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A COMPUTER PROGRAMME FOR POPULATION PROJECTIONS  
USING THE COMPONENT METHOD

(Prepared by the Population Division, Department of Economic and  
Social Affairs of the United Nations Secretariat)

CONTENTS

	<u>Pages</u>
I. BASIC MODEL	1
II. TYPES OF PROJECTION	1-2
III. INPUT DATA REQUIREMENTS	3
IV. OUTPUTS	4
<del>V. OPERATION PHASES OF THE PROGRAMME</del>	<del>4-7</del>
VI. PROGRAMME SIZE AND TIME REQUIREMENT	7
APPENDIX I INPUTS AND OUTPUTS SPECIFICATIONS	1-3
APPENDIX II CARD FORMATS OF INPUT DATA	1-10
APPENDIX III THE COMPUTER PROGRAMME FOR POPULATION PROJECTIONS	1-33
APPENDIX IV LIFE TABLES SURVIVAL RATIOS OF THE UNITED NATIONS AND THE "WEST", "NORTH", "EAST", and "SOUTH" OF THE COALE AND DEMENY MODEL LIFE TABLES	1-21

## A COMPUTER PROGRAMME FOR POPULATION PROJECTIONS USING THE COMPONENT METHOD

1. This paper presents a computer programme for making population projections using the component method. The basic outlines of the programme have been described in an earlier working paper of the Population Division entitled Demographic projections with the aid of computers (ESA/P/WP.40). The present paper describes the types of projection that this programme can do, information that it will generate, the steps of projection, the specifications of input and output data, input data card formats, and the projection programme in Fortran-IV language.

### I. BASIC MODEL

2. The basic model of the programme is a forward and backward projection model. The programme provides either a forward projection, a backward projection, or a combination of a forward and a backward projection for a period of up to 50 years. It utilizes the information on the age-sex distribution of a population at a base moment and the assumed levels and trends of fertility, mortality, and migration to project populations by age and sex for every fifth year of the selected projection period. It computes various demographic indicators for each of the quinquennial projection intervals and draws population pyramids for selected dates. In each run of the programme, a sequence of projections for different variants of fertility, mortality, and migration assumptions can be made.

### II. TYPES OF PROJECTION

3. The basic types of projection are the forward and the backward projections. In many cases, one may wish to print certain readily available population data obtained from other sources along with the projected population on the same computer printouts so that it presents a continuous series of population estimate in one table, the programme provides seven different types of variation for such needs. These types are described as follows:

1) Type 0: A forward projection. The forward projection projects the population to the future. It makes use of the life table survival ratios to survive each age group of a population at a given date to a date five years later. The number of births expected in the given quinquennial projection interval is derived by applying the assumed age-specific fertility rates to the average female populations in the child-bearing ages of this interval. These fertility rates are either a part of the input fertility data or calculated by the computer based upon the input fertility indicators. The estimated number of deaths for a projection interval is the difference between the initial population total plus the expected births in this interval and the terminal population

totals.<sup>1/</sup> Estimated numbers of net-migrants (immigrants minus emigrants) are added to the terminal population. The base date of projection is the initial date of the entire projection period.

2) Type 1: A backward projection. The backward projection projects the population to the past. It makes use of the life table survival ratios to revive each age group of a population at a given date to a date five years earlier. The number of births estimated for a projection interval is obtained by reviving the population aged 0-4 at the end of the projection interval to their births. The number of deaths estimated for the five-year period is the difference between the initial population total plus the estimated births in this interval and the terminal population total. Estimated numbers of net-migrants for each interval are subtracted from the base population initial population before the population is projected backward. The base date of the projection is the last date of the entire projection period.

3) Type 2: A forward-backward projection. It combines the forward and the backward projections in one operation. The base date which is the same for both the forward and the backward projections may be any date in the projection period that differs from the beginning or the end date of the projection by a multiple of 5.

4) Type 3: The programme makes a forward projection and prints out other input population data for those dates before the base date.

5) Type 4: The programme only prints out the input population data. No projections are made.

6) Type 5: The programme makes a backward projection and prints out other input population data for those dates after the base date.

7) Type 6: A forward-backward projection with two base dates; one for the forward projection and one for the backward projection. These two base dates should be aparted by a multiple of 5. The programme also prints out all other input population data for those dates between the two base dates.

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<sup>1/</sup> Estimates of crude birth rates, crude death rates and expectations of life at birth, regions and countries, 1950-1965 (ESA/P/WP.38).

### III. INPUT DATA REQUIREMENTS

4. Input data consist of two kinds of data: one is the stock data and the other is the flow data. The stock data are the population data by age and sex and the flow data are those of migration, fertility, and mortality. Detailed specifications of the data and input data card formats are given in appendices I and II.

1) Population: Population data should be classified by sex and five-year age groups. The last age group is age 80 and over.

2) Migration: This is the number of net-migrants (immigrants minus emigrants) assumed to occur in the given projection intervals. The age-sex distribution of migrants should be classified in the same manner as the population data. If no migration is assumed, this part of input is not needed.

3) Fertility: Fertility data consist of two parts: they are the sex ratio at birth and the quinquennial average age-specific fertility rates for each projection interval. If estimated age-specific fertility rates are not available, the assumed levels of fertility represented by gross reproduction rates and the age pattern of fertility rates which is the percentage distribution of age-specific rates are needed. If the type of projection does not involve any forward projection (types 1, 4, and 5), this part of input is not needed.

4) Mortality: Mortality data consist of two parts: they are the expectations of life at birth ( $e_0$ ) for each sex and the survival ratios by age and sex, for each projection interval. It is preferable that the  $e_0$  for males, females, and both sexes are all given as input mortality data.<sup>1/</sup> If only  $e_0$  for both sexes is available, the computer programme will calculate the  $e_0$  for males from that for both sexes according to the relationship provided of male  $e_0$  and female  $e_0$  provided in the model life tables.<sup>2/</sup> The survival ratios may be selected from a national life table or from the model life tables. Survival ratios of five model life tables, viz., the United Nations, and the "West", the "North", the "East", and the "South" models of the Coale and Demeny regional model life tables will be stored in the computer at the beginning of the projection if they are needed.

<sup>1/</sup> The expectation of life at birth for both sexes is not a necessary input information for input if the  $e_0$  for males and females are given. If the former is not given, the programme will compute it from the given  $e_0$  of males and females according to their relationship provided in the model life tables.

<sup>2/</sup> These model life tables are the United Nations model life tables and the four regional model life tables. See Methods for Population Projections by sex and Age, Table V (United Nations publication, Sales No. 56.XIII.3) and Coale, A. and Demeny, P., Regional Model Life Tables and Stable Populations (Princeton, Princeton University Press, 1966)

#### IV. OUTPUTS

5. The following outputs are provided by the programme; their specifications are given in appendix I.

- 1) Population by age and sex for every fifth year of the projection period.
- 2) Percentage distribution of population by age and sex for each fifth year of the projection period.
- 3) Sex ratios by age for each fifth year of the projection period.
- 4) Average annual rates of growth for each quinquennial projection interval.
- 5) Implied crude birth rates, crude death rates and natural rates of increase for each projection interval.
- 6) Estimated numbers of births and deaths for each projection interval.
- 7) Gross reproduction rates, general fertility rates, and total fertility rates for each projection interval.
- 8) Dependency ratios, child-women ratios, median ages for every fifth year of the projection period.
- 9) Age pyramids for population at the base, the initial, and the terminal dates.

#### V. OPERATION PHASES OF THE PROGRAMME

6. The operations of the programme consist of the following four phases: input, projection, output, and continuation.

##### A. Input phase

7. At the very beginning of the operation, an input card indicating whether the model life table survival ratios are needed in the projection is read by the computer. If the survival ratios are needed, the programme stores all five model life table survival ratios in the computer memory. The subroutine PROJET is then called to start the projection. In each projection run, the programme reads one parameter card. This card contains such information as the name of the population a numeric code for the population (optional), the time period covered by the projection, the base date(s), dates that migrations are assumed, the type of projection, the type of mortality input, the type of fertility inputs, and details of input age distribution. If there are any remarks to be noted for this projection, they may be recorded in the next three cards and will be printed out along with all input information.

8. The programme now begins to read the age-sex distribution of the base population and, if any, other given input population data that are to be printed out along with the projected populations. The input data should be arranged consecutively according to the date of each population in an ascending order. An accuracy check is made to discover whether there are any punching errors on the input data cards. This is to compare the input population totals, for each sex, with the totals that are added from each age group of the input data and print out their differences.

9. A second parameter card is read. This card instructs the computer to read the first variant of migration, fertility, and mortality inputs and whether there is a second variant of the projection that is to be made using the same base population. It also indicates whether migration is assumed for this variant of projection. If it is, whether a new set of migration data or the same set of migration data used in the previous variant is again used in this variant.

10. Migration inputs are read in after the second parameter card if they are assumed. The format and the arrangement of the input migration cards should follow the same manner as the population data. The starting date of migration is the first date of those quinquennial projection intervals for which migrations are assumed. The ending date of migration is the last date of those projection intervals for which that migration are assumed. For example, if migrations are assumed for 1970-75, 1975-80, and 1980-85, the first date of migration is then 1970 and the ending date is 1985. The programme also allows migration inputs to be read in two separated parts if those migration intervals are not connected together. For example, if migrations are assumed for 1965-1970, 1970-75, 1985-90, and 1990-95, the starting date of migration is 1965, the ending date for the first group of migration is 1975, the starting date of the second group of migration is 1985 and the ending date is 1995. After the data are read in, the computer programme makes an accuracy check to detect whether there are any punching errors on the data cards. If no migration is assumed, the computer will ignore this part of the programme.

11. Fertility inputs are read in next. If the inputs are not age-specific fertility rates, the programme then calculates these rates based upon the given input fertility information, viz., the gross reproduction rates and the assumed pattern of fertility rates.

12. Mortality inputs are read in after the fertility inputs. If model life table survival ratios are to be used, the programme begins the selection of survival ratios based upon the given values of  $e_0$  and the desired model life tables. In this selection, if a given  $e_0$  exceeds the range of  $e_0$  stored in the computer, a message "SELECTED EXPECTATION OF LIFE AT BIRTH FOR MALES (or FEMALES, BOTH SEXES) FOR XX - XX EXCEEDS THE RANGES OF MODEL LIFE TABLES" will appear and the projection for this variant is terminated. The next variant of projection, if any, will commence. The XX-XX indicates the projection interval that the computer has encountered first in which a value of  $e_0$  is not acceptable to the computer. The acceptable ranges of  $e_0$  for various model life tables are as follows:

<u>Model Life Tables</u>	$e_0$ (in Years)	
	Males	Females
United Nations	19.80 - 72.65	20.20 - 75.19
West	18.03 - 73.00	20.00 - 77.50
North	17.55 - 74.43	20.00 - 77.50
East	17.43 - 72.74	20.00 - 77.50
South	19.92 - 73.60	20.00 - 77.50

### B. Projection phase

13. After all input data are stored in the computer memory, the programme calls the subroutine PROJCT to start population projections. Each age group of the base population will be survived or revived with appropriate survival ratios according to the type of projection that is instructed. The projected population will be used as the new base population to carry out further projection until the last date of the projection is reached. Single year age distribution for ages 5-24 may be obtained through interpolation by using Sprague Multipliers which have been stored in the computer memory. To do this, the programme calls the subroutine SPRAQ. Various demographic measures such as the crude birth rates, crude death rates, rates of natural increase, average annual rates of growth, child-women ratios, dependency ratios, median ages, total fertility rates, general fertility rates, net reproduction rates, etc., are calculated during the projection phase.

