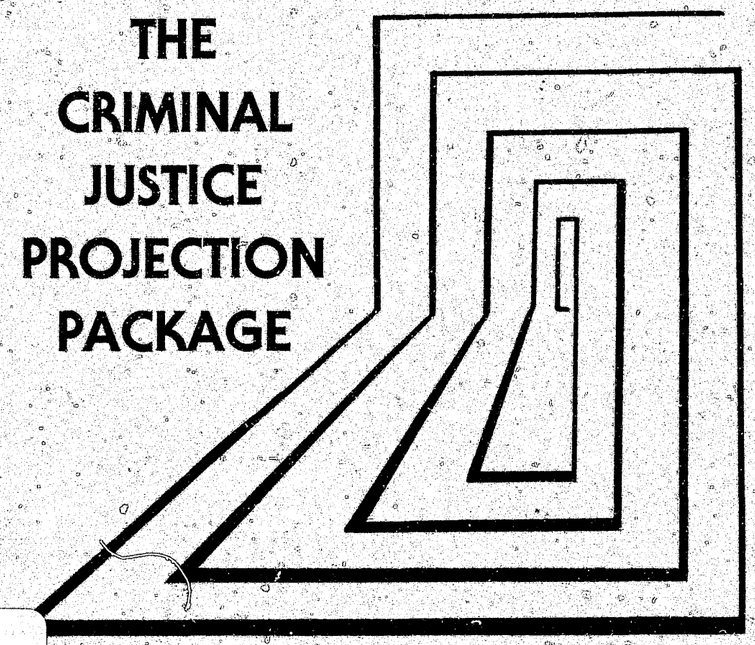
CRIMINAL JUSTICE STATISTICS ASSOCIATION, INC.

THE CRIMINAL JUSTICE PROJECTION PACKAGE



USER'S GUIDE

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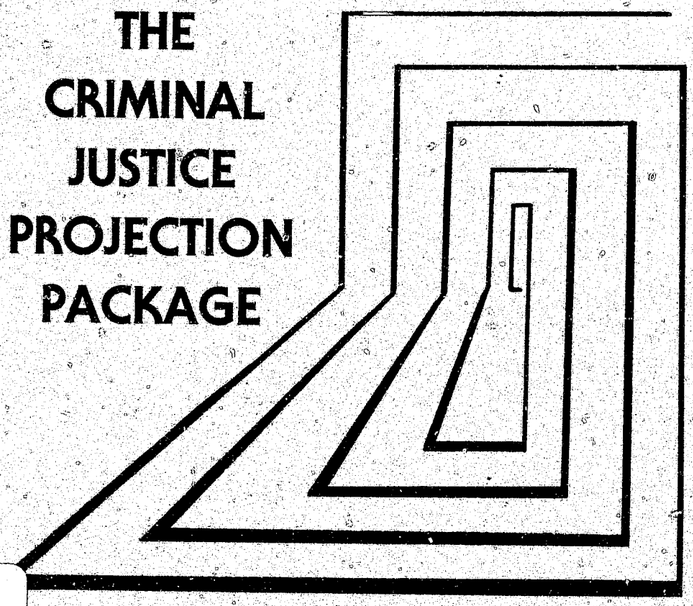

USER'S GUIDE

April, 1982

THE CRIMINAL JUSTICE PROJECTION PACKAGE

by

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A Publication of:

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Criminal Justice Statistics Association, Inc.

Executive Committee
1981-1982

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Owen Dall
February, 1982

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CHAPTER 1
INTRODUCTION

OVERVIEW

The Criminal Justice Projection Package is a comprehensive set of ten programs designed to provide the tools for a wide range of forecasting tasks. It is "turn key" (ready to run when the machine is turned on) and "menu driven" (control is by selecting one command from several options provided on the screen). The emphasis is on interactive processing, quick results, and flexibility of use. It is expected that the user will quickly gain confidence in experimenting with a variety of policy issues concerning arrest projections, general processing flow, and prison population projections.

Development was begun by Michel Lettre, the former Director of the CJSA who programmed the original versions of Population Entry and Display, State Population Estimator, Arrest Entry and Display, and Arrest Projection. These programs were modified and enhanced with error checking routines and screen data entry and editing routines. Six additional programs were developed.

The programs in this package were developed on an Apple II Microcomputer and were written in Applesoft Basic. The following hardware configuration was used:

Apple II + with 48K RAM
Language card (16K RAM) and DOS 3.3 (Disk Operating System)
2 Disk drives (5¼" Mini-Floppies)
40 x 24 Video Display
Dot Matrix Printer in 80 column mode

A version written in Microsoft Basic using the CP/M operating system will be made available upon request.

The Criminal Justice Statistics Association will offer technical assistance for adapting the package to other computer configurations.

Owen Dall
February, 1982

HOW TO USE THIS MANUAL

The first step should be to read the brief program descriptions in the next section. This will give the new user a general overview of each program module's function. Next, a perusal of the Summary Tables (pp. 1-15 to 1-20) will give the user a feel for the order in which programs must be run and the data requirements for each. This information is presented in more detail in the "Requirements Chart" at the beginning of each program module section in Chapter 2. Each chart outlines:

(1) Prior Program Runs Required

(2) Input Required
   a) Data Files
   b) Interactive Data Entry

(3) Output Provided
   a) Data Files
   b) Printed Output

Because all of the programs are "menu-driven", many users may find that the program Requirements Charts contain all the additional information they need to begin running the programs. However, each program section contains more detailed information about input, output, and procedures.

Chapter 3 describes a routine that is common to many of the program modules, the "Screen Entry and Edit" routine. This is the procedure used for entering and editing data interactively using the computer terminal.

Chapter 4 describes a sample run, from population data entry to prison population, using each program module. We suggest you try out the examples on your machine.

The appendices are for those who would like a closer look at the mathematical algorithms and the data file structure used throughout the program package.

BRIEF PROGRAM DESCRIPTIONS

1. Population Entry and Display

This program enables the user to enter, edit, save to a file, and retrieve from a file population data (state and U.S., current/past and projected). Entry and editing is done via screen display and output can be directed to a printer. The user can stipulate the number and type of age groupings, number of years of data, and whether data is broken down by race. Typically four files are created for use throughout the program package:

(1) State Population Data - Current/Past
(2) State Population Data - Projected
(3) U.S. Population Data - Current/Past
(4) U.S. Population Data - Projected

The two U.S. population data files are needed only when the state population age categories are to be transformed to UCR categories using the State Population Estimator program.

2. State Population Estimator

This program estimates population for a jurisdiction using the standard UCR age and race groupings which may be desired for generating the arrest rates and arrest projections. While data on jurisdiction population from any source can be used, the source used by the CJSA staff has been the Bureau of the Census projections of the state population.* Since population data are not typically broken down by the standard UCR age groupings, the State Population Estimator program takes state population data, and using United States population data which are available by individual age grouping (e.g., 1,2,3,...) and year, generates state population estimates for the standard UCR age groupings which may be used in the arrest projection program. The program generates output reports displaying the current and future jurisdiction's population by age and race. The program enables the user to save to files both the current and future population figures that are calculated, so that they can be retrieved later on for use in generating the arrest rates and projections of arrests.

*U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 796, "Illustrative Projections of State Populations by Age, Race, and Sex: 1975 to 2000," U.S. Government Printing Office, Washington, D.C. 1979.

3. Arrest Entry and Display

This program enables the user to enter, edit, save to a file, and retrieve from a file arrest data by type of crime. The program also uses the jurisdiction population data file on current population along with the arrest data to calculate arrest rates per 100,000 population by age and type of crime. The output reports displaying arrests and arrest rates can be generated for any specific crime (e.g., burglary) or grouping of crimes (e.g., index offenses).

4. Arrest Projection

This program enables the user to retrieve from disk files both current and future population data as well as arrest data. The program then calculates and displays the number of future arrests using either the exponential or weighted average techniques described in Appendix B. Projected arrests can be saved to a file for use in flow and prison population projections.

5. Arrest Regrouper

This program is used to change the age grouping structure of an arrest data file (current/past or projected) and to create and save a new file with the new structure. Age groupings can be eliminated or collapsed into larger groupings. For example, a data file with standard UCR groupings (12 groupings total) can be reduced to 2 groupings, "JUV" and "ADULT". Another example would be to eliminate all juvenile data, and collapse the adult groupings into two, "18-30" and "31+".

The program automatically sums and/or subtracts data across groupings (and years) and displays the results on the screen for editing. A new data file is automatically generated.

6. Flow and Prison Population Entry and Display

This program is used to enter, edit, save to a file, and retrieve from a file system "flow" data (any downstream criminal justice processing flow including prison population) to be used in the Flow Projection program or Prison Population Projection program. Age groupings are automatically set up to correspond to those of your current/past arrest data file (unless otherwise stipulated). Flow types can be merged together to create new types (e.g., percentage of murder and rape arrestees convicted) to be used in comparative analyses.

7. Flow Projection

This program is used to retrieve from disk files current/past arrest data, projected arrest data, and current/past flow data. The projections are based on the increase or decrease in arrests as determined by the ratio of projected arrests to current/past arrests. As in the Arrest Projection program, either an exponential or weighted average technique is used to smooth the data that are used for the projections.

8. Prison Parameter Entry and Display

In addition to current/past prison population, four other sets of data are needed to project prison population (see Method I in item 9 below). The prison commitment probabilities (a=probability of indictment; b=probability of conviction given indictment; c=probability of imprisonment given conviction) and the average length of stay are entered using this program.

9. Prison Population Projection

Two methods of projecting prison population are available with this program:

Method I projects prison population at a point in time (e.g., end of year - 1985). It is a variation of the method discussed by Stollmach and Blumstein.* Input includes (1) current/past prison population, (2) average length of stay, (3) projected arrests, (4) commitment probabilities,** and (5) current/past arrests.

Method II projects future average daily prison population*** using (1) current/past average daily population, (2) current/past commitments, (3) projected arrests, and (4) commitment probabilities.**

Output is printed for up to 5 future years (e.g., 1985, 1990, 1995, 2000, 2005) by age grouping.

---

*Stollmach, S. "Predicting Inmate Populations from Arrest, Court Dispositions, and Recidivism Rates," Journal of Research in Crime and Delinquency, Volume 10, Number 2, July 1973, pp. 141-162.

Blumstein, A., Cohen, J., and Miller, H.P. Demographically Disaggregated Projections of Prison Populations. Urban Systems Institute, Carnegie-Mellon University, 1980.

**Alternatively, the user may enter projected commitments instead of projected arrests and commitment probabilities.

***Pennsylvania Commission on Crime and Delinquency. An Analysis of the Adequacy of our Current Corrections Facilities Now and in the Future.

10. Peak Prison Population Projection

This program projects the upper limit of prison population, ("asymptotic projection") given (1) initial prison population (2) expected annual admissions, and either (3a) expected annual releases or (3b) expected average length of stay. All data are entered interactively (no prior program run is required). Output is printed in tabular form, displaying projected prison population for the range of annual admissions and the range of release rates (calculated from the range of annual releases or average lengths of stay) desired.

An option is also available to project prison population for a specific year.

CRIMINAL JUSTICE PROJECTION PACKAGE

SUMMARY TABLES

SUMMARY TABLES

The three tables that follow visually summarize the relationships between the input and output of the various program modules.

TABLE I Program Modules by Prior Program Runs Required

The columns represent programs to be run, the rows represent programs that must have been run previously in order to supply the required data. For example, running the Arrest Projection program requires three prior program runs: Population Entry, State Pop Estimator, and Arrest Entry. Notice the "*" in the row corresponding to the Arrest Regrouper. This is optional. For example, if arrests had been projected for both juveniles and adults, you may wish to use the Arrest Regrouper to delete the juvenile age categories before running the prison population projection program. The new, regrouped arrest file would then be used as a model for the prison population data file (see also Table III). Notice the program Peak Prison Pop Projection does not require any prior program runs.

TABLE II Program Modules by Data File Input Requirements

This table outlines in detail the data requirements for each program. An "I" in a box means the data are entered interactively during the program run. An "F" in a box means the data must have been saved to a disk file prior to the program run. This data set will be retrieved from disk during the program run. An "or" appearing in a column implies that one or the other (not both) of the files can be used.

TABLE III Data Files Used as Structural Models for Creation of Other Data Files

Instead of stipulating over and over again the structure for data files (e.g., number of years of data, number and type of age groupings, year labels, age labels, etc.) the programs in this package offer the user the option of using the structure of a file previously created as a model for a new file. This table shows which files are used as models for each type of file. Notice that State Pop is not in a column. This is because State Pop is the first file to be created and thus the structural parameters must be entered interactively, as there is no prior model to build upon.

Table I

PROGRAM MODULES BY PRIOR PROGRAM RUNS REQUIRED

PRIOR PROGRAM RUNS REQUIRED	PROGRAM MODULES: POPULATION ENTRY	STATE POP ESTIMATOR*	ARREST ENTRY	ARREST PROJECTION	ARREST REGROUPER	FLOW & PRISON POP ENTRY	FLOW PROJECTION	PRISON PARAMETER ENTRY	PRISON POP PROJECTION	PEAK PRISON POP PROJECTION
POPULATION ENTRY		X	X	X	X	X	X	X	X	
STATE POP ESTIMATOR[1]			X	X	X	X	X	X	X	
ARREST ENTRY				X	X	X	X	X	X	
ARREST PROJECTION					X		X	X	X	
ARREST REGROUPER						*	*	*	*	
FLOW & PRISON POP ENTRY							X		X	
FLOW PROJECTION										
PRISON PARAMETER ENTRY									X	

*If state population data is available in the desired age categories, running this program is not necessary.

TABLE II

PROGRAM MODULES BY DATA FILE INPUT REQUIREMENTS

DATA FILES REQUIRED	PROGRAM MODULES: POP ENTRY	STATE POP ESTIMATOR	ARREST ENTRY	ARREST PROJECTION	ARREST REGROUPER	FLOW & PRISON POP ENTRY	FLOW PROJECTION	PRISON PARAMETER ENTRY	PRISON POP PROJECTION	PEAK PRISON POP PROJECTION	
C.B. STATE POP (PAST)	I	F									
C.B. STATE POP (FUTURE)	I	F									
C.B. U.S. POP (PAST)	I	F									
C.B. U.S. POP (FUTURE)	I	F									
STATE POP (PAST)			F	F							
STATE POP (FUTURE)				F							
ARRESTS (PAST)			I	F	F	F	F		F*		
ARRESTS (FUTURE)					F		F	F	F		
SYSTEM FLOW (PAST)						I	F				
PRISON POP (PAST)						I			F		
LENGTH OF STAY (FUTURE)								I	F		
AVERAGE DAILY POP (PAST)						I			or F		
COMMITMENT PROB (FUTURE)								I	F*		
INITIAL PRISON POP										I	
ANNUAL ADMISSIONS										I	
ANNUAL RELEASES										I	
LENGTH OF STAY										or I	

F=Disk File
I=Interactive Data Entry

* Alternatively, the user may use projected commitments rather than commitment probabilities and future arrests.

TABLE III

DATA FILES USED AS STRUCTURAL MODELS
FOR CREATION OF OTHER DATA FILES

Files Used As Models	Files Created				
	Arrests -Current/Past"	System Flow -Current/Past-	Prison Pop -Current/Past-	Average Daily Prison Pop -Current/Past-	Prison Parameters -Current/Past-
State Pop (Current/Past)	X				
Arrests (Current/Past)		X	X	X	
Arrests (Projected)					X

CHAPTER 2

PROGRAM MODULES

START UP

START UP

To begin using the package, just insert the floppy disk into Drive #1 and turn on the computer. Figure i-1 illustrates a facsimile of the Main Command Menu that is displayed on the video screen as soon as the computer has been "booted up". To run a particular program, all you have to do is enter the number corresponding to the program desired. After you finish running a program it will bring you back to the main menu for another choice.

While the package can be run using one disk drive, it is more convenient to use two. The programs themselves take up about one entire disk, so there is only room for a few data files. We suggest you use a second disk for saving your data. If you have two disk drives you won't have to switch disks back and forth between program runs.

THROUGHOUT THIS PACKAGE, YOU SHOULD RESPOND "Y" OR "N" TO QUERIES THAT REQUIRE A "YES" OR "NO" ANSWER.

