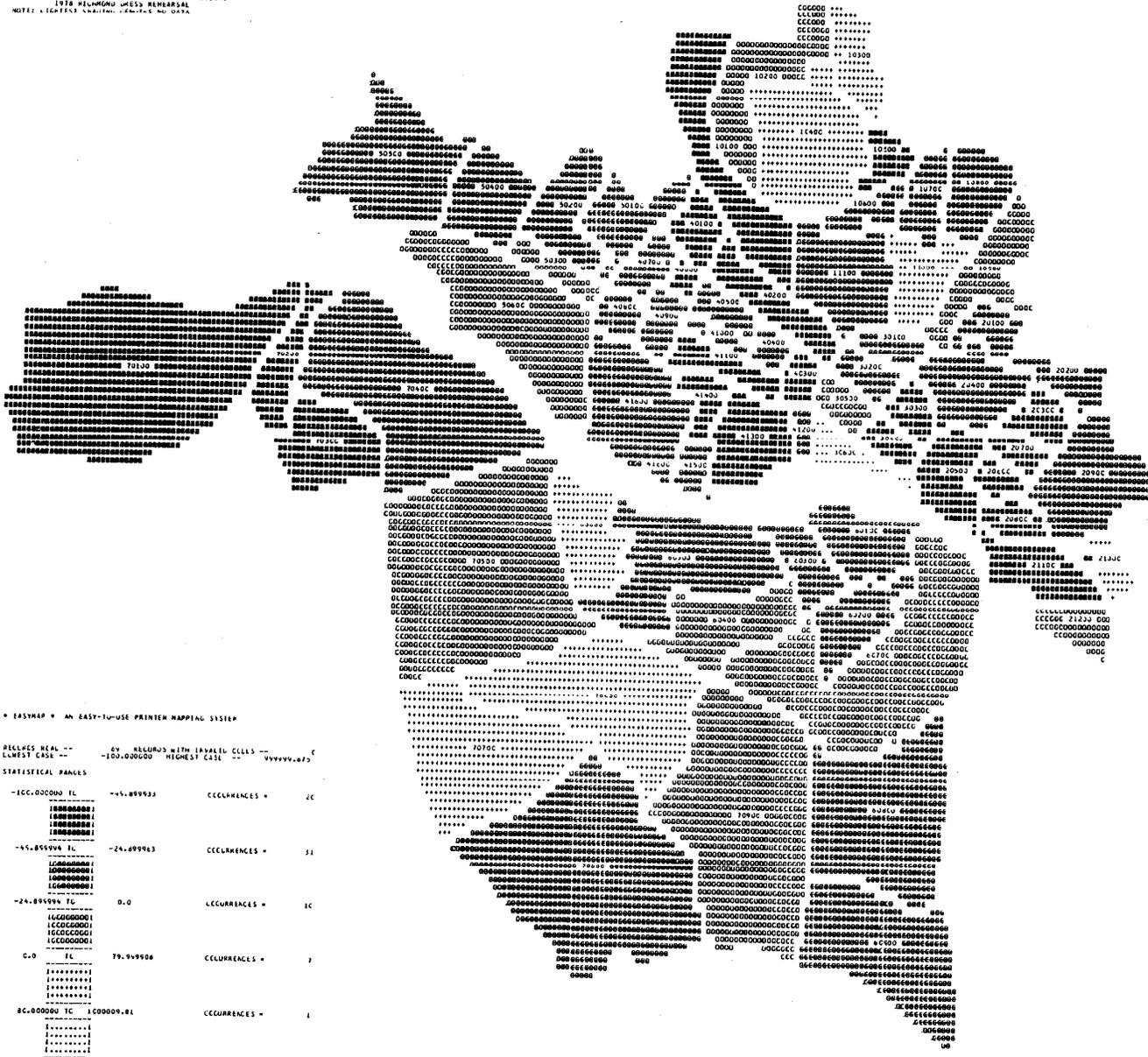


Figure 6: Map of Census Tracts in Richmond, Virginia Showing Percent Change between 1970 and 1978 for One Age Group

## Data Suppression

To maintain the confidentiality of information reported to the Census Bureau, no tabulated data are made public where it could be possible to identify the characteristics of individual persons or households. The type of suppression relevant to this demonstration precludes the publication of population characteristics where there are fewer than fifteen persons residing in a geographic unit. Of course, any population counts suppressed at one level of census geography would be included in the summary totals for a higher level.

In the 1980 census summary tapes, zeroes are contained in all data cells that have been suppressed for confidentiality. To prevent confusion between suppressed data cells and those that contain actual zero counts, a series of descriptive suppression flags are contained on each summary data record. Each flag indicates whether a particular population or housing group occurs in sufficient numbers in the geographic unit to have relevant data made public.

The method of representing data suppression in the 1970 summary tapes differs from that used in the 1980 summary tapes. In the 1970 summary tapes, the existence of suppression must be interpreted by reading the table cell values directly rather than by reading an associated flag. Suppression on the 1970 and 1980 census summary tapes is more fully discussed in the 1970 Census Users' Guide and the technical documentation for each 1980 summary tape file. 5/

The CENSPAC software commands contained in Technical Appendices 2.A, 2.B and 3 allow for the existence of suppression in the summary data. No suppression happens to exist, though, in the summary data used in the examples shown earlier in this publication. The annotations accompanying the commands more fully explain the approach that would have been taken had there actually been suppression. As an example of how suppressed data would have been represented in the printed tables, census block data within tract 104 from the 1978 Richmond data are shown in figure 7. Block 102 in this tract had no residents, so the blank cell totals represent actual zeroes (a convention of CENSPAC). On the other hand, blocks 105 and 106 had between one and fifteen residents, and the printed '(S)' in each cell shows that the cell totals have been suppressed for confidentiality.

5/ U.S. Bureau of the Census, 1970 Census Users' Guide, U.S. Government Printing Office, Washington, D.C., 1970.

Census of Population and Housing, 1980--Summary Tape File 1: 1978 Richmond Dress Rehearsal Technical Documentation/ prepared by the Data User Services Division, Bureau of the Census. --Washington: The Bureau, 1980.

POPULATION AGE GROUPS, 1978  
 RICHMOND, VIRGINIA  
 CENSUS TRACT 104

SOURCE: 1978 RICHMOND DRESS REHEARSAL  
 (S)=DATA SUPPRESSION

B L O C K	1978						AGE
	0-5	6-17	18-24	25-44	45-64	65+	
101	5	5	1	14	7	5	
102							
103	30	25	52	130	41	11	
104	2	6	9	6	20	4	
105	(S)	(S)	(S)	(S)	(S)	(S)	
106	(S)	(S)	(S)	(S)	(S)	(S)	
107	1	14	6	12	10	2	
108	6	17	6	19	14	2	
109	1	12	6	12	18	12	
110	1	9	3	7	18	9	
111	2	2	4	6	12	8	
112	2	10	3	12	11	8	
113	2	16	9	18		-	
114	2		5	11			
115			2				

Figure 7: Example of a Method for Representing Suppressed Data in Tables Produced by CENSPAC

## AVAILABILITY OF CENSUS PRODUCTS

The Census Bureau's data and software products described in this publication may be ordered through the Data User Services Division, Customer Services (Tapes), U.S. Bureau of the Census, Washington, D.C. 20233 (301-449-1600). There is a charge for each reel of tape ordered based on the cost of reproduction (currently \$110 per reel).

Many Census Bureau products are also available from State agencies participating in the Bureau's State Data Center Program and from organizations listed in the Bureau's National Clearinghouse for Census Data Services. Contact the State and Regional Programs Staff (301-449-5632) for the addresses of State Data Centers and organizations listed with the Clearinghouse.