### C. Output phase

14. The programme prints out all the results of the projection after the projection phase is completed. This is done by calling a series of subroutines. The names and functions of these subroutines are as follows:

- AGECOM - Prints out projected population distribution, by age and sex.
- SEXDIS - Prints out the percentage distribution of the projected population, by age and sex and the sex ratios by age.
- PYRMAD - Prints out three age pyramids, one for the initial population, one for the base population, and one for the terminal population.
- SUMMA - Prints out a summary table which gives various demographic measures.

D. Continuation phase

15. The computer is now ready to make projections for the next variant. If there are no other variants or projections to be made, the programme will stop the operation.

VI. PROGRAMME SIZE AND TIME REQUIREMENT

16. The programme size is 130K. For one projection with four variants, an IBM 370/145 machine runs about 2 minutes.



## APPENDIX I

### INPUTS AND OUTPUTS SPECIFICATIONS

#### I. INPUTS

- A. Population by age and sex.
  1. Population -- full unrounded numbers.
  2. Age -- 1) five-year age groups: 0-4, 5-9 ... 75-79, and 80 and over.  
2) single years: 5, 6, ... 24 (if available).  
3) total.
  3. Sex -- males, females.
- B. Net migration (immigration minus emigration) by age and sex
  1. Migrants -- full unrounded numbers.
  2. Age -- 1) five-year age groups: 0-4, 5-9 ... 75-79, 80 and over.  
2) total.
  3. Sex -- males, females.
- C. Fertility data (for forward projections only)
  1. Sex ratio at birth (males per 1,000 females)
  2. Gross reproduction rates per mother, with two significant digits after the decimal point.
  3. Birth rates by age of mother, if available.
    - 1) Birth rates -- per woman, with three significant digits after the decimal point.
    - 2) Age -- five-year age groups: 15-19, 20-24 ... 45-49.
  4. Assumed age pattern of fertility (assumed age-specific birth rates expressed as a ratio of their total). Needed only when age-specific birth rates are not available.
    - 1) Distribution -- per unit, with three significant digits after the decimal point.
    - 2) Age -- five-year age groups: 15-19, 20-24 ... 45-49.

D. Mortality Data

1. Expectations of life at birth in years, with two significant digits after the decimal point for males, females and both sexes.
2. Life table survival ratios by age groups and sex.
  - 1) Survival ratios - per unit, with five significant digits after the decimal point.
  - 2) Age groups - birth to 0-4 to 5-9 ... 70-74 to 75-79 and 75 and over to 80 and over.
  - 3) Sex - males, females.

II. OUTPUTS

A. Population by age and sex for every fifth year of the projection period.

1. Population - number in thousand persons.
2. Age - 1) five-year age groups: 0-4, 5-9 ... 75-79, and 80 and over.
  - 2) single years: 5, 6, ... 24.
  3. total.
3. Sex - males, females, both sexes.

B. Percentage distribution of population by age and sex for every fifth year of the projection period.

1. Distribution:
  - 1) Total population of both sexes equals to 100, with two digits after the decimal point.
  - 2) Total population of each sex equals to 100, with two digits after the decimal point.
2. Age - 1) Five-year age groups: 0-4, 5-9, ... 75-79 and 80 and over.
  - 2) Total.
3. Sex - males, females, both sexes.

C. Sex ratios by age, for every fifth year of the projection period.

1. Sex ratios - per 100 females, with two digits after the decimal point.
2. Age - 1) Five-year age groups: 0-4, 5-9, ... 75-79 and 80 and over.
  - 2) Total.

D. Estimated numbers of births and death for each quinquennial projection interval.

- Numbers: in thousand persons.

E. Various demographic measures.

1. For every fifth year of the projection period:

- 1) Dependency ratios - per 1,000 working-age population with one digit after the decimal point.
- 2) Child-women ratios - per woman, aged 15-49 with 3 digits after the decimal point.
- 3) Median age - in years, with 2 digits after the decimal point.

2. For each quinquennial projection interval:

- 1) Crude birth rates - per 1,000 persons with 2 digits after the decimal point.
- 2) Crude death rates - per 1,000 persons with 2 digits after the decimal point.
- 3) Rates of natural increase - per 1,000 persons with 2 digits after the decimal point.
- 4) Average annual rates of growth - per cent, with 3 digits after the decimal point.
- 5) Net reproduction rates - per mother, with 3 digits after the decimal point.
- 6) Total fertility rates - per 1,000 women aged 15-49, with one digit after the decimal point.
- 7) General fertility rates - per 1,000 women aged 15-49, with one digit after the decimal point.

## Appendix II

### CARD FORMATS OF INPUT DATA

Input data cards consist of three parts: the first part is a control card which indicates whether model life table survival ratios are needed in the projection, the second part is the survival ratios from the five model life tables, and the third part is the projection assumptions. The card formats are given below. The order of description of the card formats is also the order of input cards that should be arranged.

#### Part I. The control card.

The format of this card is as follows:

Card No.	Column	Form	Meaning
1	1	An integer, either 0 (or blank), 1, or 2	Whether model life table survival ratios are needed in the projection. 0 (or blank) - not needed. 1 - needed, survival ratios from the five model life tables will not be printed out after the projection is completed. 2 - needed, survival ratios from the five model life tables will be printed out after the projection is completed.

#### Part II. Model life table survival ratios.

If model life table survival ratios are not used in the projection, i.e., the control card has a value "0" or is a blank card, this part of input cards is not needed. If the control card has a value of either "1" or "2", model life table survival ratios should be punched in the following formats:

Card No.	Column	Form	Meaning
1	1-3	Blank	United Nations model life table survival ratios, level 0, males
	4-10	A number with decimal point	Expectation of life at birth.
	11-17	"	Survival ratio, birth to aged 0-4
	18-26	"	Survival ratio, aged 0-4 to aged 5-9
	27-31	"	Survival ratio, aged 5-9 to aged 10-14
	32-38	"	Survival ratio, aged 15-19 to aged 20-24
	39-52	"	Survival ratio, aged 20-24 to aged 25-29
	53-59	"	Survival ratio, aged 25-29 to aged 30-34
	60-66	"	Survival ratio, aged 30-34 to aged 35-39
	67-73	"	Survival ratio, aged 35-39 to aged 40-44
	74-80	"	Survival ratio, aged 40-44 to aged 45-49

Card No.	Column	Form	Meaning
2			United Nations model life table survival ratios, level 0, males
	1-3	Blank	
	4-10	A number with a decimal point	Survival ratio, aged 45-49 to 50-54
	11-17	"	" " " 50-54 to 55-59
	18-24	"	" " " 55-59 to 60-64
	25-31	"	" " " 60-64 to 65-69
	32-38	"	" " " 65-69 to 70-74
	39-45	"	" " " 70-74 to 75-79
	46-52	"	" " " 75+ to 80+
	53-80	Blank	
3	Same as card 1, for UN mortality level 5		
4	Same as card 2, for UN mortality level 5		
49-96	Same as cards 1-48, for females.		

Each model life table has 24 levels of mortality; 2 cards are needed to record the survival ratio for each sex. Thus each model life table has 96 cards and five model life tables have 480 cards. The first group of survival ratio cards are those of the United Nations followed by the West, North, East and the South models of the Coale and Demeny models. The first West model survival ratio card (card No. 97) should be placed immediately after the last United Nations model survival ratio card (card No. 96) and the first North model survival ratio card (card No. 193) should be placed immediately after the last West model survival ratio card (card No. 192), etc.

## Part III. Projection Assumption

I. Parameter Card: The programme reads one parameter card which should be punched in the following format:

Card No.	Column	Form	Meaning
1	1-6	A positive integer	Identification (optional).
	7-34	Any 28 characters	Name of the population.
	35-38	A positive integer	Starting date of projection.
		in the form of "1955"	
	39-42	Same as above	First base date of the projection (needed only in types 2, 3, 5 and 6 runs).
	43-46	Same as above	Second base date of the projection (needed only in type 6 run).
	47-50	Same as above	Ending date of projection.
	51-54	Same as above	Starting date of migration.
	55-58	Same as above	Ending date of the first group of migration.
	59-62	Same as above	Starting date of the second group of migration.
	63-66	Same as above	Ending date of the second group of migration (this is the ending date of the first group of migration if there is no second group of migration).
	67	An integer, either 0, 1, 2, 3, 4, 5, or 6	Type of projection (see text, para. 3) 0 - forward projection. 1 - backward projection. 2 - forward-backward projection. 3 - a forward projection with printouts of other input population data. 4 - prints out input population data, no projection is making. 5 - a backward projection with printouts of other input population data. 6 - a forward and a backward projection with printouts of other input population data.
	68	An integer, either 0, 1, or 2	Whether single year age data for 5 to 24 are given in the input population and whether single-year data for 5 to 24 are needed in output. 0 - not given in input data, prints out single-year age data. 1 - given in input data, prints out single-year age data. 2 - not given in input, prints out only five-year age data.

Card No.	Column	Form	Meaning
1	69	An integer, either 0, 1, 2, 3, 4, or 5	Life table to be used: 0 - Other life table. 1 - United Nations model life table. 2 - West model life table. 3 - North model life table. 4 - East model life table. 5 - South model life table.
	70	Blank	
	71	An integer, either 0 or 1	Type of fertility data given: 0 - only percentage distribution of age-specific fertility rates are given. 1 - Age-specific fertility rates are given
	72-79	Blank	
	80	An integer, either 0 or 1	Whether projection is to be continued: 0 - No more projection to be made. 1 - Another projection to be made.

II. Remark cards: Any remarks about this projection may be punched on the next three cards. If there are no remarks, three blank cards should be placed after the parameter card.

III. Base Population Cards: The following seven cards contain the population by age and sex of the base year.

Card No.	Column	Form	Meaning
1	1-10	Any 10 characters or blank	Identification (optional).
	11-22	A number, right justified	Total population, males.
	23-34	A number, right justified	Total population, females.
	35-80	Blank	
2	1-10	Any 10 characters or blank	Identification (optional).
	11-20	A number, right justified	Population aged 0-4, males
	21-30	"	" 5-9, "
	31-40	"	" 10-14, "
	41-50	"	" 15-19, "
	51-60	"	" 20-24, "
	61-70	"	" 25-29, "
	71-80	"	" 30-34, "

Card No.	Column	Form	Meaning
3	1-10	Any 10 characters or blank	Identification (optional).
	11-20	A number, right-justified	Population aged 35-39, males
	21-30	"	" 40-44, "
	31-40	"	" 45-49, "
	41-50	"	" 50-54, "
	51-60	"	" 55-59, "
	61-70	"	" 60-64, "
	71-80	"	" 65-69, "
4	1-10	Any 10 characters or blank	Identification (optional).
	11-20	A number, right-justified	Population aged 70-74, males
	21-30	"	" 75-79, "
	31-40	"	" 80 & over, males
5	Same as card 2; this is for the female population.		
6	Same as card 3; this is for the female population.		
7	Same as card 4; this is for the female population.		