Figure i-1

INITIAL COMMAND MENU FOR PROGRAM PACKAGE

```
********** COMMAND MENU **********
*                                *
*                                *
* DATA ENTRY AND MODIFICATION PROGRAMS
*                                *
*          (1)  POPULATION       *
*          (2)  ARRESTS          *
*          (3)  FLOW/PRISON POPULATION
*          (5)  STATE POP ESTIMATOR
*          (6)  ARREST REGROUPER *
*          (7)  PRISON PARAMETERS
*                                *
*       PROJECTION PROGRAMS      *
*                                *
*          (8)  ARRESTS          *
*          (9)  PROCESSING FLOW  *
*         (10)  PRISON POPULATION
*         (11)  PEAK PRISON POPULATION
*                                *
**********************************
```

*Notice "(4)" is missing. This is reserved for another data modification program yet to be developed.

SECTION I

POPULATION ENTRY AND DISPLAY

TABLE I-0

REQUIREMENTS CHART

POPULATION ENTRY AND DISPLAY		
PRIOR PROGRAM RUNS REQUIRED	INPUT REQUIRED	OUTPUT
NONE	INTERACTIVE DATA ENTRY *(a)STATE POPULATION -current/past-* *(b)STATE POPULATION -future-* ** (c) U.S. POPULATION -current/past-* ** (d) U.S. POPULATION -future-*	DATA FILES *STATE POPULATION DATA -current/past-* *STATE POPULATION DATA -future-* *U.S. POPULATION DATA -current/past-* *U. S. POPULATION DATA -future-* PRINTED *ANY/ALL OF THE ABOVE*

*THIS DATA IS ONLY NECESSARY IF THE USER CHOOSES TO USE THE STATE POPULATION ESTIMATOR TO REGROUP HIS POPULATION DATA INTO THE UCR FORMAT. IF HE DOES CHOOSE TO REGROUP HIS DATA ALL OF THE POPULATION DATA ENTERED MUST BE IN U.S. CENSUS BUREAU FORMAT.

POPULATION ENTRY AND DISPLAY

PURPOSE

This program is used to enter, edit, and save to a file state and U.S. population data by age, race, and year. Altogether, four data sets may be created: (1) State Population (current/past); (2) State Population (future); (3) U.S. Population (current/past); (4) U.S. Population (future). These data sets may be input into the next program in the series, State Population Estimator,* in order to create two new state population files (current/past and future) with age groupings in the FBI Uniform Crime Reports format.

INPUT

Data is initially entered interactively via a terminal (see Chapter 3: The Edit/Entry Routine). The user specifies the number and type of age groupings, whether or not the data is to be entered by race (i.e., white or non-white), and number of years of data to be used. The pre-programmed choices for number and type of age categories are displayed in Figure I-1 and include (1) Census Bureau format for state data, (2) Census Bureau format for U.S. data, (3) UCR standard groupings, and (4) special groupings. If the "special groupings" option is chosen, the user is asked to specify the number of age groupings to be used, the number of juvenile age groupings, labels for the groupings, and whether the data will be broken down by race.

This program can also be used to retrieve and edit population data files previously created. The appropriate screen formats are generated automatically using the grouping and labeling information contained in the file (see Chapter 3 for more details).

OUTPUT

Data Files

After entry and editing, a disk file of the data is automatically created when the user answers "Y" to the query "SAVE DATA?". The user is then asked to specify a file name for the data to be saved, and a sequential text file is created on disk with that name.

Printed Output

If the user so desires, a printed version of the data set can be generated (see Figure I-2). Three tables are printed, one showing total population, one with white population, and one with non-white population (the latter two if data is broken down by race). Each of these tables displays the data broken down by age group and year, with subtotals of juveniles and adults within each year.

*If state population data are available with the desired age grouping format, creating U.S. population data files and running State Population Estimator is not necessary.

Figure I-1

PRE-PROGRAMMED POPULATION AGE CATEGORY CHOICES

CENSUS BUREAU FORMAT		UCR FORMAT
(A) State Population	(B) U.S. Population	(C) State Population
1) <5	1) 5-9	1) <12
2) 5-14	2) 10	2) 13-14
3) 15-24	3) 11	3) 15-16
4) 25-34	4) 12	4) 17
5) 35-44	5) 13	5) 18-19
6) 45-53	6) 14	6) 20-24
7) 55-64	7) 15	7) 25-29
8) 65+	8) 16	8) 30-34
	9) 17	9) 35-39
	10) 18	10) 40-44
	11) 19	11) 44-49
	12) 20-24	12) 50+
	13) 25-29	
	14) 30-34	
	15) 35-39	
	16) 20-44	
	17) 45-49	
	18) 50-54	

*U.S. populations data for ages <5 and ≥55 are not needed to estimate UCR data, because C.B. state population for these groupings is available in a usable format (see Appendix A for exact algorithms).

Figure I-2 - EXAMPLE OF PRINTED OUTPUT

REPORT: ESTIMATED POPULATION BY AGE GROUPING FOR 1985-2000
JURISDICTION: UNITED STATES
TOTAL POPULATION IN 1000'S

AGE GROUPINGS	1985	1990	1995	2000
TOTAL	165044	173479	181983	187451
5-9	16260	19040	19666	19000
10	3255	3671	4085	4089
11	3067	3386	3913	3970
12	3163	3280	3894	4007
13	3354	3191	3835	4012
14	3728	3190	3801	4079
15	3644	3236	3643	4048
16	3526	3129	3450	3977
17	3495	3217	3333	3947
18	3604	3431	3261	3911
19	3740	3769	3232	3845
20-24	20510	17953	16728	16898
25-29	20581	20167	17665	16468
30-34	19279	20917	20489	17981
35-39	17274	19260	20874	20435
40-44	14102	17331	19304	20909
45-49	11531	13890	17052	18990
50-54	10931	11421	13758	16885
JUV	43492	45340	49620	51129
ADULT	121552	128139	132363	136322

AGE GROUPINGS	%CHANGE 1990/1985	%CHANGE 1995/1985	%CHANGE 2000/1985
TOTAL	5.11	10.26	13.58
5-9	17.1	20.95	16.85
10	12.78	25.5	25.62
11	10.4	27.58	29.44
12	3.7	23.11	26.68
13	-4.86	14.34	19.62
14	-14.43	1.96	9.42
15	-11.2	-.03	11.09
16	-11.26	-2.16	12.79
17	-7.95	-4.64	12.93
18	-4.8	-9.52	8.52
19	.78	-13.58	2.81
20-24	-12.47	-18.44	-17.61
25-29	-2.01	-14.17	-19.98
30-34	8.5	6.28	-6.73
35-39	11.5	20.84	18.3
40-44	22.9	36.89	48.27
45-49	20.46	47.88	64.69
50-54	4.48	25.86	54.47
JUV	4.25	14.09	17.56
ADULT	5.42	8.89	12.15

PROCEDURE

Data Sources

Most states publish current and future estimates of their population by year, age, race, sex, and jurisdiction. The U.S. Census Bureau (CB) also publishes current and future estimates of state populations by year, age, race, and sex* and current and future estimates of total U.S. population by year, age, race, and sex.** The CB population data for states is aggregated for the most part in 10-year age intervals as listed in Figure I-1 (e.g.,<5, 5-14, 15-24, etc.). The CB U.S. population data are available in one year age group increments (e.g., 1,2,3...) up to 44 years and are in five year increments through 85 years of age. This information may be used to disaggregate state population data into the Uniform Crime Reports (UCR) standard age groupings displayed in Figure I-1.

Data Entry (see Chapter 3)

Creating UCR Format. If you are relying upon the CB data and wish to end up with data in UCR groupings, four sets of data must be entered:

(1) State Population (current/past)
(2) U.S. Population (current/past)
(3) State Population (future)
(4) U.S. Population (future)

Each set of data should be entered via the terminal (see Chapter 3 for details about the Screen Entry and Edit Routine) and saved to a file. These four files will then be used in the State Population Estimator to create two new files, one for current/past state population, and one for future state population.

Data is in Format Desired. If the population data you have is categorized in the desired age groupings, only two data sets need to be entered and saved:

(1) State Population (current/past)

(2) State Population (future)

After these data are saved to disk files, you can skip the State Population Estimator and proceed to the Arrest Entry and Display program.

COMMENTS/FEATURES

Using Non-Population Data. Although we have been discussing "population" data in this section, there is actually nothing sacred about entering only population data into a "population" data file. Because arrest projections are based on the ratio of future population to past population, these ratios can be created "artificially." For example, to simulate an increase of arrests (for a particular age grouping and/or crime type) of 20% from 1980 to 1985, you would enter "1.2" for the future population value and "1.0" for the current/past population value. Thus, you can simulate different scenerios affecting future arrests (increased police activity, increased criminal activity, new investigative methods, etc.).

*U.S. Bureau of the Census, Current Population Reports, Series P-25, no. 796, "Illustrative Projections of State Populations by Age, Race, and Sex: 1975 to 2000," U.S. Government Printing Office, Washington, D.C. 1979.

**U.S. Bureau of the Census, Current Populations Reports, Series P-25, No. 704, "Projections of the Populations of the United States: 1977 to 2050," U.S. Government Printing Office, Washington, D.C., 1977.

SECTION II

STATE POPULTION ESTIMATOR

TABLE II-0

REQUIREMENTS CHART

STATE POPULATION ESTIMATOR		
PRIOR PROGRAM RUNS REQUIRED	INPUT REQUIRED*	OUTPUT
	(1) STATE POPULATION -current/past-	DATA FILES
POPULATION ENTRY AND DISPLAY	*(2) STATE POPULATION -future-*	*STATE POPULATION -current/past- (UCR Format)*
	(3) U.S. POPULATION -current/past-	*STATE POPULATION -future- (UCR Format)*
	(4) U.S. POPULATION -future-	PRINTED
		STATE POPULATION -current/past- (UCR Format)
		STATE POPULATION -future- (UCR Format)

*AGE GROUPINGS IN CENSUS BUREAU FORMAT

STATE POPULATION ESTIMATOR

PURPOSE

State population data available from the Census Bureau are not grouped into the age categories corresponding to the FBI's Uniform Crime Reporting (UCR) categories (see Figure I-1). This program transforms state population data entered in the Census Bureau format into UCR categories for use in the arrest, flow, and prison population projection programs.

INPUT

For each data file to be created by this program, two must be input: (1) State Population data (in Census Bureau format) and (2) U.S. Population data (in Census Bureau format). The two data sets must have the same number of years of data with a maximum of 5. They must have been created with the Population Entry and Display program described in Section I.

Typically, the program is run twice, the first time to create a "current/past" data file and the second to create a "future" data file. They are both needed in order to eventually run all of the projection programs, with the exception of Peak Prison Population Projection.

OUTPUT

Data Files

Disk files of the regrouped population data are automatically saved when requested via a command query "SAVE NEW DATA TO A FILE?". The user is asked to specify a data file name, after which the program writes the sequential data file onto the disk for future use.

Printed Output

The user can have the contents of the new data file printed in table format (see figure II-1). This format is identical to that provided by the printing routine in Population Entry and Display, with separate tables printed for white and non-white populations in addition to total population (if data is actually broken down by race).

FIGURE II-1 EXAMPLE OF PRINTED OUTPUT

REPORT: ESTIMATED AND PROJECTED POPULATION BY AGE GROUPING FOR 1976-1979
JURISDICTION: MARYLAND
TOTAL POPULATION IN 100'S

AGE GROUPINGS	1976	1977	1978	1979
TOTAL	41768	42322	42876	43428
<=12	8645	8533	8436	8367
13-14	1650	1619	1574	1499
15-16	1682	1685	1670	1208
17	836	837	856	614
18-19	1688	1696	1706	1647
20-24	3866	3976	4083	4967
25-29	3664	3669	3778	3873
30-34	2928	3168	3304	3454
35-39	2502	2620	2758	2870
40-44	2342	2377	2392	2433
45-49	2338	2318	2294	2273
50+	9627	9824	10025	10223
JUV	12813	12674	12536	11688
ADULT	28955	29648	30340	31740

AGE GROUPINGS	%CHANGE 1977/1976	%CHANGE 1978/1976	%CHANGE 1979/1976
TOTAL	1.33	2.65	3.97
<=12	-1.3	-2.42	-3.22
13-14	-1.88	-4.61	-9.15
15-16	.18	-.71	-28.18
17	.12	2.39	-26.56
18-19	.47	1.07	-2.43
20-24	2.85	5.61	28.48
25-29	.14	3.11	5.7
30-34	8.2	12.84	17.96
35-39	4.72	10.23	14.71
40-44	1.49	2.13	3.89
45-49	-.86	-1.88	-2.78
50+	2.05	4.13	6.19
JUV	-1.08	-2.16	-8.78
ADULT	2.39	4.78	9.62

PROCEDURE

The program requests file names for the state population data to be regrouped and the U.S. census data to be used as a regrouping resource. These data files (i.e., state population and U.S. census) must be in the format specified in Figure I-1. As such, range checks are used by the program to insure that the appropriate number of groupings are in each file* and the the same number of years of data are in each. If the checks are negative, execution is terminated. If everything is O.K., the new data set is created. The user is then asked if the new data is to be saved to a file. The user can then run the program again or go back to the MAIN MENU.

*State population = 8 age groupings
U.S. population = 18 age groupings
(See Figure I-1)

SECTION III

ARREST ENTRY AND DISPLAY

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TABLE III-0

REQUIREMENTS CHART

ARREST ENTRY AND DISPLAY		
PRIOR PROGRAM RUNS REQUIRED	INPUT FILES REQUIRED	OUTPUT
POPULATION ENTRY AND DISPLAY		DATA FILES
STATE POPULATION ESTIMATOR	(1) *STATE POPULATION -current/past-*	*ARRESTS -current/past-*
	(2) INTERACTIVE DATA ENTRY	PRINTED
	ARRESTS -current/past-	*ARRESTS -current/past-*
		ADJUSTED ARRESTS -current/past-
		ARREST RATES -current/past-

ARREST ENTRY AND DISPLAY

PURPOSE

This program enables you to enter, edit, save to a file, and retrieve from a file (for further editing and/or display) arrest data to be used in the Arrest Projection program. The program also uses the jurisdiction population data file on current/past population along with the arrest data to calculate arrest rates per 100,000 population for each age grouping.

INPUT

Arrest data is initially entered interactively via the terminal. You can have the input screen set up to correspond to the categories, years, and labels of the state population data file (current/past) previously created (see Chapter 3 for more details) by responding to the appropriate command queries (see procedure section). Alternatively, you can create any format desired by responding to the program's queries.

Notice in Figure III-1 the label "JUR/P" next to data element #1. This stands for "jurisdiction population". This feature is included to allow total state arrests for a given crime to be estimated by using a subset of reported data (answer "N" to "ARREST DATA REPRESENTS 100% REPORTING?"). For example, perhaps data are available for only 20 of 23 countries in a state, but estimates for the entire state are desired. You would then enter arrest data for the 20 counties, and then the population of the 20 counties into "JUR/P". Adjusted arrests (see OUTPUT, below) would then be estimated using arrests entered X state population/ jurisdiction population, where state population is the total state population.

If the arrest data you have is complete, answer "Y" to the query "ARREST DATA REPRESENTS 100% REPORTING?" The program will then automatically set "JUR/P" to be equal to the state population in the state population (current/past) data file (see Chapter 4 for more details) and the value will appear on the video screen instead of a "Ø".

When the input screen format is created, you enter the data and then check it for consistency by using the Edit subroutine.

Additional data sets can then be entered and appended, if desired, allowing you to "aggregate" or "disaggregate" arrest data. For example, data for "homicide" could be entered, saved to a file, and printed. Then data for "Rape" could be entered and added to murder to create a new file "Murder/Rape". This could be done indefinitely to create the number and type of arrest files desired.