The availability of 1980 census summary tapes and 1980 tract boundary files is subject to their release by the Bureau. Some individual State summary files will occupy more than one reel of tape. CENSPAC is available on one reel of tape, and the Special Programs Information Tape contains both EASYCORD and EASYMAP in addition to other computer software.

TECHNICAL APPENDICES

```

1 FILEIN CNT2
  ITEM A24.0 FLD1A A6.0 TRACT A1770.0 FLD1 14A1800.0 FLD2 FLD3 FLD4 FLDS
    FLD6 FLD7 FLD8 FLD9 FLD10
      FLD11 FLD12 FLD13 FLD14 FLD15

```

```

2 IF CDTA70 = '760' INCLUDE

```

```

3 SOURCE
  IF CA-TRACT = '100101' MOVE '0704' TO CA-TRACT.
  IF CA-TRACT = '100102' MOVE '0703' TO CA-TRACT.
  IF CA-TRACT = '100104' MOVE '0705' TO CA-TRACT.
  IF CA-TRACT = '100105' MOVE '0706' TO CA-TRACT.
  IF CA-TRACT = '100201' MOVE '0707' TO CA-TRACT.
  IF CA-TRACT = '100202' MOVE '0708' TO CA-TRACT.
  IF CA-TRACT = '100301' MOVE '0709' TO CA-TRACT.
  IF CA-TRACT = '100303' MOVE '0709' TO CA-TRACT.
  IF CA-TRACT = '100901' MOVE '0701' TO CA-TRACT.
  IF CA-TRACT = '100907' MOVE '0702' TO CA-TRACT.
SOURCE

```

```

4 SORT CDTA70 TRACT

```

```

5 FILEOUT BLFACTOR 3
  ITEM A24.0 FLD1A A6.0 TRACT A1770.0 FLD1
  ITEM A1800.0 FLD2
  ITEM A1800.0 FLD3
  ITEM A1800.0 FLD4
  ITEM A1800.0 FLDS
  ITEM A1800.0 FLD6
  ITEM A1800.0 FLD7
  ITEM A1800.0 FLD8
  ITEM A1800.0 FLD9
  ITEM A1800.0 FLD10
  ITEM A1800.0 FLD11
  ITEM A1800.0 FLD12
  ITEM A1800.0 FLD13
  ITEM A1800.0 FLD14
  ITEM A1800.0 FLD15

```

FUNCTION: To create a local extract file from the 1970 second count summary tape file. The extract file is to contain tract records only for the city of Richmond. The function is also to convert 1970 tract codes to 1980 codes.

INPUT: Second count summary tape file for the State of Virginia from the 1970 Census of Population and Housing.

OUTPUT: Local extract file containing only tract records for the city of Richmond.

PROCESS: 1. The 'FILEIN CNT2' command accesses the data dictionary for the 1970 second count summary tape file. The subsequent 'ITEM' command defines TRACT as a single field composed of the basic tract and tract suffix fields. The 15 physical records constituting each logical record are also defined by the 'ITEM' command.

2. The 'IF' command selects only those records pertaining to the city of Richmond (county 760).

3. The COBOL statements delimited by the two 'SOURCE' commands renumber the 1970 census tracts to 1980 tract codes.

4. The 'SORT' command resequences the file by county and tract codes.

5. The 'FILEOUT' command generates an output file with 3 records per block. The subsequent 'ITEM' commands specify the 15 physical records constituting each logical record.

1 FILEIN STF1  
ITEM 2A1638.0 FLD1 FLD2

2 IF SUMRYLVL = '14' AND COUNTY = '760' INCLUDE  
SORT COUNTY TRACT  
TOTAL TRACT  
IF \$TOTAL = 1 INCLUDE

3 FILEOUT BLFACTOR 6  
ITEM A1638.0 FLD1  
ITEM A1638.0 FLD2

**FUNCTION:** To create a local extract file from the 1980 summary tape file (STF)1. The extract file is to contain tract records only for the city of Richmond.

**INPUT:** Summary tape file (STF)1, File A, for the State of Virginia from the 1980 Census of Population and Housing. (1978 Richmond Dress Rehearsal).

**OUTPUT:** Local extract file containing only tract records for the city of Richmond.

**PROCESS:** 1. The 'FILEIN STF1' command accesses the data dictionary for the summary tape file (STF1) from the 1980 Census of Population and Housing. The 'ITEM' command identifies the two 1638 character record segments constituting one logical record on the STF1 file.

2. The first 'IF' command selects the tract records (summary level 14) for the city of Richmond (county 760). The 'SORT, TOTAL, IF' sequence of commands aggregates the parts of any tract split by a place or MCD/CCD boundary.

3. The 'FILEOUT' command generates an output file with 6 records per block. The subsequent 'ITEM' commands specify the two 1638 character record segments constituting one logical record in STF1.

1 [ FILEIN CNT2  
ITEM X77.0 A1.0 SUPFLG01 X186.0 AB.0 FL1

FUNCTION: To create a table extract file containing population age group counts from the 1970 Census of Population and Housing.

INPUT: Local extract file from the 1970 Census of Population and Housing, second count summary data.

OUTPUT: Table extract file containing 6 population age group counts for each census tract.

PROCESS: 1. The 'FILEIN CNT2' command accesses the data dictionary for the 1970 second count summary data. The subsequent 'ITEM' command reads the first cell of Table 2 (FL1) independent of the data dictionary and identifies one column of record fill space to be used as a suppression flag (SUPFLG01). The first cell of the table would contain '-0000001' if suppression were present in the first 'race' stratifier, 'total'. In the course of processing, CENSPAC would convert the negative value to zero and set a system variable, \$SUP2, to indicate suppression without specifying which of the table's three stratifiers had been suppressed. Therefore, upon input the 'ITEM' command reads the first table cell for processing through 'SOURCE' statements.

```

SOURCE
IF CA-TRACTS = ' ' MOVE '00' TO CA-TRACTS.
IF A-FL1 = '-0000001' MOVE '1' TO CA-SUPFLG01
ELSE MOVE '0' TO CA-SUPFLG01.
SOURCE