If single years of age from 5 to 24 for the base population are also given these data should be punched in the following format and placed immediately after card 7.

Card No.	Column	Form	Meaning
8	1-10	Any 10 characters or blank	Identification (optional).
	11-20	A number, right justified	Population age 5, males
	21-30	"	" 6, "
	31-40	"	" 7, "
	41-50	"	" 8, "
	51-60	"	" 9, "
	61-70	"	" 10, "
	71-80	"	" 11, "
9	1-10	Any 10 characters or blank	Identification (optional).
	11-20	A number, right-justified	Population aged 12, males
	21-30	"	" 13, "
	31-40	"	" 14, "
	41-50	"	" 15, "
	51-60	"	" 16, "
	61-70	"	" 17, "
	71-80	"	" 18, "



Card No.	Column	Form	Meaning
10	1-10	Any 10 characters or blank	Identification (optional).
	11-20	A number, right-justified	Population age 19, males
	21-30	"	" 20, "
	31-40	"	" 21, "
	41-50	"	" 22, "
	51-60	"	" 23, "
	61-70	"	" 24, "
	71-80	Blank	"
11	Same as card 8; this is for the female population.		
12	Same as card 9; this is for the female population.		
13	Same as card 10; this is for the female population.		

If there is a second base population or there are readily available population data of other years that are to be printed out along with the projected population (types 3-6 runs), these data should be prepared according to the same formats as above (cards 1-13). All input cards should be arranged according to their dates consecutively in ascending order.

#### IV. Second parameter card:

This card records the information whether another variant of projection is to be run after the present one. It records the name of the present variant of projection, and indicates whether migration is assumed for this variant. For type 4 run, this is the last card of all input cards for the given variant.

#### V. Migration cards:

If no migration is assumed, this part of preparation may be ignored. Migration cards should be prepared in the same formats as the population cards but the single year age distribution is not needed. For example, if migration is assumed for 1965-1985, then four sets of migration cards should be prepared. If migration is assumed for two separate periods, for instance, 1955-1970 and 1985-1995, then five sets of cards should be prepared. All cards must be arranged consecutively according to their dates in ascending order.

Card No. Column

1	1	An integer	0 (or blank) - no projection is to be prepared after this variant. 1 - another variant of projection is to be made after this run.
	2-9	Any 8 characters	Name of this variant of projection.
	10	An integer	Whether migration is assumed for this variant. 0 (or blank) - not assumed. 1 - assumed. Migration input cards are given after this card. 2 - assumed. Migration assumption is the same as those assumed in the previous variant. No migration input cards are needed in this variant.

VI. Fertility cards:

Fertility cards consist of two parts. The first part is the sex ratio at birth and gross reproduction rates and the second part is either the age-specific fertility rates or the age pattern of fertility, i.e., assumed age-specific fertility rates expressed as a per cent of their total. Only one group of data in the second part is needed. If it is the age-specific fertility rate, the number "1" should be punched in column 7 of the first parameter card.

## 1. Sex ratio at birth and gross reproduction rates

Card No.	Column	Form	Meaning
1	1-10	Any 10 characters or blank	Identification (optional).
	11-16	A number with a decimal point	Sex ratio at birth, for example, 1.055.
	16-22	"	Gross reproduction rate of the first quinquennial interval of forward projection
	23-28	"	Gross reproduction rate of the second quinquennial interval of forward projection
	29-34	"	"
	35-40	"	"
	41-46	"	"
	47-52	"	"
	53-58	"	"
	59-64	"	"
	65-70	"	"
	71-76	"	"
	77-80	Blank	"

2. Age-specific fertility rates or percentage distribution of age-specific fertility rates. One card for each interval projection.

Card No.	Column		
2	1-10	Any 10 characters blank	Identification (optional).
	11-17	A number with a decimal point	Rate for aged 15-19
	18-24	"	" 20-24
	25-31	"	" 25-29
	32-38	"	" 30-34
	39-45	"	" 35-39
	46-52	"	" 40-44
	53-59	"	" 45-49
	60-80	Blank	

- 3 Same as card 2; this is for the second interval projection.

... If there are four projection intervals, the rates for the fourth interval should be on card 5.

#### VII. Mortality cards:

Mortality for each quinquennial projection interval, expressed by the expectation of life at birth, should be punched according to the format given in cards 1, 2 and 3. If survival ratios other than those of the model life tables are to be used, the punch formats are given in cards 4, 5, 6, etc.

##### 1. Expectation of life at birth:

Card No.	Column	Form	Meaning
1	1-10	Any 10 characters or blank	Identification (optional).
	11-15	A number with a decimal point	$\frac{0}{0}$ , males, first projection interval.
	16-20	"	" females, "
	21-25	"	" both sexes "
	26-30	"	" males, second projection interval
	31-35	"	" females, "
	36-40	"	" both sexes "
	41-45		
	46-50	If there are four quinquennial projection intervals, then the male expectation of life at birth of the fourth should be punched in columns 56-60; the females, columns 61-65; and both sexes, columns 66-70.	
	51-55		
	56-60		
	61-65		
	66-70		
	71-80	Blank	
2	If there are five or more projection intervals, then card 2 should record all data for intervals 5-8 and card 3 should record all data for interval 9, 10, according to the same format as shown for Card 1. Cards 2 and 3 are not needed if there are less than 5 projection intervals.		
3			

For type 6 projection, the values of  $e_0$ , for the projection interval which begins with the second base date should be punched immediately after the  $e_0$  of the interval which ends with the first base date.

If the expectation of life at birth for both sexes is not available, the columns designated for both sexes should be left blank. If only the expectation of life at birth for both sexes is available, the columns designated for males and females should be left blank.

2. Survival ratios: This part of preparation is needed only when survival ratios other than model life tables are to be used.

Card No.	Column		
4	1-10	Any 10 characters or blank	Identification (optional).
	11-17	A number with a decimal point	Ratios of birth to aged 0-4, males
	18-24		0-4 to 5-9 ; "
	25-31		5-9 to 10-14 ; "
	32-38		10-14 to 15-19, "
	39-45		15-19 to 20-24, "
	46-52		20-24 to 25-29, "
	53-59		25-29 to 30-34, "
	60-66		30-34 to 35-39, "
	67-73		35-39 to 40-44, "
	74-80	"	" 40-44 to 45-49, "
5	1-10	Any 10 characters or blank	Identification (optional).
	11-17	A number with a decimal point	Ratio of 45-49 to 50-54, males
	18-24	"	" 50-54 to 55-59, "
	25-31	"	" 55-59 to 60-64, "
	32-38	"	" 60-64 to 65-69, "
	39-45	"	" 65-69 to 70-74, "
	46-52	"	" 70-74 to 75-79, "
	53-59	"	" 75+ to 80+
	60-80	Blank	
6	Same as card 4; this is for the female population.		
7	Same as card 5; this is for the female population.		

Card No.	Column	Form	Meaning
8			Every projection interval should have 4 cards prepared; if there are four intervals, survival ratios for the fourth interval should be punched from card 16.
9			
10			
11			
...			
...			
...			
...			

For type 6 projection, survival ratios input cards for the projection interval which begins with the second base date, should be placed immediately after the cards for the interval which ends with the first base date.

### Appendix III

#### THE COMPUTER PROGRAMME FOR POPULATION PROJECTIONS IN FORTRAN LANGUAGE

This programme contains a main programme and six subroutines prepared in Fortran IV language. The names of these subprogrammes are as follows:

1. Main programme
2. Subroutine PROJET
3. Subroutine SPRAG
4. Subroutine AGEKOM
5. Subroutine SEXDIS
6. Subroutine PYRMAD
7. Subroutine SUMMA

C-----THIS IS THE MAIN PROGRAMME	MAIN 1
C THIS PROGRAMME READS IN ALL MODLE LIFE TABLE SURVIVAL RATIOS.	MAIN 2
C MODEL LIFE TABLES INCLUDE THE UNITED NATIONS MODEL AND THE COALE	MAIN 3
C AND DEMENY MODELS. IF MODEL LIFE TABLES ARE NOT USED IN PROJECTION	MAIN 4
C THE FIRST INPUT DATA CARD SHOULD HAVE A VALUE 0.	MAIN 5
IMPLICIT REAL*8 (A-H,O-Z), INTEGER (I-N)	MAIN 6
COMMON AGE(40,11,3), DFT(11,3),SR(19,24,10),RS(20,11,2),VI,V2,	MAIN 7
2R(3,10), ASFR(7,10), GRR(10),EX(10,3),CBR(10),CDR(10),RNI(10),	MAIN 8
4GFR(10),WPOP(11)DPOP(11),W(11),CW(11),DRAT(11),RNR(11),B(10,3),	MAIN 9
3PASFR(7,10),TFR(10),DEAD(10),C(7),KIRST,KASE1,KASE2,KYPE	MAIN 10
COMMON LASS, LAST, IASE1, IASE2, IX(11),	MAIN 11
INOTE(60), LA(20),LB(20) ,N7,N8	MAIN 12
DIMENSION MLT(10),IU(2)	MAIN 13
DATA MLT/4PU.N.,1H ,4HWEST,1H ,4HNORT,4H1 ,4HEAST,1H ,4HSOUT,	MAIN 14
14HH /,IU/2H ,2HFE/	MAIN 15
1 FORMAT (11)	MAIN 16
4 FORMAT (5X,F5.2, 10F7.5/3X,9F7.5)	MAIN 17
5 FORMAT (1H1,'—',2X,A2,'MALE SURVIVAL RATIOS — ',A4,A2,'MODEL	MAIN 18
1LIFE TABLE'///)	MAIN 19
6 FORMAT (1X,'EXPECTATION OF'/1X,'LIFE AT BIRTH',5X,12F8.2//1X,'AGE	MAIN 20
1GROUP'/)	MAIN 21
7 FORMAT (1H ,I2,1H-,I2,1H/,I2,1H-,Iw,8X,12F8.5)	MAIN 22
8 FORMAT (1X,'75+ /80+ ',9X,12F8.5///)	MAIN 23
C INPUTS	MAIN 24
DO 103 I=2,20	MAIN 25
LA(I)=I*5-10	MAIN 26
103 LB(I)=LA(I)-4	MAIN 27
LA(1)=0	MAIN 28
LB(1)=0	MAIN 29
C	MAIN 30
C	MAIN 31
C	MAIN 32
REAC (5,1) LT	MAIN 33
IF (LT.EQ.C) GO TO 9	MAIN 34