FIGURE III-1

DATA ENTRY SCREEN DISPLAY:

DATA HAS NOT BEEN ENTERED YET

Murder for 1975

(1)	Ø	JUR/P	
(2)	Ø	=12	
(3)	Ø	13-14	
(4)	Ø	15-16	
(5)	Ø	17	JUV TOT = Ø
(6)	Ø	18-19	ADULT TOT = Ø
(7)	Ø	20-24	TOT = Ø
(8)	Ø	25-29	
(9)	Ø	30-34	
(10)	Ø	35-39	
(11)	Ø	40-44	
(12)	Ø	45-49	
(13)	Ø	50+	
(14)	Ø	W JUV	
(15)	Ø	N JUV	
(16)	Ø	W ADULT	
(17)	Ø	N ADULT	

* * * * * * * * * * * * * *

* '0' TO EXIT *

* ENTER/REPLACE *

* WHICH ONE? *

* * * * * * * * * * * * * *

Homicide	Homicide	Homicide
	Rape	Rape
	Assault	Assault
		Robbery/Burglary/Larceny/MV Theft
File 1	File 2	File 3

The sequence outlined above might be useful, with the last file a composite of all Part I offenses. File 1 and File 2 could be available for separate analysis when required.

Previously Saved Data. In addition to entering and editing data interactively, a previously saved file of arrest data may be retrieved from disk, printed as is, or edited and saved to a file (same file or different one, if desired). This makes it easy to make major changes to a data file in a few seconds.

OUTPUT

Data Files

Data entered and/or edited using the program can be saved to a file by responding "Y" to the program query "DO YOU WANT TO SAVE ARREST DATA?". If the response is "Y", the user will be asked to specify a file name, and the data will be written to that file on the disk.

Printed Output

Three types of printed output tables are available:

(1) Arrests

(2) Adjusted arrests*

(3) Arrest rates

Adjusted arrests (see discussion above) are calculated by multiplying the absolute number of arrests in the data by the ratio of total state population divided by the population of the jurisdiction from which arrest data were taken (this is only necessary when arrest data were not from the entire state). Arrest rates are the number of arrests per 100,000 population.

Any or all of the tables may be requested by responding to the appropriate command queries.

Figures III-2 to III-4 are examples of the printed output tables.

*You have the option of saving adjusted arrests, if desired, to be used in the various projection routines.

FIGURE III-2

EXAMPLE OF PRINTED OUTPUT: TABLE 1*

REPORT: NUMBER OF ACTUAL REPORTED ARRESTS FOR 1976-1979
JURISDICTION: MARYLAND
CRIME TYPE: ALL OFFENSES

AGE GROUPINGS	1976	1977	1978	1979	%CHANGE 1979/1978	%CHANGE 1979/1976
TOTAL	168892	171244	173864	168419	-3.13%	-.28%
<=12	6671	6855	6244	6148	-1.54%	-7.84%
13-14	14532	14263	13585	13908	2.38%	-4.29%
15-16	25600	26110	25308	24455	-3.37%	-4.47%
17	13689	13734	13662	13234	-3.13%	-3.32%
18-19	20235	20394	19980	18311	-8.35%	-9.51%
20-24	31310	32143	33314	31453	-5.59%	.46%
25-29	18867	19782	20920	20363	-2.66%	7.93%
30-34	11431	11483	12950	13117	1.29%	14.75%
35-39	7902	8027	8602	8749	1.71%	10.72%
40-44	6219	6152	6433	6227	-3.2%	.13%
45-49	6218	6151	6433	6227	-3.2%	.14%
50+	6218	6150	6433	6227	-3.2%	.14%
JUV	60492	60962	58799	57745	-1.79%	-4.54%
ADULT	108400	110282	115065	110674	-3.8%	2.1%

*Hypothetical data

FIGURE III-3

EXAMPLE OF PRINTED OUTPUT: TABLE 2*

REPORT: NUMBER OF ADJUSTED ARRESTS FOR 1976-1979
JURISDICTION: MARYLAND
CRIME TYPE: ALL OFFENSES

AGE GROUPINGS	1976	1977	1978	1979	%CHANGE 1979/1978	%CHANGE 1979/1976
TOTAL	176361	176344	176232	170890	-3.03%	-3.1%
<=12	6966	7059	6329	6238	-1.44%	-10.45%
13-14	15175	14688	13770	14112	2.48%	-7%
15-16	26732	26888	25653	24814	-3.27%	-7.17%
17	14294	14143	13848	13428	-3.03%	-6.06%
18-19	21130	21001	20252	18580	-8.26%	-12.07%
20-24	32695	33100	33768	31915	-5.49%	-2.39%
25-29	19701	20371	21205	20662	-2.56%	4.88%
30-34	11937	11825	13126	13309	1.39%	11.49%
35-39	8251	8266	8719	8877	1.81%	7.59%
40-44	6494	6335	6521	6318	-3.11%	-2.71%
45-49	6493	6334	6521	6318	-3.11%	-2.7%
50+	6493	6333	6521	6318	-3.11%	-2.7%
JUV	63167	62778	59600	58592	-1.69%	-7.24%
ADULT	113194	113566	116632	112298	-3.72%	-.79%

*Hypothetical data

FIGURE III-4

EXAMPLE OF PRINTED OUTPUT: TABLE 3*

REPORT: ADJUSTED ARREST RATE PER 100,000 POPULATION FOR 1976-1979
JURISDICTION: MARYLAND
CRIME TYPE: ALL OFFENSES

AGE GROUPINGS	1976	1977	1978	1979	%CHANGE 1979/1978	%CHANGE 1979/1976
TOTAL	4222.3	4166.52	4110.26	3935.02	-4.26%	-6.8%
<=12	801.43	797.46	733.46	738.95	.75%	-7.8%
13-14	9466.42	11298.28	9971.03	9910.16	-.61%	4.69%
15-16	17726.9	17841.79	14650.27	13441.94	-8.25%	-24.17%
17	19448.16	18536.06	16805.87	14788.75	-12%	-23.96%
18-19	13702.91	12353.74	12618.11	10414.62	-17.46%	-24%
20-24	7624.69	7832.53	8166.3	8187.41	.26%	7.38%
25-29	5780.93	6062.84	6457.02	5891.58	-8.76%	1.91%
30-34	3748.91	3400.91	3456.12	3484.15	.81%	-7.06%
35-39	3092.75	3133.45	3253.41	3380.57	3.91%	9.31%
40-44	2984.39	2685.55	2639.92	2360.24	-10.59%	-20.91%
45-49	2675.32	2458.92	2527.36	2572.63	1.79%	-3.84%
50+	680.75	662.05	669.53	629.32	-6.01%	-7.55%
JUV	5038.06	5053.74	4735.77	4642.81	-1.96%	-7.85%
ADULT	3872.4	3797.95	3850.38	3645.09	-5.33%	-5.87%

*Hypothetical data

PROCEDURE

The minimum requirement for use of this program is to have a state population (current/past) data file saved on disk. The file will be used (1) as a model for age groupings, age labels, years, year labels, etc., and (2) to compute adjusted arrests and arrest rates for the printed output (the user may, however, specify special age goupings, labels, etc., if desired, without the use of the population file; however, arrest rates and adjusted arrests cannot be calculated).

New data is entered by the user with the screen entry routine, an edit check is done, and then the data may be printed and/or saved to a file. Additional data (for another crime type) that is in the same format may then be entered, edited, and appended to the first data set for printing and/or saving (see "INPUT" discussion above).

Arrest data files previously created may be retrieved from a file, edited, printed, and saved to a file.

COMMENTS/FEATURES

The Arrest Entry and Display program has a subroutine to check the congruence of the state population and arrest data files. Unless both of these files have the same number and type of age groupings, and the same number and type of years, the results of the calculations of arrest rates and adjusted arrests will be spurious. To avoid this, the program automatically checks these parameters and prints warnings if errors are discovered. The type of errors are specified along with the values for each of the files. This will allow the user to see exactly where the problem lies. The user then has the following options:

(1) GO BACK TO MENU

(2) RE-ENTER POP FILE

(3) RE-ENTER ARREST FILE

(4) RE-ENTER ARREST DATA BY TERMINAL

SECTION IV

ARREST PROJECTION

TABLE IV-0

REQUIREMENTS CHART

ARREST PROJECTION		
PRIOR PROGRAM RUNS REQUIRED	INPUT FILES REQUIRED	OUTPUT
POPULATION ENTRY AND DISPLAY	*STATE POPULATION -current/past-*	DATA FILES
STATE POPULATION ESTIMATOR	*STATE POPULATION -future-*	*ARRESTS -base year-*
ARREST ENTRY AND DISPLAY	*ARRESTS -current/past-*	*ARRESTS -projected-*
		PRINTED
		ARRESTS -projected-

ARREST PROJECTION PROGRAM
(VERSION 1.2)

FLOW PROJECTION PROGRAM
(VERSION 1.2)

SAVING A SMOOTHED/WEIGHTED BASE YEAR OF DATA

These two programs, in addition to having the option of saving projected arrests to a file, have the option of saving a smoothed base year, a composite of the several years of data typically used to project future arrests and flows. For example, if the current/past data set is comprised of data from 1979, 1980, 1981, and 1982, the base year to be saved would be a composite forming a new 1982 data file. This base year of data is needed for the Prison Population Projection program.

Data files for the base year of arrests and prison population (or commitments and average daily population) should contain only one year of data. Notice that the last paragraph on page 2-63 of the User's Guide no longer applies, since data files with only one year are used.

ARREST PROJECTION

PURPOSE

This program enables the user to retrieve from disk files both the current/past and future population data as well as the current/past arrest data. The program then calculates and displays the number of projected arrests using either the exponential or weighted average techniques described in Appendix B. Projected arrests can then be saved to a file for use in the Flow Projection and Prison Population Projection programs.

INPUT

Three data files are needed in order to calculate projections.

(1) State population (current/past)
(2) State population (future)
(3) Arrests (current/past)

All of the files must have the same number and type of age groupings. The arrest file and current/past state population files must have the same number of years of data.

The program prompts the user for the names of these files, and then automatically retrieves them from the disk.

OUTPUT

Data Files

The results of the arrest projection* can be saved to disk, if desired. A projected arrests file is required for both the Flow Projection and Prison Population Projection** programs (see Table F-1 for an outline of the structure of the projected arrest file).

Printed Output

Printed output is in the form of a table (see Figure IV-1) displaying arrests by age grouping for a "smoothed" base year of data and the projected "smoothed" future years. The value of the exponential smoothing constant or weights used with the weighted average method are also displayed on the table. (A brief outline of the "smoothing" projections routine follows with a more detailed description given in Appendix B.)

---

* including a base year (smoothed combination of all the years in the current/past arrests data file).

** A base year file is also required for the Prison Population Projection program.

FIGURE IV-1

EXAMPLE OF PRINTED OUTPUT

REPORT: SMOOTHED ESTIMATED AND PROJECTED ARRESTS FOR 1979-2000
JURISDICTION: MARYLAND
CRIME TYPE: ALL OFFENSES
EXPONENTIAL SMOOTHING CONSTANT = .3

AGE GROUPINGS	1979	1985	1990	1995	2000
TOTAL	170493	200059	213077	228045	248551
<=12	6308	6626	7432	7931	8048
13-14	13892	14488	14061	16748	17885
15-16	25013	25369	23847	25097	28494
17	13456	13445	13285	13092	15495
18-19	19205	20396	20907	19172	22555
20-24	32107	36913	34059	34607	35938
25-29	20381	30403	33601	32718	32429
30-34	12746	16525	20165	21469	19832
35-39	8560	12838	16754	20443	22329
40-44	6275	8383	11105	14351	17338
45-49	6275	6888	8913	11885	15413
50+	6275	7785	8948	10532	12795
JUV	59669	59928	58625	62868	69922
ADULT	111824	140131	154452	165177	178629

AGE GROUPINGS	%CHANGE 1985/1979	%CHANGE 1990/1979	%CHANGE 1995/1979	%CHANGE 2000/1979
TOTAL	17.34	24.98	33.76	45.78
<=12	5.04	17.82	25.73	27.58
13-14	4.29	1.22	20.56	28.74
15-16	1.42	-4.66	.34	13.92
17	-.08	-1.27	-2.71	15.15
18-19	6.2	8.86	-.17	17.44
20-24	14.97	6.08	7.79	11.93
25-29	49.17	64.86	60.53	59.11
30-34	29.65	58.21	68.44	55.59
35-39	49.98	95.72	138.82	160.85
40-44	33.59	76.97	128.7	176.3
45-49	7.77	42.04	89.4	145.63
50+	24.06	42.6	67.84	103.9
JUV	2.15	-.07	7.16	19.18
ADULT	25.31	38.12	47.71	59.74

PROCEDURE

The following is a schematic outline of the information the user must supply in order to run the program:

(1) Name of State Population data file (current/past)
(2) Name of State Population data file (future)
(3) Name of Arrest data file (current/past)
(4) Do arrests represent 100% reporting?
(5a) Value for exponential smoothing constant if Exponential Smoothing is used
(5b) Values for weights for Weighted Averages method
(6) Whether to adjust projected arrests for race (Y/N)
(7) Whether to print data
(8) Name of a file to save the projected arrest data to, if desired

All of the above choices are made in response to program queries.

After data from one crime is entered and projected, you can, if desired, retrieve another arrest data file to be added to the first. Another projection can then be made with the summed data.

Smoothing Options

A projection of future arrests for each future year desired (e.g., 1985, 1990, 1995, 2000) is calculated using each current/past year of arrest data (e.g., 1976, 1977, 1978, 1979, 1980). Therefore, initially, 1985 has five estimated values for arrests. In order to "smooth" out the variability of these separate values but also keep as much as possible the information intrinsic in this variability, two different smoothing options are available in this program. They allow the user to come up with one projected value for each future year that captures some of the trend information of the individual projected values.

1. Exponential Smoothing Option. The user selects an exponential smoothing constant (see Appendix B for a detailed explanation) value between 0 and 1 (the most commonly used values range from .01 to .3).* The choice of the particular constant depends upon which years of the current/past arrest data are to be emphasized in the projections:

-Early years emphasized - smaller smoothing constant
-Recent years emphasized - larger smoothing constant

For example, a smoothing constant of .3 would emphasize more the most recent year of arrest data and would emphasize very little of the previous years' trend.

*Brown, R.G. Smoothing, Forecasting and Prediction. Englewood Cliffs, N.J.: Prentice Hall, Inc., 1963.

2. Weighted Averages Option. With this option, the user assigns a weight directly to each year of current/past arrest data (all weights must sum to 1). The larger the weight, the more the particular year will be emphasized in the projections. For example, a user might assign a weight of .4 to 1980, .2 to 1979, .2 to 1978, .1 to 1977, and .1 to 1976. In this case, 1980 data is emphasized twice as much as 1979 and 1978 and four times as much as 1977 and 1976.

COMMENTS/FEATURES

Subroutine to Adjust Projected Arrests for Race. This option is available if both the state population data files (i.e., current/past and future) are broken down by race for each age category (see Appendix B for exact algorithm). The race breakdown within each aggregated age grouping (i.e., juvenile, adult) is used to estimate the effect on projected arrests that a differential change in the demographics of the population may have. This estimation is necessary because, unlike population data, arrest data is not usually reported by race within age categories, but only by total juveniles (white and non-white) and total adults (white and non-white).

The fact that projected arrests have been adjusted for race is not obvious by looking at a printout (Figure IV-1), but the effect (if any) is included in the totals for each age grouping.

Using Non-Population Data. As we mentioned in the section describing Population Entry and Display, data other than actual population can be used to project arrests. If, for instance, you want to model an increase in arrests of one-third for 18-24 year-olds from 1980 to 1990, you would enter 1.333 for that age grouping's future population in the 1990 data file and 1.0 for that age grouping's current/past population in the 1980 data file.

SECTION V

ARREST REGROUPER

TABLE V-0

REQUIREMENTS CHART

ARREST REGROUPER		
PRIOR PROGRAM RUNS REQUIRED	INPUT FILES REQUIRED	OUTPUT
POPULATION ENTRY AND DISPLAY		DATA FILES
STATE POPULATION ESTIMATOR		*ARRESTS -current/past- (with new groupings)*
ARREST ENTRY AND DISPLAY	*ARRESTS -current/past-*	*ARRESTS -projected- (with new groupings)*
ARREST PROJECTION	*ARRESTS -projected-*	PRINTED
		NONE

ARREST REGROUPER

PURPOSE

This program is used to change the age grouping structure of arrest data files (both current/past and projected) and to create and save the new files with the new structure. These restructured files can then be used with the programs in this package that use the arrest files as models for file structure (see Table III) and/or use arrest data in calculations. This may be useful as data regarding system flow and prison population may not be available in the standard UCR age groupings.