```

```

COMPUTE T1 = TAB2 (1,1,1,1) + TAB2 (1,1,1,2) + TAB2 (1,1,1,3) + TAB2 (1,1,1,4)
+ TAB2 (1,1,1,5) + TAB2 (1,1,1,6) + TAB2 (1,2,1,1) + TAB2 (1,2,2)
+ TAB2 (1,2,3) + TAB2 (1,2,4) + TAB2 (1,2,5) + TAB2 (1,2,6)
COMPUTE T2A = TAB2 (1,1,7) + TAB2 (1,1,8) + TAB2 (1,1,9) + TAB2 (1,1,10)
+ TAB2 (1,1,11) + TAB2 (1,1,12) + TAB2 (1,1,13) + TAB2 (1,1,14)
+ TAB2 (1,1,15) + TAB2 (1,1,16) + TAB2 (1,1,17) + TAB2 (1,1,18)
+ TAB2 (1,2,7) + TAB2 (1,2,8) + TAB2 (1,2,9) + TAB2 (1,2,10)
+ TAB2 (1,2,11) + TAB2 (1,2,12) + TAB2 (1,2,13) + TAB2 (1,2,14)
+ TAB2 (1,2,15) + TAB2 (1,2,16) + TAB2 (1,2,17) + TAB2 (1,2,18)
COMPUTE T3 = TAB2 (1,1,19) + TAB2 (1,1,20) + TAB2 (1,1,21) + TAB2 (1,1,22)
+ TAB2 (1,1,23) + TAB2 (1,1,24) + TAB2 (1,1,25) + TAB2 (1,1,26)
+ TAB2 (1,2,20) + TAB2 (1,2,21) + TAB2 (1,2,22) + TAB2 (1,2,23)
+ TAB2 (1,2,24) + TAB2 (1,2,25)
COMPUTE T4A = TAB2 (1,1,26) + TAB2 (1,1,27) + TAB2 (1,1,28) + TAB2 (1,1,29)
+ TAB2 (1,1,30) + TAB2 (1,1,31) + TAB2 (1,1,32) + TAB2 (1,1,33)
+ TAB2 (1,1,34) + TAB2 (1,1,35) + TAB2 (1,1,36) + TAB2 (1,1,37)
+ TAB2 (1,1,38) + TAB2 (1,1,39) + TAB2 (1,1,40) + TAB2 (1,1,41)
+ TAB2 (1,1,42) + TAB2 (1,1,43) + TAB2 (1,1,44) + TAB2 (1,1,45)
+ TAB2 (1,2,26) + TAB2 (1,2,27) + TAB2 (1,2,28) + TAB2 (1,2,29)
+ TAB2 (1,2,30) + TAB2 (1,2,31) + TAB2 (1,2,32) + TAB2 (1,2,33)
+ TAB2 (1,2,34) + TAB2 (1,2,35) + TAB2 (1,2,36) + TAB2 (1,2,37)
COMPUTE T4C = TAB2 (1,2,38) + TAB2 (1,2,39) + TAB2 (1,2,40) + TAB2 (1,2,41)
+ TAB2 (1,2,42) + TAB2 (1,2,43) + TAB2 (1,2,44) + TAB2 (1,2,45)
COMPUTE T5A = TAB2 (1,1,46) + TAB2 (1,1,47) + TAB2 (1,1,48) + TAB2 (1,1,49)
+ TAB2 (1,1,50) + TAB2 (1,1,51) + TAB2 (1,1,52) + TAB2 (1,1,53)
+ TAB2 (1,1,54) + TAB2 (1,1,55) + TAB2 (1,1,56) + TAB2 (1,1,57)
+ TAB2 (1,1,58) + TAB2 (1,1,59) + TAB2 (1,1,60) + TAB2 (1,1,61)
+ TAB2 (1,1,62) + TAB2 (1,1,63) + TAB2 (1,1,64) + TAB2 (1,1,65)
COMPUTE T5B = TAB2 (1,2,46) + TAB2 (1,2,47) + TAB2 (1,2,48) + TAB2 (1,2,49)
+ TAB2 (1,2,50) + TAB2 (1,2,51) + TAB2 (1,2,52) + TAB2 (1,2,53)
+ TAB2 (1,2,54) + TAB2 (1,2,55) + TAB2 (1,2,56) + TAB2 (1,2,57)
+ TAB2 (1,2,58) + TAB2 (1,2,59) + TAB2 (1,2,60) + TAB2 (1,2,61)
+ TAB2 (1,2,62) + TAB2 (1,2,63) + TAB2 (1,2,64) + TAB2 (1,2,65)
COMPUTE T6A = TAB2 (1,1,66) + TAB2 (1,1,67) + TAB2 (1,1,68) + TAB2 (1,1,69)
+ TAB2 (1,1,70) + TAB2 (1,1,71) + TAB2 (1,1,72) + TAB2 (1,1,73)
+ TAB2 (1,1,74) + TAB2 (1,1,75) + TAB2 (1,1,76) + TAB2 (1,1,77)
+ TAB2 (1,1,78) + TAB2 (1,1,79) + TAB2 (1,1,80) + TAB2 (1,1,81)
+ TAB2 (1,1,82) + TAB2 (1,1,83) + TAB2 (1,1,84) + TAB2 (1,1,85)
COMPUTE T6B = TAB2 (1,1,86) + TAB2 (1,1,87) + TAB2 (1,1,88) + TAB2 (1,1,89)
+ TAB2 (1,1,90) + TAB2 (1,1,91) + TAB2 (1,1,92) + TAB2 (1,1,93)
+ TAB2 (1,1,94) + TAB2 (1,1,95) + TAB2 (1,1,96) + TAB2 (1,1,97)
+ TAB2 (1,1,98) + TAB2 (1,1,99) + TAB2 (1,1,100) + TAB2 (1,1,101)
COMPUTE T6C = TAB2 (1,2,66) + TAB2 (1,2,67) + TAB2 (1,2,68) + TAB2 (1,2,69)
+ TAB2 (1,2,70) + TAB2 (1,2,71) + TAB2 (1,2,72) + TAB2 (1,2,73)
+ TAB2 (1,2,74) + TAB2 (1,2,75) + TAB2 (1,2,76) + TAB2 (1,2,77)
+ TAB2 (1,2,78) + TAB2 (1,2,79) + TAB2 (1,2,80) + TAB2 (1,2,81)
COMPUTE T6D = TAB2 (1,2,82) + TAB2 (1,2,83) + TAB2 (1,2,84) + TAB2 (1,2,85)
+ TAB2 (1,2,86) + TAB2 (1,2,87) + TAB2 (1,2,88) + TAB2 (1,2,89)
+ TAB2 (1,2,90) + TAB2 (1,2,91) + TAB2 (1,2,92) + TAB2 (1,2,93)
+ TAB2 (1,2,94) + TAB2 (1,2,95) + TAB2 (1,2,96) + TAB2 (1,2,97)
+ TAB2 (1,2,98) + TAB2 (1,2,99) + TAB2 (1,2,100) + TAB2 (1,2,101)

```

2. The first of the two COBOL statements delimited by the 'SOURCE' commands fills the tract suffix field with zeroes if blank. This makes the suffixes comparable to those contained in the 1980 STF1. The second statement checks for the '-0000001' indicator of suppression in the first table cell (FL1) and sets the value of the specially defined field (SUPFLG01) to '1' if suppression is present.

3. The series of 'COMPUTE' commands collapses Table 2 into 6 age groups representing the total population. More than 6 'COMPUTE' commands are necessary since each may contain no more than 22 elements on the right hand side of the expression.

4: The special variable 'SUPFLG01' is checked for the existence of suppression on each tract record. If suppression is present, a '-1' is written in the first age group field (T1) of the record.

5. Two 1970 census tracts were combined for the 1980 census. In the 1970 local extract file, these two tracts have been changed to have the same 1970 tract code. The 'TOTAL' command aggregates the age group counts for the two tracts.

6. The 'FILEOUT' command generates an output file with 10 records per block. The subsequent 'ITEM' command specifies that each output record is to contain fields for census tract (TRACT) and the 6 age group categories (T1-T6).

```
COMPUTE T2 = T2A + T2B  
COMPUTE T4 = T4A + T4B + T4C  
COMPUTE T5 = T5A + T5B  
COMPUTE T6 = T6A + T6B + T6C + T6D
```

3

```
IF SUPFLG01 = '1'  
COMPUTE T1 = -1;
```

4

```
TOTAL TRACTS  
IF $TOTAL = 0 OR $TOTAL = 2 EXCLUDE
```

5

```
FILEOUT BLFACTOR 10  
ITEM A4.0 TRACTB' A2.0 TRACTS 609.0 T1 T2 T3 T4 T5 T6
```

6

**FUNCTION:** To create a table extract file containing population age group counts from the 1980 Census of Population and Housing (1978 Richmond Dress Rehearsal).