C (2) READ SURVIVAL RATIOS FROM FIVE MODEL LIFE TABLES	MAIN 35
DO 101 K=1,16	MAIN 36
DO 101 J=1,24	MAIN 37
101 READ (5,4) SR(19,J,K),(SR(I,J,K),I=1,17)	MAIN 38
9 CALL PROJET	MAIN 39
IF (LT.LE..) GO TO 99	MAIN 40
M=1	MAIN 41
DO 102 K=1,10	MAIN 42
L=1	MAIN 43
IF (MOD(K,2).EQ.0) L=2	MAIN 44
WRITE (6,5) IU(L),MLT(M),MLT(M+1)	MAIN 45
WRITE (6,6) (SR(19,J,K),J=1,12)	MAIN 46
WRITE (6,7)(LA(I),LB(I),LA(I+1),LB(I+1),(SR(I,J,K),J=1,12),I=1,16)	MAIN 47
WRITE (6,8) (SR(17,J,K),J=1,12)	MAIN 48
WRITE (6,6) (SR(19,J,K),J=13,24)	MAIN 49
WRITE(6,7)(LA(I),LB(I),LA(I+1),LB(I+1),(SR(I,J,K),J=13,24),I=1,16)	MAIN 50
WRITE (6,8) (SR(17,J,K),J=13,24)	MAIN 51
IF (L.EQ.2) M=M+2	MAIN 52
102 CONTINUE	MAIN 53
99 STOP	MAIN 54
END	MAIN 55



SUBROUTINE AGEKOM (MS)	AGEC 1
C THIS PROGRAMME PRINTS OUT THE AGE-SEX DISTRIBUTION OF THE POPULATION	AGEC 2
IMPLICIT REAL*8 (A-H, O-Z), INTEGER (I-N)	AGEC 3
COMMON AGE(40,11,3), DFT(11,3), SR(19,24,10), RS(20,11,2), VI, V2,	AGEC 4
2R(3,10), ASFR(7,10), GRR(10), EX(10,3), CBR(10), CDR(10), RNI(10),	AGEC 5
4GFR(10), WPOP(11), DPOP(11), W(11), CW(11), DRAT(11), RNRR(11), B(10,3),	AGEC 6
3PASFR(7,10), TFR(10), DEAD(10), C(7), KIRST, KASE1, KASE2, KYPE	AGEC 7
COMMON LASS, LAST, IBASE1, IBASE2, IY(11), IX(11),	AGEC 8
INOTE(50), LA(20), LB(20), N7, N8	AGEC 9
20 FORMAT(1H1//1X, 7A4, 6OX, 2A4, ' VARIANT'//1X, 'POPULATION (IN THOUSAND	AGEC 10
1S) BY AGE AND SEX, ', I4, '-', I4//)	AGEC 11
21 FORMAT (1X, 'AGE/YEAR', 11I11)	AGEC 12
22 FORMAT (1H0, 'ALL AGES', 11F11.1)	AGEC 13
23 FORMAT (1H , 3X, I2, '-', I2, 11F11.1)	AGEC 14
24 FORMAT (1H , 6X, I2, 11F11.1)	AGEC 15
25 FORMAT (1H )	AGEC 16
774 FORMAT ( 1X, 'MALES'//)	AGEC 17
26 FORMAT (//1X, ' FEMALES '//)	AGEC 18
27 FORMAT ( 1X, 'BOTH SEXES'//)	AGEC 19
28 FORMAT (1H , 3X, I2, '+ ', 11F11.1)	AGEC 20
WRITE (6,20) C, V1, V2, KIRST, LASS	AGEC 21
DO 144 K=1, 3	AGEC 22
IP(K.EQ.1.OR.K.EQ.2.AND.MS.EQ.2) GO TO 145	AGEC 23
WRITE (6,20) C, V1, V2, KIRST, LASS	AGEC 24
145 GO TO (743, 141, 142), K	AGEC 25
743 WRITE (6,774)	AGEC 26
GO TO 143	AGEC 27
141 WRITE (6,26)	AGEC 28
GO TO 143	AGEC 29
142 WRITE (6,27)	AGEC 30
143 WRITE (6,21) (IY(I), I=1, LAST)	AGEC 31
WRITE (6,22) (AGE(1, J, K), J=1, LAST)	AGEC 32
WRITE (6,25)	AGEC 33

C		AGEC 34
	N1=5	AGEC 35
	DO 139 I=2,N7	AGEC 36
	WRITE (6,23) LA(I),LB(I),( AGE(I,J,K),J=1, LAST)	AGEC 37
	IF( I.GE.6. OR.MS.EQ.2) GO TO 139	AGEC 38
	N=21+(I-2)*5	AGEC 39
	M=N+4	AGEC 40
	WRITE (6,25)	AGEC 41
	DO 140 L=N,M	AGEC 42
	WRITE (6,24) N1,( AGE(L,J,K),J=1, LAST)	AGEC 43
	140 N1=N1+1	AGEC 44
	139 CONTINUE	AGEC 45
	WRITE (6,28) LA(N8),( AGE(N8,J,K),J=1, LAST)	AGEC 46
	144 CONTINUE	AGEC 47
	RETURN	AGEC 48
	END	AGEC 49

## SUBROUTINE PROJET

C THIS PROGRAMME PROJECTS POPULATION BY FIVE YEAR INTERVALS

IMPLICIT REAL\*8 (A-H,O-Z), INTEGER (I-N)

COMMON AGE(40,11,3), DFT(11,3), SR(19,24,10), RS(20,11,2), V1, V2,  
2R(3,10), ASFR(7,10), GRR(10), EX(10,3), CBR(10), CDR(10), RNI(10),  
4GFR(10), WPOP(11), DPOP(11), W(11), CW(11), DRAT(11), RNRR(11), B(10,3),  
3PASFR(7,10), TFR(10), DEAD(10), C(7), KIRST, KASE1, KASE2, KYPE

COMMON LASS, LAST, IBASE1, IBASE2, IY(11), IX(11),  
1NOTE(60), LA(20), LB(20), N7, N8

DIMENSION CHECK(11,3), CHECS(11,3), CHECP(11,3), DFS(11,3), MLT(12),  
1TEX(24), GM(20,10,3), IU(3)

DATA MLT/4PU.N., 1H ,4HWEST, 1H ,4HNORT, 4HH ,4HEAST, 1H ,4HSOUT,  
14HH ,4HOTHE, 4HR /, IU/4HMALE, 4HFEMLE, 4HBOTH/

INTEGER ECO, AREA, REQ, FIRST, VAR, TYPE, SINGLE, RERUN, BASE1, BASE2

EQUIVALENCE (FIRST, KIRST), (BASE1, KASE1), (BASE2, KASE2), (TYPE, KYPE)

C

C FORMATS

10 FORMAT (311, 13, 7A4, 8I4, 5I1, T78, 3I1)

11 FORMAT (20A4)

12 FORMAT (10X, 7F10.3)

13 FORMAT (10X, F6.3, 10F6.2)

14 FORMAT (10X, 7F7.3)

15 FORMAT (10X, 12F5.2, 10X)

16 FORMAT(/1H0, 30(' ')/5X, 'SELECTED EXPECTATION OF LIFE AT BIRTH FOR '  
1, A4, ' SEX FOR ', I4, '-', I4, F8.2/5X, 'EXCEEDS THE RANGE OF MODEL LIF  
LE TABLES'/1X, 30(' ')/)

25 FORMAT (1H )

32 FORMAT (1H0, 5X, I4, I5, 3F15.2, 4X, 2F14.3)

42 FORMAT (38X, 'MALES', 8X, 'FEMALES'/)

45 FORMAT (1H , I2, '+ /', I2, '+', 5X, 10F11.5)

48 FORMAT (10X, 10F7.5)

51 FORMAT ( // 8X, '\* MIGRATION NOT ASSUMED \*\*' )

64 FORMAT (////5X, 'AVERAGE ANNUAL RATES OF GROWTH (PERCENT)'/38X,  
1'EXPONENTIAL COMPOUND'/)

PROJ 2

PROJ 2

PROJ 3

PROJ 4

PROJ 5

PROJ 6

PROJ 7

PROJ 8

PROJ 9

PROJ 10

PROJ 11

PROJ 12

PROJ 13

PROJ 14

PROJ 15

PROJ 16

PROJ 17

PROJ 18

PROJ 19

PROJ 20

PROJ 21

PROJ 22

PROJ 23

PROJ 24

PROJ 25

PROJ 26

PROJ 27

PROJ 28

PROJ 29

PROJ 30

PROJ 31

PROJ 32

PROJ 33

PROJ 34

66 FORMAT (1H,15X,I4,'-',I4,15X,2(F7.3,7X))	PROJ 35
68 FORMAT (11,2A4,11)	PROJ 36
120 FORMAT (1H1//1X,7A4//)	PROJ 37
69 FORMAT (1H1,5X,7A4,30X,'**** VARIANT - ',2A4//)	PROJ 38
165 FORMAT (1H1//4X,'** PROJECTION ASSUMPTIONS'//8X,'COUNTRY NAME - ',	PROJ 39
1,1X,7A4,30X,'COUNTRY CODE - ',3X,3I2, I4//8X,'PERIOD COVERED - ',	PROJ 40
2I4,'-',I4)	PROJ 41
167 FORMAT (1H0,7X,'BASE YEAR - ',I4)	PROJ 42
168 FORMAT (1H0,7X,'BASE YEARS - '//10X,'FOREWARD - ',1X,I4/10X,	PROJ 43
1'BACKWARD - ',1X,I4)	PROJ 44
173 FORMAT (1H0,7X,'* POPULATION OF BASE YEAR (IN THOUSANDS)'//)	PROJ 45
174 FORMAT (1H0, 12X,'AGE',29X,2(I4,26X)//)	PROJ 46
176 FORMAT (12X,I2,'-',I2,12X,4F15.3)	PROJ 47
177 FORMAT (12X,'TOTAL',/13X,'INPUT',11X,4F15.3)	PROJ 48
180 FORMAT (1H0,7X,'* TOTALS FOR OTHER INPUT POPULATIONS'//15X,'YEAR',	PROJ 49
19X,'INPUT',7X,'ADDED',7X,'DIFFERENCE'//)	PROJ 50
182 FORMAT ( 15X,I4,' M ',2X,3F12.3/20X,'F',3X,3F12.3)	PROJ 51
184 FORMAT (/8X,'* CHECK INPUT DATA FOR SINGLE YEARS OF AGE'//15X,	PROJ 52
1'YEAR',9X,'INPUT',7X,'ADDED',7X,'DIFFERENCE'//)	PROJ 53
192 FORMAT (1H0,5X,'AGE',3X,5(12X,2I5) )	PROJ 54
194 FORMAT(5X,I2,'-',I2,4X,5(2X,2F10.3))	PROJ 55
200 FORMAT (1H0,7X,'NOTES'//10X,20A4/10X,20A4/10X,20A4)	PROJ 56
203 FORMAT (1H1///,1X,7A4// 5X,'VARIANT - ',2A4,75X,'** ',2A4,'**')	PROJ 57
210 FORMAT(//8X,'* FERTILITY INPUTS -'//11X,'SEX RATIO AT BIRTH -',	PROJ 58
2F10.3//,13X,'* GROSS REPRODUCTION RATES -'//)	PROJ 59
205 FORMAT (1H,20X,I4,I5,13X,F5.2)	PROJ 60
213 FORMAT (1H0,12X,'* AGE-SPECIFIC FERTILITY RATES'/41X,' 15-19	20 PROJ 61
1-24 25-29 30-34 35-39 40-44 45-49'//)	PROJ 62
214 FORMAT (/8X,'* MORTALITY INPUTS - EXPECTATIONS OF LIFE AT BIRTH	A PROJ 63
1ND SURVIVAL RATIOS SELECTED, ',2A4,' MODEL LIFE TABLE USED'//	PROJ 64
38X,5(17X,'TOTAL')/15X,5(5X,'MALES',5X,'FEMALES')//)	PROJ 65
216 FORMAT (1H, 20X,I4,I5, 9X,2P7F8.1)	PROJ 66
217 FORMAT (1H,9X,5X,5(7X,I4, I5,6X) )	PROJ 67
219 FORMAT (1H, I2,'-',I2,'/',I2,'-',I2,3X,10F11.5)	PROJ 68