More specifically, with this program age groupings can be collapsed together into larger groupings or eliminated. For example, a data file with standard UCR groupings (12 total) could be reduced to two groupings, "JUV" and "ADULT". Another example would be to eliminate all juvenile data and to collapse the adult groupings into two: "18-30" and "31+". The program automatically sums and/or subtracts data across groupings (for all years) and displays the results on the screen for editing. A new data file is automatically generated for use in subsequent programs.

INPUT

Two data files are used as input:

(1) Arrests (current/past)
(2) Arrests (projected)

The data files can have any number and type of age groupings and any number of years of data, but both files (i.e., current/past and projected) must have the same structure.

OUTPUT

Data Files

Data files are automatically generated for the regrouped data and are saved to disk upon command. These files may then be used as is for the Flow Entry and Display, Flow Projection, Prison Parameter Entry and Display, and Prison Population Projection programs.

Printed Output

No printed output is provided with this program (data can be viewed with the screen editor). However, you may get a printed copy of a data file created with this program by using the Arrest Entry and Display program.

PROCEDURE

You provide the program with the names of the current/past and projected arrest data files to be regrouped. (They are entered one at a time.) The program retrieves the files and displays the grouping structure on the screen (both files must have the same structure). Then, through a series of interactive queries, the user is asked to provide the following information:

(1) Create how many new groupings?
(2) How many new juvenile groupings?
(3) For each new group:
    a) How many old groups to be included?
    b) Enter (1-5 characters) age label
    c) Enter the numbers (from the display screen) for each of the old groups to be included

This process is more easily understood using an example. Let's assume we're starting with an arrest data file with the standard UCR groupings:

1)	≤12	7)	25-29
2)	13-14	8)	30-34
3)	15-16	9)	35-39
4)	17	10)	40-44
5)	18-19	11)	45-49
6)	20-24	12)	50+

The screen display will look similar to the above listing. Now, perhaps the user wishes to eliminate all juvenile groupings (because the file will be used for adult prison population projection) and wishes to combine all ages ≥35 and leave the rest of the groupings alone.

Therefore, the answers to the following queries will be:

-Create how many new groupings? 5
-How many new juvenile groupings? 0

After this, for each of the five new groupings, you will be asked to specify (1) number of old groups to be included, (2) an age label for the new grouping, and (3) the numbers for each of the old groups to be included. In our example,

New Group #	How Many ?	Age Label	Old Group #(s)
1	1	18-19	5
2	1	20-24	6
3	1	25-29	7
4	1	30-34	8
5	4	35+	9,10,11,12

After this information is supplied to the program, it deletes and sums the appropriate groupings, and creates a new data file ready to be saved. Before saving, you can view the results by accessing the Edit routine. If desired, this routine can be used to modify the data before saving the file to disk.

If the file created in our example was to be retrieved and input into the Arrest Regrouper again, the initial screen display of the grouping structure would look as follows:

1)	18-19	4)	30-34
2)	20-24	5)	35+
3)	25-29		

If desired, you could further combine categories using the new file.

COMMENTS/FEATURES

Age groupings can also be overlapped. For example, it might be useful to have a data file with the following age groupings:

1) 18-19
2) 18-24
3) 18-29
4) 18-34

This can be easily done with the program - it doesn't care how many or what type of age groupings are combined into the new groupings. It's also possible to combine groupings that are separated by large age differences, but might have similar characteristics based on some theory:

1) ≤12 and 50+*

This program is limited to adding together, and/or deleting entire groupings and cannot obviously separate out single years of data from an age grouping (e.g., 35-39) that has summary data for five years. Therefore, it is important to have the raw files disaggregated as much as possible for the most flexibility.

*A special label would have to be created, however, because of the present limit of five characters per label.

SECTION VI

FLOW/PRISON POPULATION

ENTRY AND DISPLAY

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TABLE VI-0

REQUIREMENTS CHART

FLOW AND PRISON POPULATION ENTRY AND DISPLAY		
PRIOR PROGRAM RUNS REQUIRED	INPUT FILES REQUIRED	OUTPUT
POPULATION ENTRY AND DISPLAY		DATA FILES
STATE POPULATION ESTIMATOR		*SYSTEM FLOW -current/past-*
ARREST ENTRY AND DISPLAY	(1) *ARRESTS -current/past-*	*PRISON POPULATION -current/past*
	(2) INTERACTIVE DATA ENTRY*	*AVG DAILY PRISON POP -current/past-*
	(a) *SYSTEM FLOW -current/past-*	*PRISON COMMITMENTS -current/past*
	(b) *PRISON POPULATION -current/past-*	PRINTED
	(c) *AVG DAILY PRISON POPULATION -current/past*	*SYSTEM FLOW -current/past-*
	(d) *PRISON COMMITMENTS -current/past-*	*PRISON POPULATION -current/past-*
		AVG DAILY PRISON POPULATION -current/past-
		PRISON COMMITMENTS -current/past-

*USER MAY ENTER ANY OR ALL OF THE BELOW DEPENDING ON WHAT HE WISHES TO PROJECT

FLOW/PRISON POPULATION ENTRY AND DISPLAY

PURPOSE

This program is used to enter, edit, save to a file, and retrieve from a file system "flow" data. This "flow" data can be any downstream (past the arrest stage) criminal justice processing flow, including prison population. Examples of data files which may be created with this program are.

1) Court Filings and Terminations (current/past)
2) Prison Commitments (current/past)
3) Prison Population as of a particular day, e.g., year end (current/past)
4) Average Daily Prison Population (current/past)

INPUT

A previously created data file (e.g. regrouped arrests) may be used to automatically set up the file structure (e.g., age groupings, years) for the screen entry routine (see Chapter 3). Alternatively, you can specify the number and type of age groupings, years of data, and whether or not the data will be entered by race (i.e. white and non-white). The data are entered interactively, edited, and saved to a file.

A previously created flow data file can also be retrieved in order to be viewed, printed, edited, and saved to a file again.

OUTPUT

Data Files

Data files for system flow can be saved to disk after entering/editing. The files for each of these data types have identical structures, only the file names distinguish between them.

Printed Output

Printed tabular output can be requested in order to have a hard copy record. Figure VI-1 is an example of a prison population file created and printed with this program.

PROCEDURE

The program is run once for each different type of data file (e.g. system flow, prison commitments) to be created. You have

Figure VI-1

EXAMPLE OUTPUT

REPORT: NUMBER OF ACTUAL REPORTED FLOWS FOR 1976-1979
JURISDICTION: MARYLAND
FLOW TYPE: PRISON POP

AGE GROUPINGS	1976	1977	1978	1979	%CHANGE 1979/1978	%CHANGE 1979/1976
TOTAL	7912	8148	7966	7852	-1.43%	-.76%
18-19	1187	1222	1195	1178	-1.42%	-.76%
20-24	2769	2852	2788	2748	-1.43%	-.76%
25-29	1741	1793	1753	1727	-1.48%	-.8%
30-34	1107	1141	1115	1099	-1.43%	-.72%
35-39	633	652	637	628	-1.41%	-.79%
40+	475	488	478	472	-1.26%	-.63%
ADULT	7912	8148	7966	7852	-1.43%	-.76%

the choice of using an arrest data file as a model for the structure (e.g. specification for the number and type of age groupings, age labels, number of years, year labels, etc.) or to specify all these structure parameters by responding to queries in a special subroutine. After the data structure is specified, you can then enter the data interactively using the screen entry routine. The data can then be printed and saved to a disk file for future use.

SECTION VII

FLOW PROJECTION

TABLE VII-0

REQUIREMENTS CHART

FLOW PROJECTION		
PRIOR PROGRAM RUNS REQUIRED	INPUT REQUIRED	OUTPUT
POPULATION ENTRY AND DISPLAY		DATA FILES: *SYSTEM FLOW -base year-*; *SYSTEM FLOW -projected-*
STATE POPULATION ESTIMATOR		
ARREST ENTRY AND DISPLAY	(1) *ARRESTS -current/past-*	PRINTED: *SYSTEM FLOW -projected-*
ARREST PROJECTION	(2) *ARRESTS -projected-*	
FLOW/PRISON POPULATION ENTRY AND DISPLAY	(3) *SYSTEM FLOW -current/past-*	

FLOW PROJECTION

PURPOSE

This program is used to project future system flow (any downstream criminal justice processing flows such as court filings court convictions, prison commitments) using either an exponential or weighted average technique (see Appendix C for detailed description). Generally speaking, the projections are based on the estimated percent change in the smoothed ratio of future arrests to current/past arrests and on the assumption that the ratio of "flow" to arrests will remain constant over time.

INPUT

Three data files are needed to project flows for a particular crime or set of crimes:

(1) Arrests (current/past)
(2) Arrests (projected)
(3) Flows (current/past)

These files are retrieved from disk files previously created. The program then calculates the projections based on these data sets.

OUTPUT

Data Files

The projected flows may be saved to disk if they are to be used for further projections (e.g. estimated future prison commitments may be used to project prison populations).

Printed Output

Printed output similar to Figure VII-1 is provided, displaying projected flows by future years, broken down by age groupings with sub-totals of juveniles and adults for each future year.

PROCEDURE

It is assumed that the user has previously run the Arrest Entry and Display, Arrest Projection, and Flow/Prison Population Entry and Display programs. The first step of the present program is to specify the names of the three necessary data files (see INPUT,

Figure VII-1

EXAMPLE OUTPUT
(Prison Commitments)

REPORT: SMOOTHED ESTIMATED AND PROJECTED FLOWS FOR 1979-2000
JURISDICTION: MARYLAND
FLOW TYPE: MD.COM.PAST
EXPONENTIAL SMOOTHING CONSTANT = .3

AGE GROUPINGS	1979	1985	1990	1995	2000
TOTAL	3464	3823	3844	3707	3601
18-19	528	491	423	386	397
20-24	1156	1250	1098	974	917
25-29	826	982	1049	933	827
30-34	446	493	591	633	563
35-44	327	407	460	527	607
45+	181	200	223	254	290
JUV	0	0	0	0	0
ADULT	3464	3823	3844	3707	3601

AGE GROUPINGS	%CHANGE 1985/1979	%CHANGE 1990/1979	%CHANGE 1995/1979	%CHANGE 2000/1979
TOTAL	10.36	10.97	7.02	3.95
18-19	-7.01	-19.89	-26.89	-24.81
20-24	8.13	-5.02	-15.74	-20.67
25-29	18.89	27	12.95	.12
30-34	10.54	32.51	41.93	26.23
35-44	24.46	40.67	61.16	85.63
45+	10.5	23.2	40.33	60.22
JUV	99999	99999	99999	99999
ADULT	10.36	10.97	7.02	3.95

above); the program will then project future flows for the same years that are in the projected arrests data file and using the same smoothing method. For example, if arrests were projected and then smoothed using the exponential method with a value of .1, the same value will be used to smooth the current/past flow data. The ratio of smoothed future arrests to current arrests (smoothed using the exponential method with a value of .1) will then be applied to the smoothed current/past flow data in order to extrapolate the flow to future years. This can be done automatically because the information concerning the type of smoothing routine used and the value of the smoothing constant or the values of the smoothing weights are stored in the projected arrests data file (see Appendix F).

The results of the projection calculation are then output to a line printer in the format outlined in Figure VII-1.

SECTION VIII

PRISON PARAMETER ENTRY

TABLE VIII-0

REQUIREMENTS CHART

PRISON PARAMETER ENTRY		
PRIOR PROGRAM RUNS REQUIRED	INPUT FILES REQUIRED	OUTPUT
POPULATION ENTRY AND DISPLAY *STATE POPULATION ESTIMATOR* *ARREST ENTRY AND DISPLAY* *ARREST PROJECTION*	(1) *ARRESTS -projected-* (2) INTERACTIVE DATA ENTRY (a) *INDICTMENT, CONVICTION, COMMITMENT* > *PROBABILITIES* (b) *AVG LENGTH OF STAY*	DATA FILES: *PRISON COMMITMENT PARAMETERS -future-* PRINTED: *NONE*

PRISON PARAMETER ENTRY

PURPOSE

This program allows the user to enter, edit, and save to a file the additional "policy sensitive" data needed to run the Prison Population Projection program. These two data sets* are:

(1) Prison commitment probabilities**:

a = probability of indictment given arrest
b = probability of conviction given indictment
c = probability of imprisonment given conviction

(2) Average length of stay in prison***

Different values for each age grouping and/or year can be entered for each of the parameters listed above.

INPUT

The data file of projected arrests that will be used for prison population projection is retrieved in order to be used as a model for age groupings and number of years of data for the screen entry subroutine. The prison probabilities and average length of stay data are then entered interactively after a series of queries are answered concerning how the probabilities are broken down (separate or total?, by age?, by year?) and how the average length of stay data are broken down (by age?, by year?).

Previously created data files of prison commitment probabilities or average length of stay can also be retrieved, edited, and saved to a file.

OUTPUT

Data Files

The data files created using this program (i.e., prison commitment probabilities, and/or average length of stay) can be saved to disk for use in the Prison Population Projection program.

---

*It is not necessary to enter prison commitment probabilities. Alternatively, the user can project future commitments using the flow projection program and can use the future commitments data file in the Prison Population Projection program. Additionally, if the Average Daily Prison Population method of projection (see Section IX) is used, it is not necessary to enter length of stay data.

**If separate probabilities are not available, a total probability of "imprisonment given arrest" can be used instead.

***If the "Average Daily Population" method is used, length of stay data is not relevant.

Printed Output

No printed output is supplied with this program. However, all values of the parameters can be seen using the screen editing routine.

PROCEDURE

If probability and/or length of stay data are to be entered for the first time, the program requests a projected arrests data file from which age groupings and years (plus labels) will be copied. If a probability or length of stay file has been previously saved and viewing or editing is desired, the file is retrieved directly from disk and a projected arrests data file is not needed.

Entering Prison Commitment Probabilities

The user has complete freedom to determine the disaggregation of the probability values. First, all three separate probabilities can be entered or only a "total probability" can be entered if separate values are not available. In addition, these probabilities may be entered separately for each age grouping and for each year to be projected. Figure VIII-1 illustrates the one extreme of most "disaggregation". In this example, the user wants to enter a separate value for each probability (rather than a "total" probability) for each age grouping and each year to be projected. Therefore, in this example, there are a total of 3 X 4 X 4 = 48 separate values.

It should be emphasized that these values are those we think will apply to the projected years, although we derive these values (or an approximation) from current or past data. The usefulness of this program as a planning tool lies in our ability to quickly adjust the values to take into account proposed or possible policy changes in order to see what would happen. We can easily play with alternative scenarios, e.g. what if the imprisonment probabilities for 18-24 year olds increases in 1980 but decreases for those over 35?

On the other extreme, the user can specify only one "total" probability (probability of commitment to prison given arrest) and have it apply to all years and all groups.

As the user gains experience with the program, the range of options will become more obvious.

Figure VIII-1

EXAMPLE OF COMMITMENT PROBABILITY DISAGGREGATION

COMMITMENT PROBABILITIES	PROJECTED YEAR															
	1985				1990				1995				2000			
	AGE GROUP				AGE GROUP				AGE GROUP				AGE GROUP			
	18	19-25	26-29	30+	18	19-25	26-29	30+	18	19-25	26-29	30+	18	19-25	26-29	30+
P_1	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13	x14	x15	x16
P_2	x17	x18	x19	x20	x21	x22	x23	x25	x25	x26	x27	x28	x29	x30	x31	x32
P_3	x33	x34	x35	x36	x37	x38	x39	x40	x41	x42	x43	x44	x45	x46	x47	x48

P_1 = Probability of indictment given arrest

P_2 = Probability of conviction given indictment

P_3 = Probability of imprisonment given conviction

CONTINUED

1 OF 2

Entering Average Length of Stay Data

These data can also be disaggregated by age grouping and year. The above description of options also applies.

Saving the Data

After entering is completed, the user saves the files to disk. The saving is done by responding to command queries in the program.