**INPUT:** Local extract file from the 1980 Census of Population and Housing, STF1, File A.

**OUTPUT:** Table extract file containing 6 population age group counts for each census tract.

**PROCESS:** 1. The 'FILEIN STF1' command accesses the data dictionary for the 1980 summary tape file (STF) 1.

2. The series of 'COMPUTE' commands collapses Table 10 into 6 age groups representing the total population.

3. The suppression flag pertaining to Table 10 (SUPFLG01) is checked for the existence of suppression on each tract record. If suppression is present, a '-1' is written in the first age group field (T1) of the record.

4. The 'FILEOUT' command generates an output file with 10 records per block. The subsequent 'ITEM' command specifies that each output record is to contain fields for census tract (TRACT) and the 6 age group categories (T1-T6).

1 FILEIN STF1

COMPUTE T1 = TAB10 (1,1) + TAB10 (1,2) + TAB10 (1,3) + TAB10 (1,4)  
COMPUTE T2 = TAB10 (1,5) + TAB10 (1,6) + TAB10 (1,7) + TAB10 (1,8)  
COMPUTE T3 = TAB10 (1,9) + TAB10 (1,10) + TAB10 (1,11)  
COMPUTE T3 = TAB10 (1,12) + TAB10 (1,13) + TAB10 (1,14) + TAB10 (1,15)  
COMPUTE T3 = TAB10 (1,16)  
COMPUTE T4 = TAB10 (1,17) + TAB10 (1,18) + TAB10 (1,19)  
COMPUTE T5 = TAB10 (1,20) + TAB10 (1,21) + TAB10 (1,22) + TAB10 (1,23)  
COMPUTE T6 = TAB10 (1,24) + TAB10 (1,25) + TAB10 (1,26)

3 IF SUPFLG01 = '1'  
COMPUTE T1 = -1;

4 FILEOUT BLFACTOR 10  
ITEM A6.0 TRACT 609.0 T1 T2 T3 T4 T5 T6

**FUNCTION:** To match the 1970 and 1980 table extract files on the basis of tract code and compute measures of change between the two years; then to generate two printed tables and produce an output file.

**INPUT:** Table extract files from the 1970 and 1980 summary data.

**OUTPUT:** Two printed tables and a summary data file containing 1970 and 1980 population age group counts and measures of change between the two years.

**PROCESS:** 1. The two 'FILEIN' commands input the two table extract files. The 'AGE' data dictionary parameter of each 'FILEIN' command purposely does not match any recognized data dictionary name, but this is a positional parameter which must have an entry. The 'ITEM' command subsequent to each 'FILEIN' fully describes the input records for each file, 'TRACT' is identified as the match key for the match which occurs at this point.

2. The 'ARRAY' command establishes four work storage areas to hold the results of subsequent operations.

3. The cell 'TABCH' is computed as the difference between each 1980 and 1970 age group category for each tract. Then, 'TABPC' (percent change) is computed for each category in each tract. In each case, the large value of 9999999.9 is written if the category had a zero

```
FILEIN AGE RECSIZE 60 BLKSIZE 600 DISK AINP
ITEM A6.0 TRACT 609.0 TABA (6)
MATCH TRACT
FILEIN AGE RECSIZE 60 BLKSIZE 600 DISK BINP
ITEM A6.0 TRACT 609.0 TABB (6)
MATCH TRACT
ENDM
```

1

```
ARRAY TABA1 (6)
TABB1 (6)
TABCH (6)
TABPC (6)
COMPUTE TABCH (*) = A.TABA (*) - B.TABB (*)
```

2

```
IF B.TABB (1) NOT = 0
  COMPUTE TABPC (1) = TABCH (1) / B.TABB (1) * 100;
IF B.TABB (1) = 0 COMPUTE TABPC (1) = 9995999.9;
IF B.TABB (2) NOT = 0
  COMPUTE TABPC (2) = TABCH (2) / B.TABB (2) * 100;
IF B.TABB (2) = 0 COMPUTE TABPC (2) = 9995999.9;
IF B.TABB (3) NOT = 0
  COMPUTE TABPC (3) = TABCH (3) / B.TABB (3) * 100;
IF B.TABB (3) = 0 COMPUTE TABPC (3) = 9995999.9;
IF B.TABB (4) NOT = 0
  COMPUTE TABPC (4) = TABCH (4) / B.TABB (4) * 100;
IF B.TABB (4) = 0 COMPUTE TABPC (4) = 9995999.9;
IF B.TABB (5) NOT = 0
  COMPUTE TABPC (5) = TABCH (5) / B.TABB (5) * 100;
IF B.TABB (5) = 0 COMPUTE TABPC (5) = 9995999.9;
IF B.TABB (6) NOT = 0
  COMPUTE TABPC (6) = TABCH (6) / B.TABB (6) * 100;
IF B.TABB (6) = 0 COMPUTE TABPC (6) = 9995999.9;
```

3





7. The series of 'ITEM' commands specify a line of data to be printed in the table under each of a set of conditions. The first specifies the contents of a line if neither 1970 or 1980 data have been suppressed. The second specifies the contents if only 1980 data have been suppressed, and the third specifies the contents if only 1970 data have been suppressed. The fourth 'ITEM' command specifies the contents of the line if data have been suppressed for both years. In all cases an '(S)' is printed in each suppressed cell. The last 'ITEM' command specifies that a line is to be skipped after every fifth line of printed data.

```

IF A.TABA (1) NOT = -1 AND B.TABB (1) NOT = -1
ITEM X2.0 A6.0 TRACT 12F9.0 B.TABB (*) A.TABA (*);
IF A.TABA (1) = -1 AND B.TABB (1) NOT = -1
ITEM X2.0 A6.0 TRACT 6F9.0 B.TABB (*)
      (S) (S) (S) (S) (S) (S) (S) (S)
      (S) (S) (S) (S) (S) (S) (S) (S)
IF A.TABA (1) NOT = -1 AND B.TABB (1) = -1
ITEM X2.0 A6.0 TRACT (S) (S) (S) (S) (S) (S) (S) (S)
      (S) (S) (S) (S) (S) (S) (S) (S)
      6F9.0 A.TABA (*);
IF A.TABA (1) = -1 AND B.TABB (1) = -1
ITEM X2.0 A6.0 TRACT (S) (S) (S) (S) (S) (S) (S) (S)
      (S) (S) (S) (S) (S) (S) (S) (S)
      (S) (S) (S) (S) (S) (S) (S) (S)
IF RTOT1 = 5
ITEM , ,
COMPUTE RTOT1 = 0;

```

**FUNCTION:** To create a geographic boundary file suitable for input to EASYMAP.

**INPUT:** Tract boundary file for the Richmond, Virginia SMSA.

**OUTPUT:** Geographic boundary file containing census tract boundary descriptions for the city of Richmond.

**PROCESS:** 1. Specify the title of the file to be included on the printed report.

2. Indicate that the input file is an urban atlas.

3. Select records from the input file only for the city of Richmond (State=51, county=760).

4. Begin execution of the program.

1  TITLE TRACT BOUNDARY FILE FOR RICHMOND, VIRGINIA;

2  FILETYPE URBATLAS;

3  SELECT COUNTY 51760;

4  GO;

**FUNCTION:** To generate a choropleth map showing the distribution of percent change in the 0-5 year age group.

**INPUT:** Geographic boundary file for the city of Richmond and the summary data file.

**OUTPUT:** Choropleth map produced on the line printer.

**PROCESS:** 1. Specify geographic boundary file characteristics.

- a. Define the format of the geographic boundary file created by EASYCORD.
- b. Indicate that the boundary coordinates are in latitude and longitude.
- c. Specify the map width to be 26.2 inches.
- d. Begin execution.