220 FORMAT (1H,13X,10F11.2)	PROJ 69
221 FORMAT (1H,20X,I4,I5,11X,7F8.4)	PROJ 70
293 FORMAT(//8X,'* MIGRATION INPUTS -'//12X,'NET-MIGRANTS (IMMIGRANTS'	PROJ 71
1,'-EMIGRANTS) BY AGE AND SEX (NUMBER IN THOUSANDS)'/)	PROJ 72
294 FORMAT (1H0,21X,'M',10X,'F'//)	PROJ 73
295 FORMAT (3(12X,4(2I5,2X,F10.3,4X)/ ))	PROJ 74
309 FORMAT (10X,2F12.3)	PROJ 75
325 FORMAT (13X,'ADDED',11X,4F15.3)	PROJ 76
326 FORMAT (13X,'DIFFERENCE',6X,4F15.3)	PROJ 77
375 FORMAT (1H0,7X,5(12X,F10.2))	PROJ 78
525 FORMAT (1H0,12X,'* PERCENTAGE DISTRIBUTION OF FERTILITY RATES -'//	PROJ 79
141X,' 15-19 20-24 25-29 30-34 35-39 40-44 45-49'//)	PROJ 80
885 FORMAT (5X,'80+',5X,5(2X,2F10.3))	PROJ 81
886 FORMAT (12X,'80+',14X,4F15.3)	PROJ 82
887 FORMAT (1H,4X,'TOTAL'/5X,'INPUT',6X,5(2F10.3,2X))	PROJ 83
888 FORMAT (1H,4X,'ADDED',6X,5(2F10.3,2X))	PROJ 84
889 FORMAT(5X,'DIF. ',3X,5(2F10.3,2X))	PROJ 85
900 FORMAT (1H+,35X,'(FORWARD PROJECTION, TYPE 0 RUN)')	PROJ 86
901 FORMAT (1H+,35X,'(BACKWARD PROJECTION, TYPE 1 RUN)')	PROJ 87
902 FORMAT (1H+,35X,'(FORWARD AND BACKWARD PROJECTION, TYPE 2 RUN)')	PROJ 88
903 FORMAT (1H+,35X,'(FORWARD PROJECTION. TYPE 3 RUN)')	PROJ 89
904 FORMAT (1H+,35X,'(TYPE 4 RUN, ALL DATA READ IN)')	PROJ 90
905 FORMAT (1H+,35X,'(BACKWARD PROJECTION. TYPE 5 RUN)')	PROJ 91
906 FORMAT (1H+,35X,'(FORWARD AND BACKWARD PROJECTION. TYPE 6 RUN)')	PROJ 92
2001 FORMAT (1H,8X,11F11.0)	PROJ 93
2002 FORMAT (1H1)	PROJ 94
C	
DO 1000 I=1,40	PROJ 95
DO 1000 J=1,11	PROJ 96
DO 1000 K=1,3	PROJ 97
1000 AGE(1,J,K)=0.0	PROJ 98
	PROJ 99

C		PROJ 100
	70 READ (5,10) ECO,AREA,REG,NATION,C,FIRST,BASE1,BASE2,LASS,MIGF,MG1	PROJ 101
	LMG2,MIGL,TYPE,SINGLE,LT,MNA,JF,NN,IOUT,NEXT	PROJ 102
	READ (5,11) NOTE	PROJ 103
	3131 WRITE (6,165) C, ECO,AREA,REG,NATION, FIRST,LASS	PROJ 104
C		PROJ 105
	IY(1)=FIRST	PROJ 106
	K=LY(1)/100*100	PROJ 107
	DO 73 I=2,11	PROJ 108
	IY(I)=FIRST+(I-1)*5	PROJ 109
	73 IX(I)=IY(I)	PROJ 110
	NHIGH=18	PROJ 111
	N8=NHIGH	PROJ 112
	N7=NHIGH-1	PROJ 113
C		PROJ 114
C	SELECT THE BASE YEAR AND ASSIGN AN INTEGER TO EACH PERIOD	PROJ 115
	IF (BASE1.EQ.0) BASE1=FIRST	PROJ 116
	IF (TYPE.EQ.1) BASE1=LASS	PROJ 117
	IBASE1=(BASE1-FIRST)/5+1	PROJ 118
	IF (BASE2.NE.0) IBASE2=(BASE2-FIRST)/5+1	PROJ 119
	LAST=(LASS-FIRST)/5+1	PROJ 120
	IF (BASE2.NE.0) GO TO 166	PROJ 121
	WRITE (6,167) BASE1	PROJ 122
	GO TO 97	PROJ 123
	166 WRITE (6,168) BASE2,BASE1	PROJ 124
	97 I=TYPE+1	PROJ 125
	GO TO (90,91,92,93,94,95,96),I	PROJ 126
	90 WRITE (6,900)	PROJ 127
	GO TO 98	PROJ 128
	91 WRITE (6,901)	PROJ 129
	GO TO 98	PROJ 130

92 WRITE (6,902)	PROJ 131
GO TO 98	PROJ 132
93 WRITE (6,903)	PROJ 133
GO TO 98	PROJ 134
94 WRITE (6,904)	PROJ 135
GO TO 98	PROJ 136
95 WRITE (6,905)	PROJ 137
GO TO 98	PROJ 138
96 WRITE (6,906)	PROJ 139
98 WRITE (6,200) NOTE	PROJ 140
IF (NEXT.EQ.9) GO TO 186	PROJ 141
C	PROJ 142
C READ POPULATION BY SEX AND AGE	PROJ 143
IB=IBASE1	PROJ 144
IE=IBASE1	PROJ 145
IF (TYPE.EQ.3.OR.TYPE.EQ.4) IB=1	PROJ 146
IF (TYPE.EQ.4.OR.TYPE.EQ.5) IE=LAST	PROJ 147
IF (TYPE.EQ.6) IE=IBASE2	PROJ 148
DO 160 J=IB,IE	PROJ 149
READ (5,309) (AGE(1,J,K),K=1,2)	PROJ 150
DO 161 K=1,2	PROJ 151
161 READ (5,12) (AGE(I,J,K),I=2,NHIGH)	PROJ 152
IF (SINGLE.NE.1) GO TO 160	PROJ 153
DO 86 K=1,2	PROJ 154
86 READ (5,12) (AGE(I,J,K),I=21,40)	PROJ 155
160 CONTINUE	PROJ 156
C	PROJ 157
C CHECK THE ACCURACY OF DATA	PROJ 158
191 DO 169 J=IB,IE	PROJ 159
DO 169 K=1,2	PROJ 160

CHECK(J,K)=0	PROJ 161
CHECS(J,K)=0	PROJ 162
CHECP(J,K)=0	PROJ 163
DFS(J,K)=0	PROJ 164
DFT(J,K)=0	PROJ 165
DO 170 I=2,NHIGH	PROJ 166
170 CHECK(J,K)=CHECK(J,K)+AGE(I,J,K)	PROJ 167
IF (SINGLE.NE.1) GO TO 178	PROJ 168
DO 171 I=21,40	PROJ 169
171 CHECS(J,K)=CHECS(J,K)+AGE(I,J,K,)	PROJ 170
DO 172 I=3,6	PROJ 171
172 CHECP(J,K)=CHECP(J,K)+AGE(I,J,K,)	PROJ 172
DFS(J,K)=CHECP(J,K)-CHECS(J,K)	PROJ 173
178 DFT(J,K)=AGE(1,J,K)-CHECK(J,K)	PROJ 174
169 CONTINUE	PROJ 175
IF (TYPE.EQ.4) GO TO 222	PROJ 176
IF (TYPE.EQ.3) IB=IBASE1	PROJ 177
WRITE (6,173)	PROJ 178
M=IE-IB	PROJ 179
IF (TYPE.NE.6) M=M+1	PROJ 180
WRITE (6,42)	PROJ 181
DO 175 I=2,N7	PROJ 182
175 WRITE (6,176) LA(I),LB(I),((AGE(I,J,K),K=1,2),J=IB,IE,M)	PROJ 183
WRITE (6,886) ((AGE(N8,J,K),K=1,2),J=IB,IE,M)	PROJ 184
WRITE (6,177)((AGE(1,J,K),K=1,2),J=IB,IE,M)	PROJ 185
WRITE (6,325) ((CHECK(J,K),K=1,2),J=IB,IE,M)	PROJ 186
WRITE (6,326) ((DFT(J,K),K=1,2),J=IB,IE,M)	PROJ 187
IF (TYPE.LE.2) GO TO 179	PROJ 188
222 IF (TYPE.NE.4) WRITE (6,120) C	PROJ 189
IF (TYPE.EQ.3) IB=1	PROJ 190
WRITE (6,180)	PROJ 191
DO 181 J=IB,IE	PROJ 192



181 WRITE (6,182) IY(J),(AGE(1,J,K),CHECK(J,K),DFT(J,K),K=1,2)	PROJ 193
179 IF (SINGLE.NE.1) GO TO 183	PROJ 194
WRITE (6,184)	PROJ 195
DO 185 J=IB,IE	PROJ 196
185 WRITE (6,182) IY(J),(CHECP(J,K),CHECS'J,K),DFS(J,K),K=1,2)	PROJ 197
183 CONTINUE	PROJ 198
IF (TYPE.EQ.4) GO TO 196	PROJ 199
C REDA MIGRATION AND FERTILITY	PROJ 200
186 CONTINUE	PROJ 201
IF (NEXT.NE.9) GO TO 67	PROJ 202
DO 77777 I=1,NHIGH	PROJ 203
DO 77777 K=1,3	PROJ 204
77777 AGE(I,1,K)=AGE(I,11,K)	PROJ 205
67 READ (5,63) RERUN,V1,V2,MIGT	PROJ 206
I=MIGT+1	PROJ 207
GO TO(320,320,321),I	PROJ 208
320 DO 310 J=1,10	PROJ 209
DO 227 K=1,2	PROJ 210
CHECK(J,K)=0	PROJ 211
227 DFT(J,K)=0	PROJ 212
DO 310 I=1,20	PROJ 213
DO 310 K=1,3	PROJ 214
310 GM(I,J,K)=0	PROJ 215
C READ MIGRATION DATA	PROJ 216
IF(MIGT.EQ.0) GO TO 322	PROJ 217
IF (MGI.EQ.0) GO TO 187	PROJ 218
M2=(MGI-FIRST)/5+1	PROJ 219
M3=(MG2-FIRST)/5+1	PROJ 221
187 M1=(MIGF-FIRST)/5+1	PROJ 222
M4=(MIGL-FIRST)/5+1	PROJ 223
N=C	PROJ 224
IB=M1	PROJ 225