SECTION IX

PRISON POPULATION PROJECTION

TABLE IX-0

REQUIREMENTS CHART

PRISON POPULATION PROJECTION - METHOD I

PRIOR PROGRAM RUNS REQUIRED	INPUT REQUIRED	OUTPUT
POPULATION ENTRY AND DISPLAY	(1) *PRISON POPULATION -base year-*	DATA FILES
STATE POPULATION ESTIMATOR	(2) *AVG LENGTH OF STAY -future-*	*PRISON POPULATION -projected-*
ARREST ENTRY AND DISPLAY	*AND*	PRINTED
ARREST PROJECTION	Option 1: (3a) *ARRESTS -base year & projected-*; (4a) *COMMITMENT PROBABILITIES -future-*	*PRISON POPULATION -projected-*
PRISON PARAMETER ENTRY	*OR*	*PRISON POPULATION -base year-*
FLOW/PRISON POPULATION ENTRY AND DISPLAY	Option 2: (3b) *PRISON COMMITMENTS -base year & projected-*	*AVG LENGTH OF STAY -future-*
***FLOW PROJECTION*		**COMMITMENT PROBABILITIES -future-*

*For Option 1

**For Option 2

Table IX-0 (cont.)

REQUIREMENTS CHART

PRISON POPULATION PROJECTION - METHOD II

PRIOR PROGRAM RUNS REQUIRED	INPUT REQUIRED	OUTPUT
POPULATION ENTRY AND DISPLAY	(1) *AVG DAILY POPULATION -base year-*	DATA FILES
STATE POPULATION ESTIMATOR	(2) *PRISON COMMITMENTS -base year-*	*PRISON POPULATION -projected-*
ARREST ENTRY AND DISPLAY	*AND*	PRINTED
ARREST PROJECTION	Option 1: (3a) *COMMITMENT PROBABILITIES -future-*; (4a) *ARRESTS -projected-*	*AVG DAILY PRISON POPULATION -projected-*
PRISON PARAMETER ENTRY	*OR*	*AVG DAILY PRISON POPULATION -base year-*
FLOW/PRISON POPULATION ENTRY AND DISPLAY	Option 2: (3b) *PRISON COMMITMENTS -projected-*	**COMMITMENT PROBABILITIES -future-*
***FLOW PROJECTION*		

*For Option 1 only

**For Option 2 only

PRISON POPULATION PROJECTION

PURPOSE

This program is used to perform demographically disaggregated projections of prison populations. Two methods are available, one discussed by Stollmach and Blumstein (Method I) based on an exponential queueing model, and another which uses a simple ratio approach (Method II) and average daily prison population data. These programs project up to five (5) future years (e.g. 1985, 1990, 1995, 2000,2005) and are designed to consider policy sensitive variables in the computations. Additionally, there are two options available within each method. The options allow the user to specify commitment probabilities for the future years or to enter the number of commitments for the future years. Depending on which option is used, commitments or commitment probabilities, there are different input requirements as well as different prior program runs required.

INPUT

All input comes from previously created data files. The methods and options discussed above have slightly different input requirements:

Option 1: Using Commitment Probabilities

Method I	Method II
1) Arrests (Base Year* and Future)	1) Arrests (Future)
2) Prison Population (Base Year*)	2) Average Daily Prison Population (Base Year*)
3) Commitment Probabilities (Future)	3) Prison Commitments (Base Year*)
4) Average Length of Stay (Future)	4) Commitment Probabilities (Future)

Option 2: Using # of Commitments

Method I	Method II
1) Prison Population (Base Year*)	1) Average Daily Prison Population (Base Year*)
2) # of Commitments (Base Year* and Future)	2) # of Commitments (Base Year* and Future)
3) Average Length of Stay (Future)	

Table II and the Requirements Chart at the beginning of this section outline which programs must be run in order to obtain these data files. There is a separate Requirements Chart for Method I and Method II manners of projecting.

OUTPUT

Data Files

Projected prison population can be saved to a disk file.

Printed Output

Printed output for this program is similar to output from other programs in this package (see Figure IX-1).* Projected prison population is printed for future years by age with summary totals of juveniles and adults by year.

PROCEDURE

The first step in using this program is to specify whether commitment probabilities or number of commitments are to be used. If commitment probabilities are to be used, the next step is to retrieve the arrest data files, both current/past and future. The years of projected data in the future arrests file will be the same years for which prison population will be projected. The current/past arrest file is used as a "seed" (see below) for the projections. A file with the commitment probabilities is then retrieved. If Method I is to be used, a file with prison population data (base year) is retrieved and then one with average length of stay data (future). If Method II is to be used, files with base year | average daily population data, as well as current/past prison commitments, are retrieved. (This process is controlled by responding to menu queries.)

If the number of commitments are to be used, the second step is to retrieve the commitment data files, both current/past and projected. As above, the years of projected commitment data will be the same years for which prison population will be projected. As above, if Method I is to be used, the files with prison population data (base year) and average length of stay data (future) are then retrieved. For Method II, the user retrieves the current/past average daily population.

Figure IX-1

OUTPUT FOR PRISON POPULATION
PROJECTION METHOD I

(page 1 of 2)

********** PARAMETERS USED FOR PRISON POPULATION PROJECTION **********

COMMITMENT PROBABILITY VALUES USED

AGE GROUPINGS	1985	1990	1995	2000
18-19	.026	.026	.026	.026
20-24	.033	.033	.033	.033
25-29	.037	.037	.037	.037
30-34	.031	.031	.031	.031
35-44	.02	.02	.02	.02
45+	.013	.013	.013	.013

LENGTH OF STAY DATA USED

AGE GROUPINGS	1985	1990	1995	2000
18-19	26.5	34.4	34.4	34.4
20-24	25.2	32.8	32.8	32.8
25-29	26.1	33.9	33.9	33.9
30-34	26.4	34.3	34.3	34.3
35-44	30.1	39.1	39.1	39.1
45+	25.2	32.3	32.3	32.3

Figure IX-1 (cont.)

OUTPUT FOR PRISON POPULATION
PROJECTION METHOD I

(page 2 of 2)

********** PRISON POPULATION PROJECTION **********

REPORT: PRISON POPULATION FOR 1979-2000
JURISDICTION: MARYLAND
CRIME TYPE: ALL OFFENSES

AGE GROUPINGS	1979	1985	1990	1995	2000
TOTAL	7852	8207	10457	10646	10442
18-19	1178	1114	1240	1154	1135
20-24	2748	2609	3029	2796	2588
25-29	1727	2053	2768	2731	2470
30-34	1099	1072	1521	1733	1675
35-44	628	945	1343	1588	1837
45+	472	414	556	644	737

AGE GROUPINGS	%CHANGE 1985/1979	%CHANGE 1990/1979	%CHANGE 1995/1979	%CHANGE 2000/1979
TOTAL	4.52	33.18	35.58	32.99
18-19	-5.43	5.26	-2.04	-3.65
20-24	-5.06	10.23	1.75	-5.82
25-29	18.88	60.28	58.14	43.02
30-34	-2.46	38.4	57.69	52.41
35-44	50.48	113.85	152.87	192.52
45+	-12.29	17.8	36.44	56.14

SECTION X

PEAK PRISON POPULATION PROJECTION

TABLE X-0

REQUIREMENTS CHART

PEAK PRISON POPULATION PROJECTION		
PRIOR PROGRAM RUNS REQUIRED	INPUT FILES REQUIRED	OUTPUT
-NONE-	*(ALL INTERACTIVE) DATA ENTRY:* *(1) INITIAL PRISON POPULATION* *(2) EXPECTED ANNUAL ADMISSIONS* --- *AND:* *(3a) EXPECTED ANNUAL RELEASES* *OR* *(3b) AVG LENGTH OF STAY*	--- PRINTED --- *TABLE OF PRISON POPULATION CEILING BY RELEASE RATE AND ANNUAL ADMISSIONS*

PEAK PRISON POPULATION PROJECTION

PURPOSE

This program is used to estimate prison population ceilings* (not disaggregated by age) given an initial prison population, a range of expected annual admissions, and either a range of expected annual releases or expected average lengths of stay. Each ceiling represents the upper limit a prison population could reach assuming the admission and release rates upon which it is based remain constant over time. The estimated ceilings are only valid for average lengths of stay greater than one year or for turnover rates (i.e., released population) less than one, however. (See Appendix E for an explanation of the methodology.)

INPUT

All data are entered interactively (no prior program run is required). Data required are:

(1) Initial prison population (1 value)
(2) Expected annual admissions (up to 7 values) and
(3a) Expected annual releases (up to 10 values) or
(3b) Average lengths of stay in months (up to 10 values)

The user specifies how many values of items 2, 3a, or 3b are desired.

OUTPUT

The output is printed in tabular form, displaying the projected prison population ceilings for the range of annual admissions and releases (or average lengths of stay) desired. The values of the data input are also printed for future reference (see Figures X-1 and X-2). Notice that the row variables are labelled "Release Rates". This is because the values for annual releases and average lengths of stay (whichever are used) are transformed into Release Rates.

This program can be operated very quickly - a table can be generated in a minute or two. With the output generated, it is easy to see the long range effects of various combinations of policy decisions that influence admission and release rates.

---

*When the ceiling or "steady state" is reached depends upon the rate of outflow. See Appendix E for more details.

FIGURE X-1

EXAMPLE OUTPUT

Page 1

INITIAL PRISON POPULATION = 8235

ANNUAL ADMISSIONS:

4400
4500
4600
4700
4800
4900
5000

LENGTH OF STAY:

(IN MONTHS)

18	(RATE = .667)
18.5	(RATE = .649)
19	(RATE = .632)
19.5	(RATE = .615)
20	(RATE = .6)

FIGURE X-2

EXAMPLE OUTPUT

Page 2

PEAK PRISON POPULATION BY ANNUAL ADMISSIONS AND AVERAGE LENGTH OF STAY

LENGTH OF STAY	ANNUAL ADMISSIONS						
	4400	4500	4600	4700	4800	4900	5000
18	6600	6750	6900	7050	7200	7350	7500
18.5	6783	6937	7092	7246	7400	7554	7708
19	6967	7125	7283	7442	7600	7758	7917
19.5	7150	7312	7475	7637	7800	7962	8125
20	7333	7500	7667	7833	8000	8167	8333

COMMENTS/FEATURES

It is possible to do "disaggregated" projections of a sort with this program. For example, you might do separate projections for two crime types (e.g. Violent Part I and Property Part I) because you wish to vary length of stay values between them. However, you want the printed output to reflect the sum of the projected prison populations for the two subgroups. You would first do a projection with only Violent Part I offenses, using the corresponding initial prison population, annual admissions, and length of stay values. After this run is complete, the program will ask you:

Do Another Analysis?

Respond "Y" and a menu will appear:

(1) New Run
(2) Aggregate With Data From Last Run

Which?

Respond "2", which will bring you back into the program and will save the data from the first run, to be summed with the results of the second (and/or subsequent runs).

You then enter the values associated with Property Part I offenses for initial prison population, annual admissions, and length of stay values.

You will be limited to using the same number of admissions and length of stay (or annual release) values (e.g. 7 different admission values, 5 different length of stay values) that were specified during the previous run. You may, however, switch from using length of stay (or annual release) values to annual release (or length of stay) values for the second (and subsequent) projection runs.

Projecting a Specific Year. You have the option of using this program as a "Quick and Dirty" projection methodology by specifying a particular future year to be projected. This is no longer a "Peak" or "Steady State" projection, but a target projection for the year specified. (See Appendix E for the mathmatical algorithm.)

CHAPTER 3

THE SCREEN ENTRY AND EDIT SUBROUTINE

THE SCREEN ENTRY AND EDIT SUBROUTINE

Each of the Entry and Display programs in this package has a similar subroutine used to interactively enter and edit data. It is "menu driven" (the user is asked to choose among a list (menu of commands). Figure 3-1 is a facsimile of the display screen in "entry" mode. (In this example, the data have not yet been entered.) Each year of data has its own screen: at the top of the screen is the type of data and year of data that is being entered, e.g. "Murder Indictments for 1975" (in this example the file is for "flow" data). The age grouping labels are listed and numbered along the left side of the screen. The command status is shown within a starred box to the right. The top right corner lists the running totals of adults and juveniles.

Notice that after the last age grouping, "50+", there are four more groupings (i.e., juvenile white and non-white, adult white and non-white). They are there because the user specified that juvenile data would be included, and that data would be broken down by race*. If data were not available by race, categories 13-16 would be left out of the display. If only adult data were available and they were broken down by race, "W ADULT" and "N ADULT" would be included.

Figure 3-2 illustrates the next step after responding to the query "Enter/Replace which one?". It is not necessary to go in order; any item can be entered at any time, and can be replaced as many times as desired.

After specifying the item to be entered (1-16 in our example), the command box responds with the command "INPUT". The user types in the number, hits "return", and the number will appear at the appropriate place on the screen in reverse video (black on white) where a zero (or other previous value) was. As values for the age groupings are entered, a running total is displayed for quick reference. Figure 3-3 is an example of a completed year.

Once one year of data has been completed**, entering a "Ø" will bring you out of the screen to a menu that looks like this:

---

*Only the broad groupings juvenile white and non-white, and adult white and non-white, may be used to categorize offender flow data by race and age. The programs were written this way to correspond to the type of arrest data generally available (since the arrest projections are the primary input to most of the remaining programs), namely Uniform Crime Reports (UCR) data.

**Actually, exiting can be done at any point. The values entered will be safe. You can hop from year to year and back without destroying any data.

FIGURE 3-1

DATA ENTRY SCREEN DISPLAY:

DATA HAS NOT BEEN ENTERED YET

Murder Indictments for 1975

(1)	Ø	❮=12
(2)	Ø	13-14
(3)	Ø	15-16
(4)	Ø	17
(5)	Ø	18-19
(6)	Ø	20-24
(7)	Ø	25-29
(8)	Ø	30-34
(9)	Ø	35-39
(10)	Ø	40-44
(11)	Ø	45-49
(12)	Ø	50 +
(13)	Ø	W JUV
(14)	Ø	N JUV
(15)	Ø	W ADULT
(16)	ø	N ADULT

JUV TOT = Ø
ADULT TOT = Ø

TOT = Ø

```
* * * * * * * * * * * *
*                     *
*      '0' TO EXIT    *
*                     *
*    ENTER/REPLACE    *
*      WHICH ONE?     *
* * * * * * * * * * * *
```


FIGURE 3-2

DATA ENTRY SCREEN DISPLAY:

AN ITEM (1-16) HAS BEEN SELECTED FOR INPUT
THE PROGRAM IS READY FOR THE VALUE TO BE TYPED IN

Murder Indictments for 1975

(1)	Ø	❮=12
(2)	Ø	13-14
(3)	Ø	15-16
(4)	Ø	17
(5)	Ø	18-19
(6)	Ø	20-24
(7)	Ø	25-29
(8)	Ø	30-34
(9)	Ø	35-39
(10)	Ø	40-44
(11)	Ø	45-49
(12)	Ø	50 +
(13)	Ø	W JUV
(14)	Ø	N JUV
(15)	Ø	W ADULT
(16)	Ø	N ADULT

JUV TOT = Ø
ADULT TOT = Ø

TOT = Ø

```
* * * * * * * * * * * *
*                     *
*      INPUT:         *
*                     *
* * * * * * * * * * * *
```

FIGURE 3-3

DATA ENTRY SCREEN DISPLAY:

HYPOTHETICAL COMPLETED YEAR OF DATA

Murder Indictments for 1975

(1)	3	< =12
(2)	13	13-14
(3)	49	15-16
(4)	28	17
(5)	57	18-19
(6)	143	20-24
(7)	98	25-29
(8)	57	30-34
(9)	36	35-39
(10)	32	40-44
(11)	19	45-49
(12)	34	50 +
(13)	43	W JUV
(14)	50	N JUV
(15)	200	W ADULT
(16)	276	N ADULT

JUV TOT = 93

ADULT TOT = 476

TOT = 569

```
* * * * * * * * * * *
*                     *
*    '0' TO EXIT      *
*                     *
*   ENTER/REPLACE     *
*                     *
*   WHICH ONE?        *
*                     *
* * * * * * * * * * *
```


Enter:

(1) Same Year
(2) Different Year
(3) Exit

Command:

Choosing "2" will bring up another menu specifying all years available, e.g.,

Which year of data:

(1) 1975
(2) 1976
(3) 1977
(4) 1978
(5) 1979

Specifying a "3" (i.e., Exit) will bring you out of the data entry routine.