2. Specify map data file characteristics and additional map attributes.

- a. Specify that the tract boundaries are to be represented by spaces.
- b. Define the format of the map data file created by CENSPAC.
- c. Specify that the tract code is to be printed in the center of each census tract.
- d. Specify the title to be printed on the map.
- e. Specify the ranges for the data categories to be mapped.
- f. Specify the print characters to be used in overprinting to represent the data categories.
- g. Begin execution.

```
1a  FORMAT='YES'  
    (10X,2F10.0,23X,16)  
b   LATLNGD='Y'  
c   MAPSIZE=26.2  
d   GO  
2a  BORDER=' '  
b   FORMAT='Y'  
    (168X,F9.1)  
c   TEXT1='CODE'  
MAPTITLE='Y'  
CITY OF RICHMOND, VIRGINIA  
1970-1978 PERCENT CHANGE FOR AGE GROUP 0-5  
SOURCES: 1970 CENSUS OF POPULATION AND HOUSING  
         1978 RICHMOND DRESS REHEARSAL  
NOTE: LIGHTEST SHADING DENOTES NO DATA  
END  
e   RANGES=(-100.0,-49.9,-24.9,0.0,80.0,999999.9)  
SHADES='Y'  
OXVA  
OO-i  
OO  
i-  
END  
g   GO
```

Report Generation - Tables for a County and its Places

```
FILEIN STFI
IF SUMRYLVL = '11' OR SUMRYLVL = '13' INCLUDE
REPORT PAGESIZE(45)
HEAD 'REPORT GENERATION - RUN 9' X20.0 'PAGE ' $PAGE
HEAD 'TABLE 14 FOR COUNTIES AND THEIR PLACES'
HEAD '
HEAD H40.0 TAB14
HEAD U40.0 TAB14
IF SUMRYLVL = '11' AND $LCR001 > 6 COMPUTE $LCR001 = 60;
IF SUMRYLVL = '11'
ITEM ' ' ITEM 'COUNTY: ' AREANAME;
IF SUMRYLVL = '13' ITEM ' ' ITEM 'PLACE: ' AREANAME;
ITEM X34.0 2C9.0 TAB14 (*,1)
ITEM C30.0 TAB14 (L,C) TAB14 (*,C)
```

REPORT GENERATION - RUN 9  
TABLE 14 FOR COUNTIES AND THEIR PLACES

PAGE 1

SEX (2) BY MARITAL STATUS (5)  
UNIVERSE: PERSONS 15 YEARS AND OVER

COUNTY: CHESTERFIELD

	MALE:	FEMALE:
SINGLE	11035	9690
NOW MARRIED, EXCEPT SEPARATED	30757	30679
SEPARATED	771	1080
WIDOWED	559	3194
DIVORCED	1655	2457

PLACE: CHESTER

	MALE:	FEMALE:
SINGLE	484	396
NOW MARRIED, EXCEPT SEPARATED	1271	1267
SEPARATED	30	51
WIDOWED	29	175
DIVORCED	77	110

PLACE: BALANCE OF BERMUDA

	MALE:	FEMALE:
SINGLE	1457	1079
NOW MARRIED, EXCEPT SEPARATED	4183	4149
SEPARATED	166	173
WIDOWED	99	473
DIVORCED	361	391

PLACE: BALANCE OF CLOVER HILL

	MALE:	FEMALE:
SINGLE	2628	2387
NOW MARRIED, EXCEPT SEPARATED	9371	9389
SEPARATED	172	237
WIDOWED	124	775
DIVORCED	344	588

PLACE: BALANCE OF DALE

	MALE:	FEMALE:
SINGLE	2129	1612
NOW MARRIED, EXCEPT SEPARATED	6247	6159
SEPARATED	215	267
WIDOWED	97	644
DIVORCED	454	650

REPORT GENERATION - RUN 9  
TABLE 14 FOR COUNTIES AND THEIR PLACES

SEX (2) BY MARITAL STATUS (5)  
UNIVERSE: PERSONS 15 YEARS AND OVER  
COUNTY: HENRICO

	MALE:	FEMALE:
SINGLE	15274	14577
NOW MARRIED, EXCEPT SEPARATED	42306	42390
SEPARATED	1250	2109
WIDOWED	1182	8361
DIVORCED	2404	5152

	MALE:	FEMALE:
PLACE: LAKESIDE		
SINGLE	696	767
NOW MARRIED, EXCEPT SEPARATED	2345	2352
SEPARATED	48	86
WIDOWED	62	661
DIVORCED	123	351

	MALE:	FEMALE:
PLACE: BALANCE OF BROOKLAND		
SINGLE	2314	2363
NOW MARRIED, EXCEPT SEPARATED	5894	5914
SEPARATED	190	344
WIDOWED	147	1036
DIVORCED	428	907

	MALE:	FEMALE:
PLACE: HIGHLAND SPRINGS		
SINGLE	83	59
NOW MARRIED, EXCEPT SEPARATED	223	224
SEPARATED	16	14
WIDOWED	14	89
DIVORCED	18	22

	MALE:	FEMALE:
PLACE: LAKESIDE		
SINGLE	212	193
NOW MARRIED, EXCEPT SEPARATED	586	588
SEPARATED	12	25
WIDOWED	31	322
DIVORCED	47	85

Report Generation Using Scaling Factors

```
FILEIN STF1
IF SUMRYLVL = '14' INCLUDE
*
* MULTIPLY AGGREGATE VALUE BY 250 AND CALCULATE AVERAGE VALUE
COMPUTE TABVALUE (*) = TAB40 (*) * 250
COMPUTE TABAVG (*) = TABVALUE (*) / TAB41 (*)
REPORT PAGESIZE(40)
HEAD 'REPORT GENERATION USING SCALING FACTORS' X30.0 'PAGE ' $PAGE
ITEM ' ' ITEM ' ' ITEM 'TRACT: ' TRACT ITEM ' '
*
* PRINT AVERAGE NUMBER OF PERSONS PER UNIT
ITEM H32.0 TAB35 '= ' TAB35
ITEM U40.0 TAB35 ITEM ' '
*
* PRINT LABELING FOR TABLE 40. NOTE: UNIVERSE LABEL
ITEM H40.0 TAB40 X8.0 'AVERAGE VALUE'
ITEM U40.0 TAB40 U21.053 TAB40 U30.093 TAB40
ITEM ' '
*
* PRINT DATA. NOTE: USE OF $ FORMAT CODE
ITEM C25.0 TAB40 (C) $10.0 TABVALUE (C)
X10.0 $10.0 TABAVG (C)
ITEM ' '

```

Printout:

REPORT GENERATION USING SCALING FACTORS

PAGE 1

TRACT: 100408

MEAN NUMBER OF PERSONS PER UNIT = 3.38  
Universe: Occupied Housing Units

AGGREGATE VALUE BY OCCUPANCY STATUS (2) AVERAGE VALUE  
Universe: Specified Owner-Occupied and Vacant-for-Sale Only Noncondominium Housing Units

Owner occupied \$2095500 \$49892  
Vacant for sale only

TRACT: 100502

MEAN NUMBER OF PERSONS PER UNIT = 3.03  
Universe: Occupied Housing Units

AGGREGATE VALUE BY OCCUPANCY STATUS (2) AVERAGE VALUE  
Universe: Specified Owner-Occupied and Vacant-for-Sale Only Noncondominium Housing Units

Owner occupied \$50226500 \$64146  
Vacant for sale only \$1017500 \$72678

TRACT: 100503

MEAN NUMBER OF PERSONS PER UNIT = 2.72  
Universe: Occupied Housing Units

AGGREGATE VALUE BY OCCUPANCY STATUS (2) AVERAGE VALUE  
Universe: Specified Owner-Occupied and Vacant-for-Sale Only Noncondominium Housing Units