IE=M4-1	PROJ 226
IF (MGL.NE.0) IE=M2-1	PROJ 227
189 DO 104 J=IB,IE	PROJ 228
READ (5,309) (GM(1,J,K),K=1,2)	PROJ 229
DO 104 K=1,2	PROJ 230
104 READ (5,12) (GM(I,J,K),I=2,NHIGH	PROJ 231
DO 190 J=IB,IE	PROJ 232
DO 190 K=1,2	PROJ 233
DO 112 I=2,NHIGH	PROJ 234
112 CHECK(J,K)=CHECK(J,K)+GM(I,J,K)	PROJ 235
190 DFT(J,K)=GM(1,J,K)-CHECK(J,K)	PROJ 236
IB=M3	PROJ 237
IE=M4-1	PROJ 238
N=N+1	PROJ 239
IF (MGL.NE.0.AND.N.EQ.1) GO TO 189	PROJ 240
321 WRITE (6,203) C,V1,V2,V1,V2	PROJ 241
WRITE (6,293)	PROJ 242
IB=M1	PROJ 243
188 IE=M4-1	PROJ 244
L=IE-IB	PROJ 245
IF (L.GE.5) IE=IB+4	PROJ 246
WRITE (6,192) (IY(J),IX(J+1),J=IB,IE)	PROJ 247
WRITE (6,294)	PROJ 248
DO 193 I=2,N7	PROJ 249
193 WRITE (6,194) LA(I),LB(I),((GM(I,J,K),K=1,2),J=IB,IE)	PROJ 250
WRITE (6,885) ((GM(N8,J,K),K=1,2),J=IB,IE)	PROJ 251
WRITE (6,887) ((GM(1,J,K),K=1,2),J=IB,IE)	PROJ 252
WRITE (6,888)((CHECK(J,K),K=1,2),J=IB,IE)	PROJ 253
WRITE (6,889) ((DFT(J,K),K=1,2),J=IB,IE)	PROJ 254
IB=IB+5	PROJ 255
IF (IE.NE.M4-1) GO TO 188	PROJ 256
322 WRITE (6,203) C,V1,V2,V1,V2	PROJ 257
IF(MIGF.NE.0.AND.MIGT.EQ.0.OR.MIGF.EQ.0) WRITE (6,51)	PROJ 258
DO 620 I=1,10	PROJ 259

C

RNI(I)=0.0	PROJ 260
CBR(I)=0.0	PROJ 261
CDR(I)=0.0	PROJ 262
GRR(I)=0.0	PROJ 263
RNRR(I)=0.0	PROJ 264
TFR(I)=0.0	PROJ 265
620 GFR(I)=0.0	PROJ 266
IB=IBASE1	PROJ 267
IE=LAST-1	PROJ 268
IT=TYPE+1	PROJ 269
GO TO (195,197,195,196,197,198),IT	PROJ 270
198 IB=IBASE2	PROJ 271
195 READ (5,13) SEXRAT,(GRR(J),J=IB,IE)	PROJ 272
WRITE(6,210) SEXRAT	PROJ 273
IF (JF.EQ.0) GO TO 265	PROJ 274
55 DO 56 J=IB,IE	PROJ 275
56 READ (5,48)(ASFR(I,J),I=1,7)	PROJ 276
IF(GRR(IB).NE.0.0) GO TO 265	PROJ 277
DO 266 J=IB,IE	PROJ 278
GRR(J)=0.0	PROJ 279
DO 267 I=1,7	PROJ 280
267 GRR(J)=GRR(J)+ASFR(I,J)	PROJ 281
266 GRR(J)=GRR(J)*5.0 /((1.+SEXRAT)	PROJ 282
265 DO 228 J=IB,IE	PROJ 283
228 WRITE (6,205) IY(J),IX(J+1),GRR(J)	PROJ 284
IF(JF.EQ.1) GO TO 57	PROJ 285
DO 204 J=IB,IE	PROJ 286
READ (5,14) (PASFR(I,J),I=1,7)	PROJ 287
DO 199 I=1,7	PROJ 288
199 ASFR(I,J)=PASFR(I,J)*GRR(J)*(1.0+SEXRAT)/5.0	PROJ 289
204 CONTINUE	PROJ 290
	PROJ 291

WRITE (6,525)	PROJ 292
DO 224 J=IB,IE	PROJ 293
224 WRITE (6,216) IY(J),IX(J+1),(PASFR(I,J),I=1,7)	PROJ 294
57 WRITE (6,213)	PROJ 295
DO 215 J=IB,IE	PROJ 296
DO 605 I=1,7	PROJ 297
605 TFR(J)=TFR(J)+ASFR(I,J)*5000.0	PROJ 298
215 WRITE (6,221) IY(J),IX(J+1),(ASFR(I,J),I=1,7)	PROJ 299
C ——— MORTALITY INPUTS	PROJ 300
197 LK=LT*2-1	PROJ 301
IF ((TYPE.EQ.1.OR.TYPE.EQ.5).AND.NN.NE.0) READ (5,14) (PASFR(IB,IBA	PROJ 302
1SEL),I=1,7)	PROJ 303
IF (TYPE.EQ.1.OR.TYPE.EQ.5) SEXRAT=1.05	PROJ 304
IF (LT.EQ.0) LK=3	PROJ 305
DO 245 L=1,24	PROJ 306
245 TEX(L)=(SR(19,L,LK)*SEXRAT+SR(19,L,LK+1))/(1.0+SEXRAT)	PROJ 307
C	PROJ 308
IB=1	PROJ 309
IE=LAST-1	PROJ 310
IF (TYPE.EQ.3) IB=IBASE1	PROJ 311
IF (TYPE.GE.5) IE=IBASE1-1	PROJ 312
IF (TYPE.EQ.6) GO TO 202	PROJ 313
READ (5,15) ((EX(J,K),K=1,3),J=IB,IE)	PROJ 314
GO TO 201	PROJ 315
46 DO 47 J=IB,IE	PROJ 316
DO 47 K=1,2	PROJ 317
47 READ (5,48) (RS(I,J,K),I=1,N7)	PROJ 318
IF (TYPE.NE.6) GO TO 2441	PROJ 319
DO 49 J=IBASE2,N	PROJ 320
DO 49 K=1,2	PROJ 321
49 READ (5,48) (RS(I,J,K),I=1,N7)	PROJ 322
GO TO 2441	PROJ 323

202 N=LAST-1	PROJ 324
READ (5,15) ((EX(J,K),K=1,3),J=1,IE),((EX(J,K),K=1,3),J=IBASE2,N)	PROJ 325
201 IF (LT.EQ.0) GO TO 46	PROJ 326
C	PROJ 327
C INTERPOLATE E OF BOTH SEXES FROM E OF MALES AND FEMALES	PROJ 328
C	PROJ 329
2441 J=1	PROJ 330
IF (TYPE.EQ.3) J=IBASE1	PROJ 331
IF (TYPE.GE.5) IE=UVASE1-1	PROJ 332
240 IF(EX( J,1).NE.0) GO TO 1206	PROJ 333
K=3	PROJ 334
L=1	PROJ 335
208 IF (EX(J,3).GE.TEX(L).AND.EX(J,3).LE.TEX(L+1))GO TO 207	PROJ 336
L=L+1	PROJ 337
IF (L.GT.23) GO TO 109	PROJ 338
GO TO 208	PROJ 339
207 AA=(TEX(L+1)-EX(J,3))/(TEX(L+1)-TEX(L))	PROJ 340
DO 209 I=1,2	PROJ 341
M=LK+I-1	PROJ 342
BB=SR(19,L+1,M)-SR(19,L,M)	PROJ 343
209 EX(J,I)=SR(19,L+1,M)-AA*BB	PROJ 344
1206 J=J+1	PROJ 345
IF ( J.LE.IE) GO TO 240	PROJ 346
IF (TYPE.NE.6.OR.(TYPE.EQ.6.AND.IE.EQ.N)) GO TO 206	PROJ 347
J=IBASE2	PROJ 348
IE=N	PROJ 349
GO TO 240	PROJ 350
206 IF (LT.FQ.0) GO TO 211	PROJ 351
C	PROJ 352
C SELECT SURVIVAL RATIOS	PROJ 353
C	PROJ 354
K=1	PROJ 355

IF (TYPE.GE.5) IE=IBASE1-1	PROJ 356
105 J=1	PROJ 357
IF (TYPE.EQ.3) J=IBASE1	PROJ 358
106 L=1	PROJ 359
107 IF (EX(J,K).GE.SR.(19,L,LK).AND.EX(J,K).LE.SR(19,L+1,LK)) GO TO 108	PROJ 360
L=L+1	PROJ 361
IF (L.GT.23) GO TO 109	PROJ 362
GO TO 107	PROJ 363
108 DD 110 I=1,N7	PROJ 364
AA=(SR(19,L+1,LK)-EX(J,K))/(SR(19,L+1,LK)-SR(19,L,LK))	PROJ 365
BB=SR(I,L+1,LK)-SR(I,L,LK)	PROJ 366
RS(I,J,K)=SR(I,L+1,LK)-AA*BB	PROJ 367
110 CONTINUE	PROJ 368
J=J+1	PROJ 369
IF (J.LE.IE) GO TO 106	PROJ 370
K=K+1	PROJ 371
LK=LK+1	PROJ 372
IF (K.LE.2) GO TO 105	PROJ 373
IF (TYPE.EQ.6.AND.IE.NE.N) GO TO 75	PROJ 374
GO TO 211	PROJ 375
75 J=IBASE2-1	PROJ 376
IE=N	PROJ 377
K=1	PROJ 378
GO TO 106	PROJ 379
	PROJ 380
109 WRITE (6,16) IU(K),IY(J),IY(J+1),EX(J,K)	PROJ 381
GO TO 99	PROJ 382
211 J=1	PROJ 383
IF (TYPE.EQ.3) J=IBASE1	PROJ 384
IF (TYPE.GE.5) IE=IBASE1-1	PROJ 385