Upon exit, you will be asked if you wish to edit the data. This routine is essentially the same as the previous routine, except that the juvenile and adult totals from the age groupings are compared to the totals of "W JUV", "N JUV", "W ADULT", and "N ADULT" for consistency. Figure 3-4 illustrates an example in which both the juvenile and adult totals were not consistent. When corrections are made, the error messages will disappear from the screen.

Range Checking. The data edit and entry routines were designed to be as "crash proof" as possible. They will not accept values for "Enter/Replace which one?" that are out of range. This applies to each of the "menus" also.

Variations Among Program Modules. There are only slight variations in the routines among the different program modules. Any differences can easily be accommodated to while in use. The menus are designed to be as self explanatory as possible.

FIGURE 3-4

EDIT SCREEN DISPLAY:

Murder Indictments for 1975

(1)	3	< =12
(2)	13	13-14
(3)	49	15-16
(4)	28	17
(5)	57	18_19
(6)	143	20-24
(7)	98	25-29
(8)	57	30-34
(9)	36	35-39
(10)	32	40-44
(11)	19	45-49
(12)	34	50 +
(13)	45	W JUV
(14)	50	N JUV
(15)	210	W ADULT
(16)	276	N ADULT

! JUV TOT ERROR !

93 < > 95

! ADULT TOT ERROR !

476 < > 486

'0' TO EXIT

ENTER/REPLACE

WHICH ONE?

CHAPTER 4

EXAMPLE RUN

EXAMPLE RUN

*** PLEASE READ CHAPTER 2 BEFORE ***
*** BEGINNING THIS EXAMPLE ***

PROBLEM

Our ultimate goal in this example is to project prison population for the years 1985, 1990, 1995, and 2000. We have access to data on population, arrests, prison commitments, length of stay and prison population (both active and average daily) for 1976, 1977, 1978, and 1979.

How do we start?

POPULATION ENTRY AND DISPLAY

Because our projections are in part based on the change in the demographic mix (e.g., age, race) of the population over time, we must know the population of our state or jurisdiction of interest (e.g., county) for the years (past and future) listed above. We assume, for the sake of our example, that our only sources of population data are Census Bureau publications,* and that we wish to regroup this data into the Uniform Crime Reports (UCR) age groupings. Therefore, instead of entering only two data sets, one for 1976-1979 data and one for 1985-2000 data, we must also enter U.S. population data for these same years so that the State Population Estimator program can give us population data in the desired (UCR) age grouping format.

To start, we first enter the state population data using the Population Entry and Display Program. Notice that the menu is set up to deal with this problem:

---

* U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 796, "Illustrative Projections of State Populations by Age, Race, ans Sex: 1975 to 2000," U.S. Government Printing Office, Washington, D.C. 1979.

U.S. Bureau of the Census, Current Population Reports, Series P-25, No.704, "Projections of the Population of the United States: 1977 to 2050," U.S. Government Printing Office, Washington, D.C., 1977.

ENTER:

(1) STATE POP IN C.B. FORMAT

(2) US POP IN C.B. FORMAT

****

(3) EDIT/ENTER ANY POP DATA

(X) EXIT

We choose option "1", which sets up our data entry screen in the Census Bureau (CB) format. We then have to specify how many years of data to enter, what the year labels will be, and whether data is to be entered by race (white/non-white). In our example, we wish to enter data for 1976, 1977, 1978, and 1979, for both "white" and "non-white" populations.

We run into another difficulty, however, since the population in the book is only given in 5 year intervals (1975, 1980, 1985, etc.). To get values for 1976, 1977, 1978, 1979, we have to extrapolate between 1975 and 1980 (e.g., for each age grouping the 1979 estimate equals the difference between the 1980 and 1975 estimate divided by five and multiplied by four and then added to the 1975 estimate).

After we finish entering the data for both white and non-white populations (if we want to disaggregate by race), we can edit the data to make sure our totals are correct (to edit we just reply "Y" to the query "EDIT?"). We then save the data to a disk file on drive #2 (where we will keep all of our data files - there isn't much room left on the program disk) using the name "CB.STATE. PAST".

We then enter data for future state population, past US population and future US population, saving each data set to disk files. We will then have four data files on disk:

CB. STATE. PAST
CB. STATE. FUT
CB. US. PAST
CB. US. FUT

STATE POPULATION ESTIMATOR

We now need to run the State Population Estimator to regroup the state population data files into the UCR age groupings for use in the Arrest Projection program. We need to run it twice, once to get past state data using:

CB. STATE. PAST
CB. US. PAST

and once to get future state population data using:

CB. STATE. FUT
CB. US. FUT

The procedure is very straightforward - just follow the menu commands and specify file names for the new, regrouped data files. Let's assume we use the following names for our current/past and future regrouped data files:

UCR. STATE. PAST
UCR. STATE. FUTURE

From now on we will use these two data files - we no longer need the "CB" data files

ARREST ENTRY AND DISPLAY

Now that we have our population files that will be used for our projections, we need to enter arrest data. For our example, we wish to enter and save several arrest data files:

1) MURDER
2) RAPE
3) MURDER/RAPE
4) ALL OTHER (besides murder and rape)
5) ALL OFFENSES (total)

We want these files to be in the same format as our population data. To do this, we ask for the option of using our current/past population data file as the model for the structure of our arrest file (same age groupings, # of years, labels, etc.) (see Chapter 3 on Screen Entry/Edit). Therefore, when the program asks us what population file to be used as a model, we respond:

UCR. STATE. PAST

We will then enter arrest data for 1976, 1977, 1978, and 1979 corresponding to the years of our current/past population data. The correct screen-entry format will be automatically generated. We enter our data interactively, edit, and then exit the edit routine. We will then be presented with these options:

SAVE OR PRINT OUTPUTS:

(1) FOR LAST CRIME ENTERED

(2) FOR TOTAL CRIMES ENTERED

COMMAND:

We choose "1" this time, because we just want Murder saved and printed.

The next query will be:

SAVE?

We respond "Y".*

Then

PRINT?

We again respond "Y".

We are then offered the option of printing actual arrests, adjusted arrests (when available reported arrests are not for the entire state, but we wish to estimate what arrests would be for the entire state) and arrest rates.

We follow the same procedure for the "rape" data and "all other offenses" data. We now have three arrest data files on disk:

MURDER. PAST
RAPE. PAST
ALL OTHER. PAST

To create data files for "Murder/Rape" and "All Offenses" we need to merge the files we have created. So we start the program again, and enter our arrest files one by one. This time, however, when we're asked:

SAVE OR PRINT OUTPUTS:

(1) FOR LAST CRIME ENTERED

(2) FOR TOTAL CRIMES ENTERED

COMMAND:

We respond "1" only when MURDER. PAST is entered. When RAPE. PAST is entered we respond "2", giving us a combined file of MURDER/RAPE. PAST. Then we enter ALL OTHER. PAST following the same procedure as for RAPE. PAST and end up with a data set with all three files summed together: ALL OFF. PAST. The program will keep adding files together indefinitely as long as you are in the same program run.

*You have the option of saving adjusted arrests rather than actual arrests, if desired. Look for the appropriate menu command.

ARREST PROJECTION

We now have enough data to project arrests. We could project each of our crime types separately, to get "disaggregated" results, but for now let's assume we want to use only ALL OFFENSES. PAST to (eventually) come up with a prison population projection. Remember, though, that everything we do for one crime type can be done with several. As in Arrest Entry and Display, Arrest Projection would sum the data files entered to come up with an aggregated result.

So, we want to project ALL OFFENSES. PAST into the future (1985, 1990, 1995, 2000). The program menus will guide us through the retrieval of the following data files:

UCR. STATE. PAST
UCR. STATE. FUT
ALL OFF. PAST

Next, we have to decide which "smoothing" method to use for our projections, weighted average or exponential (see Appendix B for a more detailed explanation). We choose the weighted average method with .4 for 1979, .3 for 1978, .2 for 1977, and .1 for 1976 (the total must equal 1). The weights represent the proportion of our new smoothed value that each year of data should provide, e.g., we consider 1979 to be 4 times as important as 1976 in this example.

After this, the computer grinds away for a few seconds, and then prints a table of results. We then choose the option of saving this file, as we will need the projected arrest data to do prison population projections. This file will be named:

ALL OFF. PROJ

ARREST REGOUPER

It was useful (e.g., to plan for juvenile as well as adult processing) to have projected arrests broken down into the 12 UCR age categories. However, for subsequent use in the projection package we may decide to eliminate the juvenile data and to collapse some of the adult age groupings together. The juvenile data is not relevant (for the most part) to prison population projections. In addition, it may serve no useful purpose to keep the same UCR adult age groupings, or it may be impossible to get other data needed for prison population projection (length of stay, commitment probabilities) in as "disaggregated" a form. In our present example we will collapse the UCR groupings into the following 6 groupings:

(1) 18-19
(2) 20-24
(3) 25-29
(4) 30-34
(5) 35-39
(6) 40+

To do this we follow the menu instructions in the program. The result will be a new data file, without juvenile data and with 6 adult age groupings. We will call it:

ALL OFF. PAST. REG

We need to do the same thing to the projected arrests data file (ALL OFF. PROJ) to create a regrouped projected arrests file, namely:

ALL OFF. PROJ. REG

These two new data files will be used in the rest of the program modules.

FLOW/PRISON POPULATION ENTRY AND DISPLAY

This program serves several purposes. If we were only interested in projecting a particular criminal justice flow (court filings, terminations, etc.) we would use this program to enter our current/past data for this flow type, and then go on to the flow projection program. In this example, we will use this program to enter current/past prison population data for use with prison population projection Method I (see Section IX of Chapter 2). To do this, we will use ALL OFF. PAST. REG as a model for the data file structure, and enter the data interactively. The data file saved will be called:

PRIS. POP 1

This is the only file we need to create with this program for Method I projections assuming we choose to enter commitment probabilities. If we choose to use gross commitments, we would also need to enter current/past commitments (and then run the flow projection program to estimate future commitments).

Let's assume for illustrative purposes we also wish to use Method II (which uses the ratio of average daily population to commitments as the basis for its projections). We will then need to use this program to create two data files, one with current/past average daily prison population and one with current/past prison commitments. We use the same arrest file (ALL OFF. PAST. REG) as a structural model, and call the 2 data files entered and saved:

AVG. POP 1 (current/past average daily populations)
PRIS. COM 1 (current/past prison commitments)

Let's briefly review the data files we will need to project prison populations.

	METHOD I	METHOD II
CREATED SO FAR:	ALL OFF. PAST. REG ALL OFF. PROJ. REG PRIS. POP 1	ALL OFF. PROJ. REG AVG. POP PRIS. COM
STILL NEEDED:	COMMITMENT PROBABILITIES* LENGTH OF STAY	COMMITMENT PROBABILITIES*

PRISON PARAMETER ENTRY

The remaining data sets needed for prison population projections are created using this program, namely:

METHOD I	METHOD II
COMMITMENT PROBABILITIES LENGTH OF STAY	COMMITMENT PROBABILITES

As discussed in Appendix D, we may disaggregate the values of the probabilities by 1) probability type, 2) age grouping, and 3) future year. On the other extreme, we can enter one value to be used across all age groupings and years. Follow the command menus to specify the disaggregations desired.

Figure 4-1 illustrates the most expanded disaggragaion possible for commitment probabilities with the data developed for our running example. We could put 4 (years) x 6 (age groupings) x 3 (3 individual probability types)** = 72 individual data elements. Note the lines between years to be projected:

1985 ←——— 1990 ←——— 1995 ←——— 2000

These lines indicate that probability and length of stay values hold for the intervening years, as specified (e.g., 1990 values hold for 1986 through 1990).

*If we wish to use commitments rather than commitment probabilities to project prison populations we would have to use the Flow Projection program to generate the future commitments. We would still have to use this program to enter the length of stay data for Method I projections.

**
$$P_1 = \frac{\text{INDICTMENTS}}{\text{ARRESTS}}$$

$$P_2 = \frac{\text{CONVICTIONS}}{\text{INDICTMENTS}}$$

$$P_3 = \frac{\text{COMMITMENTS}}{\text{CONVICTIONS}}$$

$$PT = P_1 \times P_2 \times P_3$$

$$= \frac{\text{INDICTMENTS}}{\text{ARRESTS}} \times \frac{\text{CONVICTIONS}}{\text{INDICTMENTS}} \times \frac{\text{COMMITMENTS}}{\text{CONVICTIONS}}$$

$$= \frac{\text{COMMITMENTS}}{\text{ARRESTS}}$$

Figure 4-1

PRISON COMMITMENT PROBABILITIES DISAGGREGATION
(For Individual Probabilitites)

P_1 = Probability of Indictment Given Arrest

1985 ← 1990 ← 1995 ← 2000

1) 18-19
2) 20-24
3) 25-29
4) 30-34
5) 35-39
6) 40+

P_2 = Probability of Conviction Given Indictment

1985 ← 1990 ← 1995 ← 2000

1) 18-19
2) 20-24
3) 25-29
4) 30-34
5) 35-39
6) 40+

P_3 = Probability of Incarceration Given Conviction

1985 ← 1990 ← 1995 ← 2000

1) 18-19
2) 20-24
3) 25-29
4) 30-34
5) 35-39
6) 40+

This is because the algorithm for computing prison population projections actually calculates values for all intervening years (1986, 1987, 1988..., etc.).

You may not wish to use such an extreme disaggregation, although it can be very useful for playing with different policy options. For example, what will happen if the probability for commitment to prison of 25-29 year olds for burglary goes up in 1985 and continues to the year 1995, and then drops again? Combining this with the length of stay disaggregation (what if length of stay goes up by six months at the same time?) gives you a versatile tool to assess policy change implications.

Figure 4-2 illustrates the most disaggregated form possible when only one probability (skipping the 3 intermediate probabilities) of "incarceration given arrest" is used. In this case there are 6 (age groupings) x 4 (years) = 24 data elements.

In our running example, we'll use the three separate probabilities, but will assume the values will stay the same for all years (1985-2000). Figure 4-3 illustrates some hypothetical values. We save these values to a file:

COM. PROBS. 1

Now we need our length of stay values. Let's assume they will go up in 1990 because of a shift toward harsher sentences with longer actual lengths of stay (see Figure 4-4). This data is saved to a file called:

LOS. 1

While we're in the program, we could make several different probability and length of stay files that represent different scenarios. They would be saved to disk, ready to be used when desired.

Instead of creating these "parameter" data sets for our one large data set representing all offenses, we could have created separate ones for each crime type. We might want to do this to see the effects of a change to mandatory sentencing for burglary with sentencing for other crimes continuing as in the past. In our example, we could have entered separate parameter data for our murder and rape files, so that our resulting data sets might look like this:

	DATA FILES			
CRIME	ARRESTS*	PRISON POP	PROBABILITIES	L.O.S.
MURDER	MURDER. PROJ	POP. M	COM. P. M	LOS. M
RAPE	RAPE. PROJ	POP. R	COM. D. R	LOS. R
ALL OTHER	AO. PROJ	POP. AO	COM. R. AO	LOS. AO

*We also will need the current/past data files (e.g., MURDER. PAST. REG, etc.) for Prison Population Projection.

Figure 4-2

PRISON COMMITMENT PROBABILITIES DISAGGREGATION

PT = Probability of Incarceration Given Arrest

	1985 ←	1990 ←	1995 ←	2000
1) 18-19				
2) 20-24				
3) 25-29				
4) 30-34				
5) 35-39				
6) 40+				

Figure 4-3

PRISON COMMITMENT PROBABILITY VALUES
FOR ALL OFFENSES
(All Years)

	P_1 (Indictment)	P_2 (Conviction)	P_3 (Incarceration)
1) 18-19	.39	.44	.15
2) 20-24	.42	.46	.17
3) 25-29	.45	.43	.19
4) 30-34	.51	.40	.15
5) 35-39	.42	.36	.13
6) 40+	.31	.35	.12

Therefore:

PT = Probability of Incarceration Given Arrest

1)	18-19	.026
2)	20-24	.033
3)	25-29	.037
4)	30-34	.031
5)	35-39	.020
6)	40+	.013

Figure 4-4

LENGTH OF STAY* DISAGGREGATION
FOR ALL OFFENSES

		1985	1990	1995	2000
1)	18-19	26.5	34.4	34.4	34.4
2)	20-24	25.2	32.8	32.8	32.8
3)	25-29	26.1	33.9	33.9	33.9
4)	30-34	26.4	34.3	34.3	34.3
5)	35-39	30.1	39.1	39.1	39.1
6)	40+	25.2	32.3	32.3	32.3

*in months

The above applies to Method I. If we wanted to use Method II, we would need prison commitment data and average daily population data (instead of prison population data) for each crime type. Length of stay data would not be used.