Owner occupied \$7532500 \$55386  
Vacant for sale only \$206000 \$41200

Printout:

REPORT GENERATION USING SCALING FACTORS

PAGE 3

TRACT: 100407

MEAN NUMBER OF PERSONS PER UNIT = 3.05  
Universe: Occupied Housing Units

AGGREGATE VALUE BY OCCUPANCY STATUS (2) AVERAGE VALUE  
Universe: Specified Owner-Occupied and Vacant-for-Sale Only Noncondominium Housing Units

Owner occupied \$24051500 \$41974  
Vacant for sale only \$422500 \$38409

\* \*CENSPAC\* \* DATA RUN SUMMARY  
25 NUMBER OF RECORDS FILE A  
25 NUMBER OF RECORDS FILE A

Report Generation - Housing Unit Data

```
FILEIN STF1
IF SUMRYLVL = '11' INCLUDE
COMPUTE URBAN = TAB4 (1) - TAB4 (3)
REPORT HEAD 'HOUSING UNIT DATA FOR COUNTY: ' AREANAME
ITEM ' ' ITEM ' '
*
* PRINT TABLE 4 WITH TOTAL URBAN COUNT
ITEM 'TABLE 4: ' HIS.0 TAB4 ITEM ' '
ITEM U40.0 TAB4
ITEM U40.041 TAB4
ITEM U40.081 TAB4 ITEM ' '
ITEM 'TOTAL' X20.0 TAB4 (1)
ITEM 'URBAN' X20.0 F9.0 URBAN
ITEM ' INSIDE URBANIZED AREAS ' TAB4 (2)
ITEM 'RURAL' X20.0 TAB4 (3)
ITEM ' ' ITEM ' '
*
* PRINT TABLE 38 AND TABLE 43 ADJACENT ON PAGE
ITEM 'TABLE 38: ' H30.0 TAB38 X10.0 'TABLE 43: ' H30.0 TAB43 ITEM ' '
ITEM U40.0 TAB38 X10.0 U40.0 TAB43
ITEM U40.041 TAB38 X10.0 U40.041 TAB43 ITEM ' '
ITEM C25.0 TAB38 (C) TAB38 (C) X16.0 C20.0 TAB43 (C) TAB43 (C)
COMPUTE $LCTR001 = 100
```

Printout (page 5):

EXAMPLE RUN WITH SORT AND TOTAL  
DERIVED TOTALS WITH TOTAL COMMAND

GRAND TOTAL ACROSS ALL PLACES

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	518939
Inside urbanized areas	433088
Rural	77013

TABLE 4: URBAN AND RURAL (3)  
Universe: Housins Units

Total	198654
Inside urbanized areas	169666
Rural	26447

Printout:

HOUSING UNIT DATA FOR COUNTY: CHESTERFIELD

TABLE 4: URBAN AND RURAL

Universe: Housing Units (Including Seasonal and Migratory Units)	42475
TOTAL	42475
URBAN	26617
INSIDE URBANIZED AREAS	24076
RURAL	15858

TABLE 38: VALUE (13)

Universe: Specified Owner-Occupied Noncondominium Housing Units	71
Less than \$10,000	164
\$10,000 to \$14,999	536
\$15,000 to \$19,999	799
\$20,000 to \$24,999	1092
\$25,000 to \$29,999	583
\$30,000 to \$34,999	1002
\$35,000 to \$39,999	2155
\$40,000 to \$49,999	15833
\$50,000 to \$79,999	2150
\$80,000 to \$99,999	948
\$100,000 to \$149,000	76
\$150,000 to \$199,999	16
\$200,000 or more	

\* #CENSPACK\* \* DATA RUN SUMMARY  
25 NUMBER OF RECORDS FILE A  
25 NUMBER OF RECORDS FILE A

TABLE 43: CONTRACT RENT (14)

Universe: Specified Renter-Occupied Housing Units	65
Less than \$50	338
\$50 to \$99	204
\$100 to \$119	478
\$120 to \$139	483
\$140 to \$149	205
\$150 to \$159	383
\$160 to \$169	1426
\$170 to \$199	2157
\$200 to \$249	1719
\$250 to \$299	899
\$300 to \$399	154
\$400 to \$499	92
\$500 or more	349

No cash rent

Report Generation - Nested Geography

```
FILEIN STF1
IF SUMRYLVL = '13' OR SUMRYLVL = '14' INCLUDE
*
* CALCULATE TOTAL POPULATION USING SUM
COMPUTE TOTPOP = 0
COMPUTE TOTPOP = SUM(TAB6(*))
REPORT HEAD 'REPORT GENERATION - RUN 10' X20.0 'PAGE ' $PAGE
HEAD 'POPULATION COUNTS FOR PLACES' , AND THEIR TRACTS'
HEAD ' , '
HEAD X40.0 / TOTAL: MALE: FEMALE:'
*
* IF PLACE SUMMARY, LABEL PLACE
IF SUMRYLVL = '13' ITEM ' , '
ITEM 'PLACE: ' A33.0 AREANAME 3F9.0 TOTPOP.TAB6(*)?
*
* IF TOTAL TRACT SUMMARY, LABEL TRACT
IF SUMRYLVL = '14' AND PARTTRCT = '2'
ITEM ' TRACT-' TRACT X25.0 3F9.0 TOTPOP TAB6(*)?
*
* IF PART TRACT SUMMARY, LABEL AS PART TRACT
IF SUMRYLVL = '14' AND PARTTRCT = '1'
ITEM ' TRACT-' TRACT ' (PART) ' X15.0
3F9.0 TOTPOP TAB6 (*)
```

Printout:

REPORT GENERATION - RUN 10 PAGE 1  
POPULATION COUNTS FOR PLACES AND THEIR TRACTS

	TOTAL:	MALE:	FEMALE:
PLACE: CHESTER	5214	2565	2649
TRACT-100408 (PART)	189	91	98
TRACT-100502 (PART)	4195	2059	2136
TRACT-100503	830	415	415
PLACE: BALANCE OF BERMUDA	17071	8572	8499
TRACT-100403	2474	1263	1211
TRACT-100404	1159	617	542
TRACT-100406	1441	718	723
TRACT-100407	3210	1577	1633