244 IF (EX(J,3).NE.O) GO TO 241	PROJ 386
EX(J,3)=(EX(J,1)*SEXRAT+EX(J,2))/(1.O+SEXRAT)	PROJ 387
241 J=J+1	PROJ 388
IF ( J.LE.IE) GO TO 244	PROJ 389
IF (TYPE.NE.6.OR.(TYPE.EQ.6.AND.IE.EQ.N))GO TO 290	PROJ 390
J=IBASE2	PROJ 391
IE=N	PROJ 392
GO TO 244	PROJ 393
290 CONTINUE	PROJ 394
LK=LT*2-1	PROJ 395
IF (LK.LT.O) LK=11	PROJ 396
IF (.NOT.(TYPE.EQ.1.OR.TYPE.EQ.5)) WRITE (6,203) C,V1,V2,V1,V2	PROJ 397
WRITE (6,214) MLT(LK),MLT(LK+1)	PROJ 398
M=IB+4	PROJ 399
IM=IE	PROJ 400
IF (TYPE.EQ.6) GO TO 81	PROJ 401
80 IF (IE-IB.GT.4) IM=M	PROJ 402
76 WRITE (6,217) (IY(J),IX(J+1),J=IB,IM)	PROJ 403
WRITE (6,215) (EX(J,3),J=IB,IM)	PROJ 404
WRITE (6,220) ((EX(J,K),K=1,2),J=IB,IM)	PROJ 405
WRITE (6,25)	PROJ 406
DO 218 I=1,16	PROJ 407
218 WRITE (6,219) LA(I),LB(I),LA(I+1),LB(I+1),((RS(I,J,K),K=1,2),J=IB,	PROJ 408
IM)	PROJ 409
WRITE (6,45) LA(N7),LA(N8),((RS(N7,J,K),K=1,2),J=IB,IM)	PROJ 410
IF (IM.GE.IE) GO TO 85	PROJ 411
IB=IM+1	PROJ 412
IM=IE	PROJ 413
GO TO 76	PROJ 414
81 IB=1	PROJ 415
IM=IBASE1-1	PROJ 416
IE=IM	PROJ 417
M=5	PROJ 418
GO TO 80	PROJ 419

82 IF (IM.EQ.N) GO TO 77	PROJ 420
IB=IBASE2	PROJ 421
IM=N	PROJ 422
L=IB+4	PROJ 423
IF (N.GT.L) IM=L	PROJ 424
IE=N	PROJ 425
GO TO 76	PROJ 426
83 IB=IM+1	PROJ 427
IM=N	PROJ 428
GO TO 76	PROJ 429
85 IF(TYPE.EQ.6) GO TO 82	PROJ 430
77 CONTINUE	PROJ 431
C	PROJ 432
C COMPUTE NRR	PROJ 433
IB=IBASE1	PROJ 434
IE=LAST-1	PROJ 435
IF (TYPE.EQ.6) IB=IBASE2	PROJ 436
IF (TYPE.EQ.1.OR.TYPE.EQ.4.OR.TYPE.EQ.5) GO TO 280	PROJ 437
DO 281 J=IB,IE	PROJ 438
W(2)= RS(1,J,2)*5.0	PROJ 439
DO 3759 I=3,11	PROJ 440
3759 W(I)= RS(I-1,J,2)*W(I-1)	PROJ 441
RNRR(J)=0.0	PROJ 442
DO 282 I=1,7	PROJ 443
282 RNRR(J)=RNRR(J)+ASFR(I,J)*W(I+4)	PROJ 444
281 RNRR(J)=RNRR(J)/(1.0+SEXRAT)	PROJ 445
C	PROJ 446
C-----FORWARD PROJECTION	PROJ 447
J=IB	PROJ 448
133 DO 128 K=1,2	PROJ 449
DO 127 I=3,N7	PROJ 450
127 AGE(I,J+1,K)=AGE(I-1,J,K)*RS(I-1,J,K)+GM(I,J,K)	PROJ 451
128 AGE(N8,J+1,K)=(AGE(N7,J,K)+AGE(N8,J,K))*RS(N7,J,K)+GM(N8,J,K)	PROJ 452



C-----PROJECT BIRTHS

B(J,3)=0.

DO 129 I=5,11

M=I-4

129 B(J,3)=B(J,3)+ASFR(M,J)\*2.5\*(AGE(I,J,2)+AGE(I,J+1,2))

B(J,1)=B(J,3)\*SEXRAT/(1.0+SEXRAT)

B(J,2)=B(J,3)-B(J,1)

C PROJECT AG EO-4

DO 131 K=1,2

131 AGE(2,J+1,K)=B(J,K)\*RS(1,J,K)+GM(2,J,K)

DO 132 K=1,2

AGE(1,J+1,K)=0.

DO 132 I=2,NHIGH

132 AGE(1,J+1,K)=AGE(1,J+1,K)+AGE(I,J+1,K)

J=J+1

IF (J.LE.IE) GO TO 133

280 IF (TYPE.EQ.0.OR TYPE.EQ.3.OR TYPE.EQ.4) GO TO 196

44 L=IBASE1

145 J=L

DO 135 K=1,2

AGE(1,L-1,K)=0.

DO 130 I=2,N7

AGE(I,L-1,K)=(AGE(I+1,L,K)-GM(I+1,L-1,K))/RS(I,L-1,K)

130 AGE(1,L-1,K)=AGE(1,L-1,K)+AGE(I,L-1,K)

T=AGE(N7,L-1,K)/AGE(1,L-1,K)\*100.0

IF(MNA.EQ.0) GO TO 361

T=T+AGE(N7-1,L-1,K)/AGE(1,L-1,K)\*100.0

Y=(-0.035+0.31\*T)\*AGE(1,L-1,K)/100.0

AGE(N8,L-1,K)= AGE(N7,L-1,K)-Y

AGE(N7,L-1,K)= Y

GO TO 135

PROJ 453

PROJ 454

PROJ 455

PROJ 456

PROJ 457

PROJ 458

PROJ 459

PROJ 460

PROJ 461

PROJ 462

PROJ 463

PROJ 464

PROJ 465

PROJ 466

PROJ 467

PROJ 468

PROJ 469

PROJ 470

PROJ 471

PROJ 472

PROJ 473

PROJ 474

PROJ 475

PROJ 476

PROJ 477

PROJ 478

PROJ 479

PROJ 480

PROJ 481

PROJ 482

PROJ 483

361 NEQ=(EX(L-1,K)-25.0)/5.0	PROJ 484
IF(NEQ.LT.1) NEQ=1	PROJ 485
IF (NEQ.GT.10) NEQ=10	PROJ 486
GO TO (350,351,352,353,354,355,356,357,358,359), NEQ	PROJ 487
350 Y= -0.0095821055*T**2+ 0.6743783591*T + 0.0105417238	PROJ 488
GO TO 360	PROJ 489
351 Y= -0.0082970266*T**2+ 0.6569656211*T + 0.0130058337	PROJ 490
GO TO 360	PROJ 491
352 Y= -0.0082129812*T**2+ 0.6443192662*T + 0.0137474020	PROJ 492
GO TO 360	PROJ 493
353 Y= -0.0081596713*T**2+ 0.6317388191*T + 0.0138151460	PROJ 494
GO TO 360	PROJ 495
354 Y= -0.0081557302*T**2+ 0.6196197043*T + 0.0141523860	PROJ 496
GO TO 360	PROJ 497
355 Y= -0.0079736456*T**2+ 0.6058145621*T + 0.0155220983	PROJ 498
GO TO 360	PROJ 499
356 Y= -0.0078099024*T**2+ 0.5907848145*T + 0.0165618588	PROJ 500
GO TO 360	PROJ 501
357 Y= -0.0074294084*T**2+ 0.5727237276*T + 0.0188656477	PROJ 502
GO TO 360	PROJ 503
358 Y= -0.0067861750*T**2+ 0.5470601090*T + 0.0235653549	PROJ 504
GO TO 360	PROJ 505
359 Y= -0.0058395463*T**2+ 0.5134464583*T + 0.0330585840	PROJ 506
360 AGE(19,L-1,K)=Y*AGE(1,L-1,K)/100.0	PROJ 507
AGE(N8,L-1,K)=AGE(N7,L-1,K)-AGE(19,L-1,K)	PROJ 508
AGE(N7,L-1,K)=AGE(19,L-1,K)	PROJ 509
135 CONTINUE	PROJ 510
L=L-1	PROJ 511
IF (L.GT.1) GO TO 145	PROJ 512
C	PROJ 513
C INTERPOLATE SINGLE YEARS OF AGE	PROJ 514
196 IF (TYPE.EQ.4) READ (5,68) RERUN,V1,V2	PROJ 515

IF (SINGLE.EQ.2) GO TO 323	PROJ 516
IB=IBASE1	PROJ 517
IE=IBASE1	PROJ 518
IF (TYPE.EQ.3.OR.TYPE.EQ.4) IB=1	PROJ 519
IF (TYPE.EQ.4.OR.TYPE.EQ.5) IE=LAST	PROJ 520
IF (TYPE.EQ.6) IE=IBASE2	PROJ 521
DO 136 J=1, LAST	PROJ 522
IF (SINGLE.EQ.1.AND.(J.GE.IB.AND.J.LE.IE)) GO TO 136	PROJ 523
DO 40 K=1, 2	PROJ 524
40 CALL SPRAG (J,K)	PROJ 525
136 CONTINUE	PROJ 526
C	PROJ 527
C ADD UP MALES AND FEMALES	PROJ 528
323 DO 137 J=1, LAST	PROJ 529
DO 137 I=1, 40	PROJ 530
137 AGE(I,J,3)=AGE(I,J,1)+AGE(I,J,2)	PROJ 531
C	PROJ 532
C	PROJ 533
DO 610 J=1, LAST	PROJ 534
WPOP(J)=0.0	PROJ 535
DO 609 I=5, 14	PROJ 536
609 WPOP(J)=WPOP(J)+AGE(I,J,3)	PROJ 537
DPOP(J)=AGE(1,J,3)-WPOP(J)	PROJ 538
610 DRAT(J)=DPOP(J)/WPOP(J)*1000.0	PROJ 539
DO 608 I=1, LAST	PROJ 540
W(I)=0.0	PROJ 541
DO 607 J=5, 11	PROJ 542
607 W(I)=AGE(J,I,2)+W(I)	PROJ 543
608 CW(I)=AGE(2,I,3)/W(I)	PROJ 544
IB=1	PROJ 545
IE=LAST-1	PROJ 546
K=TYPE+1	PROJ 547
GO TO (155,230,225,226,62,225,225),K	PROJ 548