PRISON POPULATION PROJECTION

Method I

Now that we have all of our data files, we're ready to do a run. We need:

ALL OFF. PAST. REG
ALL OFF. PROJ. REG
PRIS. POP.1
COM. PROBS.1
LOS.1

The program will ask for the name of the file for each type of data set needed. All we need to do is remember which ones are which and respond correctly.

The program will then grind away and print out the results. Figure 4-5 is the output for our example.

Method II

To do this routine, we start the program up again and use these data files:

ALL OFF. PROJ. REG
AVG. POP.1
PRIS. COM.1
COM. PROBS.1

Again, the menu selections will lead us through this method. Output for this run is illustrated in Figure 4-6.

Figure 4-5

OUTPUT FOR PRISON POPULATION
PROJECTION METHOD I

(page 1 of 2)

********** PARAMETERS USED FOR PRISON POPULATION PROJECTION **********

COMMITMENT PROBABILITY VALUES USED

AGE GROUPINGS	1985	1990	1995	2000
18-19	.026	.026	.026	.026
20-24	.033	.033	.033	.033
25-29	.037	.037	.037	.031
30-34	.031	.031	.031	.02
35-44	.02	.02	.02	.013
45+	.013	.013	.013	

LENGTH OF STAY DATA USED

AGE GROUPINGS	1985	1990	1995	2000
18-19	26.5	34.4	34.4	34.4
20-24	25.2	32.8	32.8	32.8
25-29	26.1	33.9	33.9	33.9
30-34	26.4	34.3	34.3	34.3
35-44	30.1	39.1	39.1	39.1
45+	25.2	32.3	32.3	32.3

Figure 4-5 (cont.)

OUTPUT FOR PRISON POPULATION
PROJECTION METHOD I

(page 2 of 2)

********** PRISON POPULATION PROJECTION **********

REPORT: PRISON POPULATION FOR 1979-2000
JURISDICTION: MARYLAND
CRIME TYPE: ALL OFFENSES

AGE GROUPINGS	1979	1985	1990	1995	2000
TOTAL	7852	8207	10457	10646	10442
18-19	1178	1114	1240	1154	1135
20-24	2748	2609	3029	2796	2588
25-29	1727	2053	2768	2731	2470
30-34	1099	1072	1521	1733	1675
35-44	628	945	1343	1588	1837
45+	472	414	556	644	737

AGE GROUPINGS	%CHANGE 1985/1979	%CHANGE 1990/1979	%CHANGE 1995/1979	%CHANGE 2000/1979
TOTAL	4.52	33.18	35.58	32.99
18-19	-5.43	5.26	-2.04	-3.65
20-24	-5.06	10.23	1.75	-5.82
25-29	18.88	60.28	58.14	43.02
30-34	-2.46	38.4	57.69	52.41
35-44	50.48	113.85	152.87	192.52
45+	-12.29	17.8	36.44	56.14

Figure 4-6

OUTPUT FOR PRISON POPULATION
PROJECTION METHOD II

(page 1 of 2)

********** PARAMETERS USED FOR PRISON POPULATION PROJECTION **********

COMMITMENT PROBABILITY VALUES USED

AGE GROUPINGS	1985	1990	1995	2000
18-19	.026	.026	.026	.026
20-24	.033	.033	.033	.033
25-29	.037	.037	.037	.037
30-34	.031	.031	.031	.031
35-44	.02	.02	.02	.02
45+	.013	.013	.013	.013

Figure 4-6 (cont.)

OUTPUT FOR PRISON POPULATION
PROJECTION METHOD II

(page 2 of 2)

********** PRISON POPULATION PROJECTION **********

REPORT: PRISON POPULATION FOR 1979-2000
JURISDICTION: MARYLAND
CRIME TYPE: ALL OFFENSES

AGE GROUPINGS	1979	1985	1990	1995	2000
TOTAL	7852	8410	8436	8142	7898
18-19	1178	1078	927	846	871
20-24	2748	2883	2531	2247	2115
25-29	1727	1993	2130	1894	1679
30-34	1099	1168	1401	1500	1334
35-44	628	771	871	997	1149
45+	472	517	576	658	750

AGE GROUPINGS	%CHANGE 1985/1979	%CHANGE 1990/1979	%CHANGE 1995/1979	%CHANGE 2000/1979
TOTAL	7.11	7.44	3.69	.59
18-19	-8.49	-21.31	-28.18	-26.06
20-24	4.91	-7.9	-18.23	-23.03
25-29	15.4	23.34	9.67	-2.78
30-34	6.28	27.48	36.49	21.38
35-44	22.77	38.69	58.76	82.96
45+	9.53	22.03	39.41	58.9

APPENDICES

APPENDIX A

METHODOLOGY FOR STATE POPULATION ESTIMATOR

METHODOLOGY FOR STATE POPULATION ESTIMATOR

Sections I and II of the first chapter discuss the fact that population data typically available are not grouped in UCR format (see Figure A-1). The Census Bureau reports state population data in the eight categories listed in column A, while UCR arrest data is usually reported in the twelve categories listed in column C.

Since the Census Bureau breaks national population data into finer categories, we can use these data to transform the Census Bureau (CB) state population categories to the UCR categories. (Notice that national data for ages less than 5 and greater than 54 are not needed.) To do this, we make the assumption that the relative proportions of the population in each age category is the same for a state and the United States as a whole.

To get the first category of UCR data, "≤12", the following steps must be taken:

1) use the data from the CB state population category "≤5"

2) take part of the data from the CB state population category "5-14" equal to the proportion of U.S. population in groups 1 through 4 divided by the population of groups 1 through 6,

   that is:

$$\underset{(\leq 5)}{\text{CB State}} + \left[\underset{(5\text{-}14)}{\text{CB State}} \times \frac{(5\text{-}9)+(10)+(11)+(12)}{(5\text{-}9)+(10)+(11)+(12)+(13)+(14)}\right] = \underset{\leq 12}{\text{UCR}}$$

To get the second UCR group (13-14):

$$\underset{(5\text{-}14)}{\text{CB State}} \times \frac{(13)+(14)}{(5\text{-}9)+(10)+(11)+(12)+(13)+(14)} = \underset{13\text{-}14}{\text{UCR}}$$

This procedure is continued for the rest of the categories as follows:

Let A(i) = Census Bureau state population categories
B(j) = Census Bureau U.S. population categories
C(k) = UCR categories

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FIGURE A-1

CENSUS BUREAU FORMATS		UCR FORMATS
(A) State Population	(B) U.S. Population	(C) State Population
1) ≤5	1) 5-9	1) ≤12
2) 5-14	2) 10	2) 13-14
3) 15-24	3) 11	3) 15-16
4) 25-34	4) 12	4) 17
5) 35-44	5) 13	5) 18-19
6) 45-53	6) 14	6) 20-24
7) 55-64	7) 15	7) 25-29
8) 65+	8) 16	8) 30-34
	9) 17	9) 35-39
	10) 18	10) 40-44
	11) 19	11) 44-49
	12) 20-24	12) 50+
	13) 25-29	
	14) 30-34	
	15) 35-39	
	16) 40-44	
	17) 45-49	
	18) 50-54	

Then:

1) ≤=12 $C(1) = A(1) + \left[A(2) \frac{B(1)+B(2)+B(3)+B(4)}{T_1^*}\right]$

2) 13-14 $C(2) = A(2) \times \frac{B(5)+B(6)}{T_1^*}$

3) 15-16 $C(3) = A(3) \times \frac{B(7)+B(8)}{T_2^{**}}$

4) 17 $C(4) = A(3) \times \frac{B(9)}{T_2^{**}}$

5) 18-19 $C(5) = A(3) \times \frac{B(10)+B(11)}{T_2^{**}}$

6) 20-24 $C(6) = A(3) \times \frac{B(12)}{T_2^{**}}$

7) 25-29 $C(7) = A(4) \times \frac{B(13)}{B(13)+B(14)}$

8) 30-34 $C(8) = A(4) - C(7)$

9) 35-39 $C(9) = A(5) \times \frac{B(15)}{B(15)+B(16)}$

10) 40-44 $C(10) = A(5) - C(9)$

11) 45-49 $C(11) = A(6) \times \frac{B(17)}{B(17)+B(18)}$

12) 50+ $C(12) = A(6) - C(11) + A(7) + A(8)$

$^*T_1 = B(1) + B(2) + B(3) + B(4) + B(5) + B(6)$

$^{**}T_2 = B(7) + B(8) + B(9) + B(10) + B(11) + B(12)$

APPENDIX B

METHODOLOGY FOR ARREST PROJECTION

METHODOLOGY FOR ARREST PROJECTION*

The arrest projection model developed by the CJSA staff calculates for a given jurisdiction (e.g., state, county) and year (e.g., 1979) the arrest rate per 100,000 population for specific age groupings of offenders (e.g., <= 12, 13-14, 15-16, 17, 18-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50+) and categories of offenders classified by type of crime at arrest (e.g., murder, rape, robbery). The calculation of a jurisdiction's (e.g., state, county) arrest rate per 100,000 for a given age, offense and year is made as follows:

$$A/R_{ih} = (A_{ih})\ (P_{ih})^{-1}\ (100{,}000)$$

Where: A/R = Arrest Rate; A = Arrests; P = Population; i = age grouping; h = historical year (e.g. 1975, 1976, 1977)

In order to generate the above arrest rates, data is needed for one or more years on the number of actual arrests by age and type of crime for the particular jurisdiction of interest. Uniform Crime Reports (UCR) arrest data, for example, is sufficient to meet this data requirement. Also needed are overall population figures for the jurisdiction of interest broken down by the same age groupings and years for which the UCR data is available.

The arrest rates are then combined with estimates of the future population of the jurisdiction broken down by the same age groupings. The number of arrests for future years is projected as follows:

$$A_{if} = (A/R_{ih})\ (P_{if})\ (100{,}000)^{-1}$$

based on historical year (h)

Where: A/R = Arrest Rate; A = Arrests; P = Population; i = age grouping; h = historical year; f = future year

Thus, arrest projections for a given future year (e.g., 1990) are derived based on the one or more historical years (e.g., 1975, 1976, 1977, 1978, and 1979) for which arrest rates can be calculated. The only additional data needed to do this is the number of projected people for the jurisdiction of interest, identified by the same age groupings for which the arrest rates are calculated.

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*Excerpted from: Lettre, Michel; Criminal Justice Statistics Association Bulletin #2; December 29, 1980.

Since historically the arrest rates differ significantly by racial groupings of the arrestees, an adjustment factor for race is available for use in developing the future arrests where the minority population of the jurisdiction is significant in size. UCR data on race is not available by the various specific age breakdowns, only by total juvenile and total adult arrests. Thus, the adjustment factor applied to the age specific juvenile arrest projections is calculated based on the overall juvenile arrest rate by race (e.g., white vs. non-white or black vs. non-black) for the specific type of crime. Similarly, the age specific adjustment factor for the adult arrest projections is based on the overall adult arrest rate by race for the specific type of crime. The adjustment factor is determined as follows:

$$ADJ_{if} \text{ based on historical year (h)} = \frac{(\%WP_{if} * WA/R_{gh}) + (\%NWP_{if} * NWA/R_{gh})}{(\%WP_{ih} * WA/R_{gh}) + (\%NWP_{ih} * NWA/R_{gh})}$$

Where: ADJ = adjustment factor
%WP = % of Population White (Non-Black)
%NWP = % of Population Non-White (Black)
WA/R = White (Non-Black) Arrest Rate per 100,000
NWA/R = Non-White (Black) Arrest Rate per 100,000
i = age grouping
f = future years (e.g., 1985, 1990)
h = historical years (e.g., 1977, 1978)
g = juvenile arrestees or adult arrestees

The adjusted future arrests based on a given historical year (h) can then be calculated as follows:

Adjusted Arrests $_{if} = (A_{if})\ (ADJ_{if})$ based on historical year (h)

As noted previously, projections of arrests for a future year (e.g., 1990) are derived for each historical year for which arrest data is available (e.g., 1976, 1977, 1978). Since the arrest rates by type of crime and age will differ somewhat for each historical year, the future arrests for year, f, will differ somewhat depending on which of the historical years is used in making the projection. Therefore, smoothed projections are developed by applying weights to each of the projections for a given future year. Two types of smoothing options are used. One option uses exponential smoothing and the other uses a weighted sum of the individual estimates.

Exponential Smoothing Method:

For example, an exponentially smoothed projection for 1990 using 1979, 1978, 1977, and 1976 data respectively is derived using the following formula in a recursive manner starting with t = 1976 and proceeding through t = 1979.

$$E(D_t) = \bar{F}_t + \frac{(1-\alpha)}{\alpha}\bar{T}_t$$

Where: $\bar{F}_t = D_t + (1-\alpha)\bar{F}_{t-1}$

$\bar{T}_t = \alpha(\bar{F}_t - \bar{F}_{t-1}) + (1-\alpha)\bar{T}_{t-1}$

D_t = projected arrests for a given year, e.g., 1990, based on year t (t = 1976, 1977, 1978, 1979)

α = smoothing constant (α must be between 0 and 1; a large α will cause the smoothed projection to respond quickly to the most recent year, a small α will respond more slowly)

Weighted Sum Method:

Smoothing Weights (a,b,c,d) = $(a * 1976A_{if}) + (b * 1977A_{if}) + (c * 1978A_{if}) + (d * 1979A_{if})$

Where a+b+c+d = 1 and

Where $1976A_{if}$, for example, is the projected number of arrests for future year, f, and age grouping, i, based on the arrest rate for year 1976 for i

Example (0,0,0,1) = $(0 * 1976A_{if}) + (0 * 1977A_{if}) + (0 * 1978A_{if}) + (1 * 1979A_{if}) = 1979A_{if}$

In addition to providing a smoothed estimate of future arrests using the above two techniques, the number of current arrests (e.g., 1979) are also smoothed using the same smoothing technique (i.e., exponential or weighted sum) applied to the number of arrests for the prior and current years (i.e., 1976, 1977, 1978, and 1979) in order to provide a smoothed "base year" estimate of arrests.

APPENDIX C

METHODOLOGY FOR FLOW PROJECTION

Methodology for Flow Projection

The methodology for projecting any downstream system flow is similar to that of arrest projection (see Appendix B). The increase (or decrease) in flow for a given year is assumed to be proportional to the projected change in arrests. The generic formula is as follows:

$$\text{Flow}_{\text{projected}} = \text{Flow}_{\text{current/past}} \times \frac{\text{Arrests}_{\text{projected}}}{\text{Arrests}_{\text{current/past}}}$$

The projected arrest data is obtained from a file saved by the arrest projection program. These data have been smoothed using either the weighted average or exponential smoothing technique. The same smoothing technique (including the actual values of the smoothing constants) is used to smooth both the current/past flow data and the corresponding current/past arrest data. The program "knows" to do this because the data file for the projected arrests has the type of smoothing technique used and smoothing constant(s) as elements (see Appendix F, Data File Structure).