\* \*CENSPACK\* \* DATA RUN SUMMARY  
25 NUMBER OF RECORDS FILE A  
25 NUMBER OF RECORDS FILE A

Report Generation - Suppression Example

```
FILEIN STF1
IF SUMRYLVL = '14' INCLUDE
*
* COMPUTE HOUSEHOLDERS OF OTHER RACES
COMPUTE TABOTHER (*,1) = TAB28 (*,1) - (TAB28 (*,2) + TAB28 (*,3))
REPORT
HEAD 'REPORT GENERATION - SUPPRESSION EXAMPLE' X10.0 $PAGE
HEAD 'TABLE 28: ' H40.0 TAB28
HEAD U40.0 TAB28
HEAD U34.041 TAB28 U10.092 TAB28
*
* PRINTS FIRST 3 DATA CELLS WHICH ARE NEVER SUPPRESSED
ITEM ' '
ITEM 'TRACT - ' TRACT
ITEM X22.0 3C9.0 TAB28 (1,*) 'OTHER'
ITEM 'TOTAL OCCUPIED: ' TAB28 (1,*) F9.0 TABOTHER (1,1)
*
* COMPUTE NUMBER OF OWNERS
COMPUTE TABOWNER (1,*) = TAB28 (1,*) - TAB28 (2,*)
COMPUTE OTHEROWN = TABOTHER (1,1) - TABOTHER (2,1)
*
* SET OWNER CELL = 0 IF SUPPRESSION OF RENTERS
IF SUPFLG19 = '1'
COMPUTE TABOWNER (1,1) = 0
COMPUTE TABOTHER (2,1) = 0
COMPUTE OTHEROWN = 0;
*
IF SUPFLG20 = '1'
COMPUTE TABOWNER (1,2) = 0
COMPUTE TABOTHER (2,1) = 0
COMPUTE OTHEROWN = 0;
*
IF SUPFLG21 = '1'
COMPUTE TABOWNER (1,3) = 0
COMPUTE TABOTHER (2,1) = 0
COMPUTE OTHEROWN = 0;
*
* PRINT RENTER AND OWNER COUNTS
ITEM 'RENTER OCCUPIED: ' TAB28 (2,*) F9.0 TABOTHER (2,1)
ITEM 'OWNER OCCUPIED: ' 3F9.0 TABOWNER (1,*) F9.0 OTHEROWN
*
* PRINT SUPPRESSION INDICATION
IF SUPFLG19 = '1'
ITEM 'SPANISH ORIGIN HOUSEHOLDER ' 'CHARACTERISTICS SUPPRESSED';
IF SUPFLG20 = '1'
ITEM 'SPANISH-WHITE HOUSEHOLDER ' 'CHARACTERISTICS SUPPRESSED';
IF SUPFLG21 = '1'
ITEM 'SPANISH-BLACK HOUSEHOLDER ' 'CHARACTERISTICS SUPPRESSED'
```

REPORT GENERATION - SUPPRESSION EXAMPLE  
 TABLE 28: TENURE (2) BY RACE OF HOUSEHOLDER (3)  
 UNIVERSE: OCCUPIED HOUSING UNITS WITH  
 HOUSEHOLDER OF SPANISH ORIGIN

1

TRACT	TOTAL	WHITE	BLACK	OTHER
TRACT - 100408				
TOTAL OCCUPIED:	2	2		
RENTER OCCUPIED:				
OWNER OCCUPIED:				
SPANISH ORIGIN HOUSEHOLDER CHARACTERISTICS SUPPRESSED				
SPANISH-WHITE HOUSEHOLDER CHARACTERISTICS SUPPRESSED				
TRACT - 100502				
TOTAL OCCUPIED:	25	24		1
RENTER OCCUPIED:	3			
OWNER OCCUPIED:	22			
SPANISH-WHITE HOUSEHOLDER CHARACTERISTICS SUPPRESSED				
TRACT - 100503				
TOTAL OCCUPIED:	9	9		
RENTER OCCUPIED:	5	5		
OWNER OCCUPIED:	4	4		
TRACT - 100403				
TOTAL OCCUPIED:	23	19	3	1
RENTER OCCUPIED:	6	4		
OWNER OCCUPIED:	17	15		
SPANISH-BLACK HOUSEHOLDER CHARACTERISTICS SUPPRESSED				
TRACT - 100404				
TOTAL OCCUPIED:	17	17		
RENTER OCCUPIED:	9	9		
OWNER OCCUPIED:	8	8		
TRACT - 100406				
TOTAL OCCUPIED:	19	15	3	1
RENTER OCCUPIED:	15	11		
OWNER OCCUPIED:	4	4		
SPANISH-BLACK HOUSEHOLDER CHARACTERISTICS SUPPRESSED				
TRACT - 100407				
TOTAL OCCUPIED:	27	25	1	1
RENTER OCCUPIED:	7	6		
OWNER OCCUPIED:	20	19		
SPANISH-BLACK HOUSEHOLDER CHARACTERISTICS SUPPRESSED				
TRACT - 100408				
TOTAL OCCUPIED:	37	36	1	
RENTER OCCUPIED:	5			
OWNER OCCUPIED:	32			

SORT and TOTAL Example

Urban and Rural Summaries

```

FILEIN STF1
*
* URBAN AND RURAL SUMMARIES OF BG'S AND ED'S
REPORT
HEAD 'STATE SUMMARY RECORD'
IF SUMRYLVL = '04'
ITEM ' ' ITEM 'TOTAL POPULATION = ' TAB1 (1) X37.0 2C9.0 TAB14 (*,1)
ITEM 'TOTAL OCCUPIED HOUSING UNITS = ' TAB5 (2)
      X10.0 C11.0 TAB14 (1,C) TAB14 (*,C);
IF SUMRYLVL = '15' OR SUMRYLVL = '16' INCLUDE
SORT URBARURL
TOTAL URBARURL
REPORT
HEAD 'DERIVED TOTALS FOR URBAN' ' AND RURAL BG'S AND ED'S'
HEAD 'URBAN-RURAL CODE: 01 = URBAN ' 08 = RURAL'
IF $TOTAL = 2
ITEM ' ' ITEM 'TOTAL COMMAND SUMMARY ' 'OVER ALL RECORDS'
ITEM '(COMPARABLE TO STATE' ' SUMMARY RECORD TOTALS)';
*
IF $TOTAL = 1
ITEM ' ' ITEM 'URBAN-RURAL SUMMARY CODE: ' URBARURL;
IF $TOTAL = 1 OR $TOTAL = 2
ITEM ' ' ITEM 'TOTAL POPULATION = ' TAB1 (1) X37.0 2C9.0 TAB14 (*,1)
ITEM 'TOTAL OCCUPIED HOUSING UNITS = ' TAB5 (2)
      X10.0 C11.0 TAB14 (1,C) TAB14 (*,C)
ITEM ' ' ITEM '

```

Printout (page 1):

STATE SUMMARY RECORD

TOTAL POPULATION = 518939  
TOTAL OCCUPIED HOUSING UNITS = 186887

	Male:	Female:
Single	55428	54386
Now married	112131	111800
Separated	5612	8877
Widowed	4623	27675
Divorced	9108	15943

Printout (page 2):

DERIVED TOTALS FOR URBAN AND RURAL BG'S AND ED'S  
URBAN-RURAL CODE: 01 = URBAN 08 = RURAL

URBAN-RURAL SUMMARY CODE: 01

TOTAL POPULATION = 441926  
TOTAL OCCUPIED HOUSING UNITS = 162316

Male:	Female:
48903	49219
92584	92364
5122	8290
4136	25272
8149	14665
Single	
Now married	
Separated	
Widowed	
Divorced	

URBAN-RURAL SUMMARY CODE: 08

TOTAL POPULATION = 77013  
TOTAL OCCUPIED HOUSING UNITS = 24571

Male:	Female:
6521	5162
19535	19424
488	584
487	2399
959	1278
Single	
Now married	
Separated	
Widowed	
Divorced	

TOTAL COMMAND SUMMARY OVER ALL RECORDS  
(COMPARABLE TO STATE SUMMARY RECORD TOTALS)

TOTAL POPULATION = 518939  
TOTAL OCCUPIED HOUSING UNITS = 186887

Male:	Female:
55424	54381
112119	111788
5610	8874
4623	27671
9108	15943
Single	
Now married	
Separated	
Widowed	
Divorced	

Sort and Total Example

Summary Record and Derived Totals Comparison

```
FILEIN STF1
*
* DERIVED AND SUMMARY RECORD COMPARISONS OF PLACE AND COUNTY TOTALS
REPORT PAGESIZE(57) HEAD 'EXAMPLE RUN WITH SORT AND TOTAL'
HEAD 'SUMMARY RECORD TOTALS'
HEAD '
IF SUMRYLVL = '27'
ITEM 'PLACE: ( ' PLACE ' ) - ' AREANAME;
IF SUMRYLVL = '11'
ITEM 'COUNTY: ( ' COUNTY ' ) - ' AREANAME;
IF SUMRYLVL = '27' OR SUMRYLVL = '11'
ITEM '
ITEM 'TABLE 1: ' H40.0 TAB1 'TABLE 4: ' H40.0 TAB4
ITEM X9.0 U40.0 TAB1 X9.0 U25.0 TAB4
ITEM C30.0 TAB1 (C) TAB1 (C) X9.0 C30.0 TAB4 (C) TAB4 (C)
ITEM ' ' ITEM ' ';
*
* DERIVE NEW TOTALS
IF SUMRYLVL = '13' INCLUDE
SORT COUNTY PLACE
TOTAL COUNTY PLACE
REPORT PAGESIZE(57)
HEAD 'EXAMPLE RUN WITH SORT AND TOTAL'
HEAD 'DERIVED TOTALS WITH TOTAL COMMAND'
HEAD '
IF $TOTAL = 1
ITEM 'PLACE: ' PLACE;
IF $TOTAL = 2
ITEM 'COUNTY: ' COUNTY;

IF $TOTAL = 3
ITEM 'GRAND TOTAL ACROSS ALL PLACES';
IF $TOTAL = 1 OR $TOTAL = 2 OR $TOTAL = 3
ITEM '
ITEM 'TABLE 1: ' H40.0 TAB1 'TABLE 4: ' H40.0 TAB4
ITEM X9.0 U40.0 TAB1 X9.0 U25.0 TAB4
ITEM C30.0 TAB1 (C) TAB1 (C) X9.0 C30.0 TAB4 (C) TAB4 (C)
ITEM ' ' ITEM ' ';
```

EXAMPLE RUN WITH SORT AND TOTAL  
SUMMARY RECORD TOTALS

COUNTY: (041) - CHESTERFIELD

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	126134
Inside urbanized areas	69477
Rural	47819

TABLE 4: URBAN AND RURAL (3)  
Universe: Housing Units

Total	42475
Inside urbanized areas	24076
Rural	15858

COUNTY: (087) - HENRICO

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	172922
Inside urbanized areas	143728
Rural	29194

TABLE 4: URBAN AND RURAL (3)  
Universe: Housing Units

Total	65967
Inside urbanized areas	55378
Rural	10589

COUNTY: (760) - RICHMOND CITY

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	219883
Inside urbanized areas	219883
Rural	

TABLE 4: URBAN AND RURAL (3)  
Universe: Housing Units

Total	90212
Inside urbanized areas	90212
Rural	

PLACE: (0122) - BON AIR

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	16334
Inside urbanized areas	16334
Rural	

TABLE 4: URBAN AND RURAL (3)  
Universe: Housing Units

Total	5469
Inside urbanized areas	5469
Rural	

PLACE: (0245) - CHESTER

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	5214
Inside urbanized areas	
Rural	

TABLE 4: URBAN AND RURAL (3)  
Universe: Housing Units

Total	1831
Inside urbanized areas	
Rural	

PLACE: (0448) - ETTRICK

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	3624
Inside urbanized areas	
Rural	

TABLE 4: URBAN AND RURAL (3)  
Universe: Housing Units

Total	710
Inside urbanized areas	
Rural	

EXAMPLE RUN WITH SORT AND TOTAL  
SUMMARY RECORD TOTALS

PLACE: (0620) - HIGHLAND SPRINGS

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	8671
Inside urbanized areas	8671
Rural	

TABLE 4: URBAN AND RURAL (3)  
Universe: Housing Units

Total	3241
Inside urbanized areas	3241
Rural	

PLACE: (0713) - LAKESIDE

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	11536
Inside urbanized areas	11536
Rural	

TABLE 4: URBAN AND RURAL (3)  
Universe: Housing Units

Total	4674
Inside urbanized areas	4674
Rural	

PLACE: (0797) - MATOACA

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	1549
Inside urbanized areas	
Rural	1549

TABLE 4: URBAN AND RURAL (3)  
Universe: Housing Units

Total	575
Inside urbanized areas	
Rural	575

PLACE: (1035) - RICHMOND

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	219883
Inside urbanized areas	219883
Rural	

TABLE 4: URBAN AND RURAL (3)  
Universe: Housing Units

Total	90212
Inside urbanized areas	90212
Rural	

EXAMPLE RUN WITH SORT AND TOTAL  
DERIVED TOTALS WITH TOTAL COMMAND

PLACE: 0122

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	16334
Inside urbanized areas	16334
Rural	

TABLE 4: URBAN AND RURAL (3)  
Universe: Housing Units

Total	5469
Inside urbanized areas	5469
Rural	

PLACE: 0245

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	5214
Inside urbanized areas	
Rural	

TABLE 4: URBAN AND RURAL (3)  
Universe: Housing Units

Total	1831
Inside urbanized areas	
Rural	

PLACE: 0448

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	3624
Inside urbanized areas	
Rural	

TABLE 4: URBAN AND RURAL (3)  
Universe: Housing Units

Total	710
Inside urbanized areas	
Rural	

PLACE: 0797

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	1549
Inside urbanized areas	
Rural	1549

TABLE 4: URBAN AND RURAL (3)  
Universe: Housing Units

Total	575
Inside urbanized areas	
Rural	575

PLACE: 9999

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	99413
Inside urbanized areas	53143
Rural	46270

TABLE 4: URBAN AND RURAL (3)  
Universe: Housing Units

Total	33890
Inside urbanized areas	18607
Rural	15283

COUNTY: 041

TABLE 1: URBAN AND RURAL (3)  
Universe: Persons

Total	126134
Inside urbanized areas	69477
Rural	47819

TABLE 4: URBAN AND RURAL (3)  
Universe: Housing Units

Total	42475
Inside urbanized areas	24076
Rural	15858

EXAMPLE RUN WITH SORT AND TOTAL  
DERIVED TOTALS WITH TOTAL COMMAND

PLACE: 0620

TABLE 1: URBAN AND RURAL (3)

	Universe: Persons	
Total		8671
Inside urbanized areas		8671
Rural		

TABLE 4: URBAN AND RURAL (3)

	Universe: Housing Units	
Total		3241
Inside urbanized areas		3241
Rural		

PLACE: 0713

TABLE 1: URBAN AND RURAL (3)

	Universe: Persons	
Total		11536
Inside urbanized areas		11536
Rural		

TABLE 4: URBAN AND RURAL (3)

	Universe: Housing Units	
Total		4674
Inside urbanized areas		4674
Rural		

PLACE: 9999

TABLE 1: URBAN AND RURAL (3)

	Universe: Persons	
Total		152715
Inside urbanized areas		123521
Rural		29194

TABLE 4: URBAN AND RURAL (3)

	Universe: Housing Units	
Total		58052
Inside urbanized areas		47463
Rural		10589

COUNTY: 087

TABLE 1: URBAN AND RURAL (3)

	Universe: Persons	
Total		172922
Inside urbanized areas		143728
Rural		29194

TABLE 4: URBAN AND RURAL (3)

	Universe: Housing Units	
Total		65967
Inside urbanized areas		55378
Rural		10589

PLACE: 1035

TABLE 1: URBAN AND RURAL (3)

	Universe: Persons	
Total		219883
Inside urbanized areas		219883
Rural		

TABLE 4: URBAN AND RURAL (3)

	Universe: Housing Units	
Total		90212
Inside urbanized areas		90212
Rural		

COUNTY: 760

TABLE 1: URBAN AND RURAL (3)

	Universe: Persons	
Total		219883
Inside urbanized areas		219883
Rural		

TABLE 4: URBAN AND RURAL (3)

	Universe: Housing Units	
Total		90212
Inside urbanized areas		90212
Rural		