As an example, if there are five years of arrest and flow data (current/past), these five years are "smoothed" into a new value for the most recent year of data:

Flow

F_{ih} 1975, 1976, 1977, 1978, 1979 → Smoothed Linear Combination → SF_{ib}

Smoothed Flow

Arrests

A_{ih} 1975, 1976, 1977, 1978, 1979 → Smoothed Linear Combination → SA_{ib}

Smoothed Arrests

Where F = Flow
A = Arrests
SF = Smoothed Flow
SA = Smoothed Arrests
i = age grouping
h = historical year
b = Smoothed base year, i.e. the new smoothed value for the most recent year of data, in this example 1979

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Using these new smoothed base year data, the future flows are estimated by:

$$FF_{if} = \frac{SA_{if}}{SA_{ib}} \cdot SF_{ib}$$

Where FF = Future Flow
f = Future year

APPENDIX D

METHODOLOGY FOR PRISON POPULATION PROJECTION

METHOD I - DETERMINISTIC MODEL

THEORETICAL FOUNDATION

The prison population of a given jurisdiction at a future point in time is a function of three factors:

1) Current inmate population
2) Number of new commitments over the years
3) Expected average duration of inmate stay prior to departure over the years

The model used in the prison population program incorporates these three factors and is essentially a variation of that described by Stollmack* and Blumstein**. The model can be viewed as a combination of two equations. The first equation is that of a "simple death process model," that is, without intakes, how many inmates would be left at the end of year t given an initial prison population P_o. Assuming that the length of stay in prison is exponential (Stollmack, p 145), the reduction of the initial population, P_o, over the course of a year can be expressed as follows:

$$R_t = P_o e^{-1/T_t} \qquad (1)$$

Where: R_t = Number of inmates remaining at end of year t
T_t = Average length of stay in prison for year t

The second equation is that of a "queuing" process. That is, given an initial prison population of zero, what would the population, due solely to the arrival of inmates, be at the end of the year. Assuming this process can be considered a Poisson process (Stollmack, p 145-147), the number of inmates active at the end of the year (of those inmates who arrived during the year) can be expressed as follows:

$$A_t = C_t \cdot T_t \ (1-e^{1/T_t}) \qquad (2)$$

Where A_t = Number of inmates active at the end of year t who arrived during the course of year t
C_t = Number of commitments (intake) during year t
T_t = Average time served in prison

*Stollmack, Stephen, "Predicting Inamte Population from Arrest, Court Disposition, and Recidivism Rates," Journal of Research in Crime and Delinquency, Volume 10, Number 2, July 1973, pp. 141-162.

**Blumstein, A., Cohen, J., and Miller, H.D. Demographically Disaggregated Projections of Prison Populations. Urban Systems Institute, Carnegie-Mellon University, 1980, p.12.

The total inmate population at the end of year t can be expressed as the sum of these two processes:

$$P_t = A_t + R_t \qquad (3)$$

Where: P_t = Total inmate population at the end of year t
R_t = Number of inmates remaining at the end of year t from the initial prison population
A_t = Number of inmates added by the intake process and still remaining at the end of year t.

Substituting equations 1 and 2 into 3, we obtain:

$$P_t = C_t \cdot T_t(1-e^{-1/T_t}) + P_o e^{-1/T_t} \qquad (4)$$

This equation can alternatively be expressed in more general form in order to estimate future populations as:

$$P_f = C_f \cdot T_f(1-e^{-1/T_f}) + P_{f-1}e^{-1/T_f} \qquad (5)$$

P_f is the estimated prison population at the end of future year f. P_{f-1} is the prison population at the end of the year prior to year f. The term "P_{f-1}" can be expanded to:

$$P_{f-1} = C_{f-1} \cdot T_{f-1}(1-e^{-1/T_{f-1}}) + P_{f-2}e^{-1/T_{f-1}} \qquad (6)$$

This expansion is continued until $P_{f-x} = P_o$. For example, if the initial year of prison population is 1980, and the year to be projected is 1990:

f = 1990
f-5 = 1985
f-10=fo = 1980

Thus, altogether, there are 10 "terms" to be evaluated to obtain P_f.

Equation 5 can be disaggregated by age grouping (as well as by race and crime type although this is not explicitly done in the program) to allow for possible differences in length of stay and commitment rates among age cohorts (i):

$$P_{if} = C_{if} \cdot T_{if}(1-e^{-1/T_{if}}) + P_{if-1}e^{-1/T_{if}} \qquad (7)$$

The programs allow the user to disaggregate the prison populations by age group. However, while they do not explicitly allow for disaggregation of Equation 5 by race, the disaggregation is implicit if the Arrest Projection program with race adjustment factor is used. Disaggregation by crime type is also possible using this program as will be discussed subsequently.

HOW THE PROGRAM WORKS

Equation 7 describes the mathematical algorithm that is used to calculate the prison population projections according to Method I in the Prison Population Projection program. This section discusses what data must be input and how the program uses the data in the calculations.

Program Options

Generally speaking, the following information is required to calculate the projections:

1) Base year of prison population
2) Projected commitments
3) Expected length of stay for years to be projected

The projected commitments can be obtained in two different ways, and using different data sets, corresponding to two different options available in the program:

OPTION 1 - COMMITMENT PROBABILITIES. This method for obtaining projected commitments uses projected arrests plus commitment probabilities. That is:

$$C_{if} = A_{if} \cdot P_{if}$$

or

$$C_{if} = A_{if} \cdot P1_{if} \cdot P2_{if} \cdot P3_{if}$$

Where: C_{if} = Commitments for age grouping i and future year f
P_{if} = Probability of incarceration given arrest for age grouping i and future year f
$P1_{if}$ = Probability of indictment given arrest for age grouping i and future year f
$P2_{if}$ = Probability of conviction given indictment for age grouping i and future year f
$P3_{if}$ = Probability of incarceration given conviction for age grouping i and future year f

Therefore, two data sets are required in order to obtain projected prison commitments:

a) Projected arrests
b) Commitment probabilities

To obtain these the Arrest Projection and Prison Parameter Entry programs are run (see the appropriate sections for details).

Additionally, it is necessary to enter current/past prison population and arrest data in order to generate base year data to start the model (see Program Calulations section below).

In summary, for OPTION 1, the following data sets need to be entered:

1) Current/past prison population
2) Current/past arrests
3) Projected arrests
4) Commitment probabilities
5) Expected length of stay

OPTION 2 - PROJECTED COMMITMENTS. Under this option, the projected commitments are entered directly; no commitment probabilities are specified. Use of this option requires the prior projection of future commitments with the Flow Projection program (using a data set of current/past commitments).

OPTION 2 requires the following data sets:

1) Current/past prison population
2) Current/past prison commitments
3) Projected commitments
4) Expected length of stay

Program Calculations (for both OPTION 1 and OPTION 2)

We can consider a hypothetical program run with years to be projected (1985, 1990, 1995) and base year (1980). These years are not contiguous, but the algorithm requires contiguous years of data. Therefore, the program fills in data for the intervening years (1981-84, 1986-1989, 1991-1994). Number of arrests and commitment data (if commitments are used instead of commitment probabilities) are calculated for the intervening years by linear extrapolation, e.g. Data 1981 = Data 1980 + 1/5 (Data 1985-Data 1980).

The prison parameters (length of stay and commitment probabilities) are distributed to intervening years in the following manner:

1980 ← 1985 ← 1990 ← 1995

In other words, if a length of stay value for 1985 is 20.4 months, this will be used for 1981-1984 also. The same thing holds for commitment probabilities for 1985.

Remember (see Section IX), the same length of stay values and commitment probability values can be used for all years, if desired.

"Disaggregating" by Crime Type

The program is set up to allow for summation of separate projections. For example, perhaps separate prison population projections for murder, robbery, and aggravated assault are desired because of the different length of stay and commitment probability values for each crime type. The program will keep a running total (when this option is selected in the command menu) of the prison population projections. Data can be saved and/or printed at each stage of aggregation.

METHOD II - AVERAGE DAILY POPULATION

This projection method is a variation of the one used by the Pennsylvania Commission on Crime and Delinquency.* This method assumes that there is a direct relationship in a given year between the average daily prison population (ADP) and the number of prison commitments in the same year. Therefore, the average daily prison population (ADP) for some future year f and age grouping i is equal to the commitments for year f times the ratio for a base year b of the ADP to the actual number of commitments for the same year:

$$ADP_{if} = ADP_{ib} \cdot C_{if}/C_{ib}$$

There are two methods available for obtaining the commitment data for this formula:

OPTION 1 - COMMITMENT PROBABILITIES. This method for obtaining projected commitments uses projected arrests plus commitment probabilities:

$$C_{if} = A_{if} \cdot P_{if}$$

or

$$C_{if} = A_{if} \cdot P1_{if} \cdot P2_{if} \cdot P3_{if}$$

Where: P_{if} = Probability of incarceration given arrest
$P1_{if}$ = Probability of indictment given arrest
$P2_{if}$ = Probability of conviction given indictment
$P3_{if}$ = Probability of incarceration given conviction

for future year f and age grouping i.

With this option the following dats sets are required:

1) Base year of average daily population
2) Base year of commitments
3) Projected arrests
4) Commitment probabilities

*Pennsylvania Commission on Crime and Delinquency, An Analysis of the Adequacy of Our Current State Correctional Facilities Now and in the Future, January, 1980.

OPTION 2 - PROJECTED COMMITMENTS. If the flexibility of using commitment probabilities is not desired, the Flow Projection program can be used to calculate projected commitments given current/past commitments.

With this option the following data sets are required.

1) Base year of average daily population
2) Base year of commitments
3) Projected commitments

APPENDIX E

METHODOLOGY FOR PEAK PRISON POPULATION PROJECTION

METHODOLOGY FOR PEAK PRISON POPULATION PROJECTION

The derivation of the formula for calulating the "Peak" or "Asymptotic" prison population is outlined below. This methodology was suggested by Daryl Fischer (Iowa Statistical Analysis Center) as a concise and useful planning tool.

P_f = Active future prison population

A = Annual admission (commitments)

R = Rate of outflow = $\frac{\text{Annual Releases}}{\text{Beginning Population}} = \frac{RE}{P_o}$

If annual admissions and release rates are assumed to remain steady, then it can be shown that:

$P_f = \frac{A}{R}$, for $0 < R < 1$

To arrive at this formula:

Let "not released rate" = 1-R

Therefore, the prison population at the end of the first year is equal to the initial population times the "not released rate" plus the number of admissions:

$P_1 = P_o(1-R) + A$

Now, at the end of the second year:

$P_2 = P_1(1-R) + A$

Substituting for P_1:

$P_2 = \left[P_o(1-R) + A\right](1-R) + A$

Expanding the equation:

$P_2 = P_o(1-R)^2 + A(1-R) + A$

Following the same procedure to obtain P_3:

$P_3 = P_2(1-R) + A$

and substituting for P_2 gives:

$P_3 = P_o(1-R)^3 + A(1-R)^2 + A(1-R) + A$

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Extrapolating this process to year "n":

$$P_n = P_o(1-R)^n + A(1-R)^{n-1} \ldots + A(1-R) + A^*$$

As n increases, and when $0 < R < 1$, the term $(1-R)^n$ becomes insignificant. Therefore, the nth term can be dropped and so:

$$P_n = A\left[(1-R)^{n-1} + (1-R)^{n-2} \ldots + (1-R) + 1\right]$$

Using the infinite series formula:

$$\frac{1}{1-x} = 1 + x + x^2 \ldots + x^n + \ldots, \quad -1 < x < 1$$

and substituting 1-R for x:

$$\frac{1}{1-(1-R)} = \frac{1}{R}$$

we get

$$P_n = A\left(\frac{1}{R}\right) = \frac{A}{R}$$

and so $P_f = \frac{A}{R}$ for $0 < R < 1$ and as n approaches ∞.**

An alternative formulation of the release rate can also be used, namely:

$$R \cong \frac{12}{T}$$

Where T = time served (in months).

The projection formula then becomes:

$$P_f = AT/12 \quad \text{for } 0 < R < 1$$

In running the program Peak Prison Population Projection, the user enters the initial prison population (P_o), a range of annual admissions (A) and either a range of annual releases (RE) or a range for average time served (T). The active "peak" future prison population is then calculated as specified above for the range of values entered.

*This entire formula is used when the program option to project a specific year is chosen.

**See Table E-1 for number of years needed to approach zero by value of R.

Table E-1

NUMBER OF YEARS FOR $(1-R)^n$ TO APPROACH ZERO BY VALUE OF R

VALUE OF R (Release Rate)	EQUIVALENT LENGTH OF STAY (months)	NUMBER OF YEARS FOR $(1-R)^n$ TO APPROACH ZERO	NUMBER OF YEARS FOR $(1-R)^n$ TO APPROACH .001
.1	120.0	30+	30+
.2	60.0	30+	30
.3	40.0	27	19
.4	30.0	19	13
.5	24.0	13	10
.6	20.0	11	8
.7	17.1	8	6
.8	15.0	6	5
.9	13.3	5	3

APPENDIX F

DATA FILE STRUCTURE

DATA FILE STRUCTURE

The various "Data Entry and Display" programs in this package automatically create sequential data files from the information gathered from interactive querys and the screen edit/ entry routines. In addition to the raw data elements of arrests, system flows, prison populations, etc., each file contains important information about the structure and labelling of data (see Table F-1). This structure/labelling information is used by each program to set up screen edit or entry displays in the correct format and to create compatible structures for new file creation (e.g., use the state population file previously created as a model for the number of age groupings, age labels, number of years, year labels, etc., for an arrest data file).

Table F-1 outlines the structure of all data files used in the projection package.

Notice that many of the variable labels are in "array" format. For example, the variable for current/past year labels is YP$*(J), indicating there are "J" number of year labels. (In this package, "J" is equal to "YP" or "YF", the number of years of data in the file). The variable "C(J,I)" is the number of arrests for each year (J) and each age group (I=GP) within each year. Thus, if YP=5 and GP=12 there would be 60 values for the array C(J,I).

As you've probably noticed, variable labels for "current/past" and "future" data differ slightly. The following is a list of the differences:

	Current/past	Future
# of years	YP	YF
year labels	YP$(J)	YF$(J)
# of age groupings	GP	GF
# of Juv age groupings	JP	JF
Total pop by year	PP(J)	PF(J)
Pop by year/age	QP(J,I)	QF(J,I)

---

*A "$" indicates a variable should be treated as having character values rather than numeric values.

Table F-1

SEQUENTIAL DATA FILE STRUCTURE

VARIABLE LABELS	POPULATION (current/past)	POPULATION (future)	ARRESTS (current/past)	ARRESTS (projected)	SYSTEM FLOW (current/past)	PRISON POP (current/past)	COMMITMENT PROBABILITIES (future)	LENGTH OF STAY (future)	AVG DAILY PRISON POP (current/past)
Crime Type/Flow Type			CR$	CR$	F$	CR$	CR$	CR$	CR$
Jurisdiction Name	JR$	JR$	JR$	JR$	JR$	JR$	JR$	JR$	JR$
Number of Years of Data (=J)	YP	YF	YP	YF	YP	YP	YF	YF	YP
Jurisdiction Population (By Year)			JUR(J)						
Year Labels	YP$(J)	YF$(J)	YP$(J)	YF$(J)	YP$(J)	YP$(J)	YF$(J)	YF$(I)	YP$(J)
Total Number of Age Groups (=I)	GP	GF	GP	GF	GP	GP	GF	GF	GP
Number of Juvenile Age Groups	JP	JF	JP	JF	JP	JP	JF	JF	JP
Age Group Labels	AG$(I)	AG$(I)	AG$(I)	AG$(I)	AG$(I)	AG$(I)	AG$(I)	AG$(I)	AG$(I)
Data by Race? (y/n)	R$	R$	R$	R$	R$	R$			R$
* If PV=3, Then Separate Prob's							PV		
Total Population by Year	PP(J)	PF(J)							
Data by Year (J) and Age Group (I)	QP(J,I)	QF(J,I)	C(J,I)	SM(J,I)	F(J,I)	PC(J,I)	PT(J,I)	LS(J,I)	AD(J,I)
* Indictment Probabilities by Year and Age							P1(J,I)		
* Conviction Probabilities by Year and Age							P2(J,I)		
* Imprisonment Probabilities by Year and Age							P3(J,I)		
Ratio of PP(J)/JUR(J)				M(J)					
Smoothing Weights				WG(J)					
Exponential Smoothing Constant				A1					
If R$='Y' White Population by Year and Age	W(J,I)	W(J,I)							
If R$='Y' Non-White Population by Year and Age	NW(J,I)	NW(J,I)							
If R$='Y' White Juveniles by Year			WJ(J)		WY(J)	WY(J)			NY(J)
If R$='Y' Non-White Juveniles by Year			NJ(J)		NY(J)	NY(J)			NY(J)
If R$='Y' White Adults by Year			WA(J)		WO(J)	WO(J)			WO(J)
If R$='Y' Non-White Adults by Year			NA(J)		NO(J)	NO(J)			WO(J)

END