226 IB=IBASE1	PROJ 549
GO TO 155	PROJ 550
225 IE=IBASE1-1	PROJ 551
230 DO 150 J=1,IE	PROJ 552
B(J,3)=0	PROJ 553
DO 150 K=1,2	PROJ 554
150 B(J,3)=(AGE(2,J+1,K)-GM(2,J,K))/RS(1,J,K)+B(J,3)	PROJ 555
IE=LAST-1	PROJ 556
155 N=0	PROJ 557
C CALCULATE VITAL RATES	PROJ 558
151 CONTINUE	PROJ 559
IF (TYPE.GE.5) IE=IBASE1-1	PROJ 560
1155 DO 152 J=IB,IE	PROJ 561
GFR(J)=B(J,3)/(W(J)+W(J+1))*2000.	PROJ 562
AA=(AGE(1,J,3)+AGE(1,J+1,3))/2.0	PROJ 563
DEAD(J)=0	PROJ 564
IF (MIGF.EQ.0) GO TO 1886	PROJ 565
DO 1885 K=1,2	PROJ 566
DO 1885 I=2,18	PROJ 567
IF (GM(I,J,K).LE.0.0) GO TO 1885	PROJ 568
DEAD(J)=GM(I,J,K)*(1.0/RS(I-1,J,K)-1.)*0.5+DEAD(J)	PROJ 569
1885 CONTINUE	PROJ 570
1886 DEAD(J)=AGE(1,J,3)+B(J,3)+GM(1,J,1)+GM(1,J,2)+DEAD(J)-AGE(1,J+1,3)	PROJ 571
CBR(J)=B(J,3)/AA*200.0	PROJ 572
CDR(J)=DEAD(J)/AA*200.0	PROJ 573
152 RNI(J)=CBR(J)-CDR(J)	PROJ 574
IF (TYPE.NE.6.OR.N.GE.1) GO TO 62	PROJ 575
IB=IBASE2	PROJ 576
IE=LAST-1	PROJ 577
N=N+1	PROJ 578
GO TO 1155	PROJ 579
62 CONTINUE	PROJ 580

IE=LAST-1	PROJ 581
DO 63 J=1, LAST	PROJ 582
R(1,J)=DLOG(AGE(1,J+1,3)/AGE(1,J,3))*20.0	PROJ 583
63 R(2,J)=((AGE(1,J+1,3)/AGE(1,J,3))**0.2-1.0)*100.0	PROJ 584
DO 812 K=1,3	PROJ 585
DO 812 J=1, LAST	PROJ 586
DFT(J,K)=0.0	PROJ 587
I=2	PROJ 588
810 F=AGE(I,J,K)/AGE(1,J,K)	PROJ 589
DFT(J,K)=DFT(J,K)+F	PROJ 590
IF (DFT(J,K).GE.0.5) GO TO 811	PROJ 591
I=I+1	PROJ 592
GO TO 810	PROJ 593
811 DFT(J,K)=FLOAT(LA(I+1))-(DFT(J,K)-.5)*5.0/F	PROJ 594
812 CONTINUE	PROJ 595
IF(NN.EQ.0.AND. (TYPE.EQ.1.OR.TYPE.EQ.5). OR.TYPE.EQ.0.OR.TYPE.EQ.	PROJ 596
13.OR.TYPE.EQ.4) GO TO 1258	PROJ 597
M=IBASE1	PROJ 598
IF (TYPE.EQ.6) M=IBASE2	PROJ 599
IE=IBASE1-1	PROJ 600
IF (JF.NE.1) GO TO 374	PROJ 601
F = 0.0	PROJ 602
DO 371 I = 1,7	PROJ 603
371 F = ASFR(I,M)+F	PROJ 604
DO 372 I = 1,7	PROJ 605
372 PASFR(I,M) = ASFR(I,M)/F	PROJ 606
374 DO 330 J=1, IE	PROJ 607
F=0.0	PROJ 608
DO 331 I=1,7	PROJ 609
331 F=F+PASFR(I,M)*(AGE(I+4,J,")+AGE(I+4,J+1,2)-GM(I+4,J,2))/2.0	PROJ 610
DO 332 I=1,7	PROJ 611
ASFR(I,J)=PASFR(I,M)*B(J,3)/F	PROJ 612

332 GRR(J)=GRR(J)+ASFR(I,J)	PROJ 613
TFR(J)=GRR(J)*1000.0	PROJ 614
GRR(J)=GRR(J)/(1.0+SEXRAT)	PROJ 615
CHECK(2,3)=RS(1,J,2)*5.0	PROJ 616
DO 333 I=3,11	PROJ 617
333 CHECK(I,3)=RS(I-1,J,2)*CHECK(I-1,3)	PROJ 618
DO 334 I=1,7	PROJ 619
334 RNRR(J)=RNRR(J)+ASFR(I,J)*CHECK(I+4,3)	PROJ 620
RNRR(J)=RNRR(J)/(1.0+SEXRAT)/5.0	PROJ 621
330 CONTINUE	PROJ 622
C ----- OUTPUTS	PROJ 623
1258 IF (ICUT.EQ.1) GO TO 11137	PROJ 624
CALL AGECOM(SINGLE)	PROJ 625
IF (ICUT.EQ.2) GO TO 99	PROJ 626
CALL SEXDIS	PROJ 628
CALL PYRMAD (1)	PROJ 629
IF (.NOT.(TYPE.LE.1.OR.TYPE.EQ.4)) CALL PYRMAD (IBASE1)	PROJ 630
IF (BASE2.NE.0) CALL PYRMAD (IBASE2)	PROJ 631
CALL PYRMAD (LAST)	PROJ 632
11137 CALL SUMMA NN	PROJ 633
99 IF(TYPE.EQ.4.AND.RERUN.NE.0) GO TO 3131	PROJ 634
IF(RERUN.NE.0) GO TO 67	PROJ 635
IF(NEXT.NE.0) GO TO 7C	PROJ 636
RETURN	PROJ 637
END	PROJ 638

	SUBROUTINE PYRMAD(JU)	PYRM	1
C	THIS PROGRAMME DRAWS A POPULATION AGE PYRAMID FOR YEAR IYEAR.	PYRM	2
	IMPLICIT REAL*8 (A-H,C-Z),INTEGER (I-N)	PYRM	3
	COMMON AGE(40,11,3),DFT(11,3),SR(19,24,10),RS(20,11,2),V1,V2,	PYRM	4
	2R(3,10), ASFR(7,10), GRR(10),EX(10,3),CBR(10),CDR(10),RNI(10),	PYRM	5
	4GFR(10),WPOP(11),DPOP(11),W(11),CW(11),DRAT(11),RNRR(11),B(10,3),	PYRM	6
	3PASFR(7,10) TFR(10),DEAD(10),C(7),KIRST,KASE1,KASE2,KYPE	PYRM	7
	COMMON LASS, LAST, IBASE1, IBASE2, IY(11), IX(11),	PYRM	8
	1NOTE(60), LA(20),LB(20) ,N7,N8	PYRM	9
	DIMENSION LINE(81), JD(20), KD(20), P(4),D(4,20),IM(20),IFO(10)	PYRM	10
	REAL LINE	PYRM	11
	DATA P/' ', '+', '-', 'I' /	PYRM	12
7	FORMAT (1H1///4X,7A4,6OX,2A4, ' VARIANT'//4X, 'SEX RATIOS (MALES PE	PYRM	13
	1R 100 FEMALES) AND PERCENTAGE'/4X, 'DISTRIBUTION OF POPULATION, BY	PYRM	14
	2 AGE AND SEX, ',I4//)	PYRM	15
41	FORMAT(4X, 'AGE' ,5X, 'SEX',4X, 'TOTAL',2X, 'MALES',1X, 'FEMLAES'/11X, '	PYRM	16
	IRATIOS' /)	PYRM	17
45	FORMA	PYRM	18
105	FORMAT(45X,81A1)	PYRM	19
108	FORMAT(45X,20(4H+---)), '+')	PYRM	20
110	FORMAT(4X, 'TOTAL',1X,4F7.2/)	PYRM	21
204	FORMAT(3X,2I3,1X,4F7.2,7X,81A1)	PYRM	22
205	FORMAT( 3X,I3, '+', 3X,4F7.2,7X,81A1)	PYRM	23
	IYEAR=KIRST-5+JU*5	PYRM	24
	K1=41	PYRM	25
	K2=41	PYRM	26
	JJ=N7	PYRM	27
	JK=JJ+1	PYRM	28
	DO 35 I=1,JJ	PYRM	29
	JD(I)=85-I*5	PYRM	30
35	KD(I)= -(JD(I)+4)	PYRM	31
	WRITE(6,7) C,V1,V2,IYEAR	PYRM	32
C	COMPUTE ( OF DISTRIBUTION	PYRM	33

K=JK	PYRM 34
DO 200 I=1,JK	PYRM 35
D(1, I)=AGE(K,JU,1)/AGE(K,JU,2)*100.0	PYRM 36
D(2, I)=AGE(K,JU,3)/AGE(1,JU,3)*100.0	PYRM 37
D(3, I)=AGE(K,JU,1)/AGE(1,JU,3)*100.0	PYRM 38
D(4, I)=AGE(K,JU,2)/AGE(1,JU,3)*100.0	PYRM 39
200 K=K-1	PYRM 40
WRITE(6,41)	PYRM 41
WRITE(6,110) (D(K,JK),K=1,4)	PYRM 42
C SELECT VALUES	PYRM 43
DO 777 I=1,JJ	PYRM 44
DO 101 J=1,81	PYRM 45
101 LINE(J)= P(1)	PYRM 46
KM= (41.-D(3,I)*4.)+.5	PYRM 47
KF= (D(4,I)*4.+41.)+.5	PYRM 48
K3=KM	PYRM 49
K4=KF	PYRM 50
IF(KM.GT.K1) KM=K1	PYRM 51
IF(KF.LT.K2) KF=K2	PYRM 52
IF (KM.EQ.41) GO TO 300	PYRM 53
DO 780 LL=KM,40	PYRM 54
780 LINE(LL)= P(3)	PYRM 55
300 IF (KF.EQ.41) GO TO 301	PYRM 56
DO 790 MM=42,KF	PYRM 57
790 LINE(MM)= P(3)	PYRM 58
301 LINE(KF)= P(2)	PYRM 59
LINE(KM)= P(2)	PYRM 60
LINE(41)= P(4)	PYRM 61
9 IF (I.GT.1) GO TO 20	PYRM 62
WRITE(6,205) JD(1), (D(J,1),J=1,4), LINE	PYRM 63
GO TO 21	PYRM 64



20 WRITE(6,204) JD(I),KD(I),(D(K,I),K=1,4), LINE	PYRM 65
21 DO 550 J=1,81	PYRM 66
550 LINE(J)= P(1)	PYRM 67
LINE(K3)= P(2)	PYRM 68
LINE(K4)= P(2)	PYRM 69
LINE(41)=P(4)	PYRM 70
WRITE(6,105) LINE	PYRM 71
K1=K3	PYRM 72
K2=K4	PYRM 73
777 CONTINUE	PYRM 74
WRITE(6,108)	PYRM 75
IM(12)=0	PYRM 76
II=11	PYRM 77
DO 55 I=1,10	PYRM 78
IM(II)=I	PYRM 79
II=II-1	PYRM 80
55 IFO(I)= I	PYRM 81
WRITE(6,45) (IM(I),I=2,12), IFO	PYRM 82
RETURN	PYRM 83
END	PYRM 84

	SUBROUTINE SEXDIS	SEXD 1
C	THIS PROGRAMME COMPUTES THE PERCENTAGE DISTRIBUTION OF THE	SEXD 2
C	POPULATION AND SEX RATIOS BY AGE.	SEXD 3
	IMPLICIT REAL*8 (A-H, O-Z), INTEGER (I-N)	SEXD 4
	COMMON AGE(40,11,3), DFT(11,3), SR(19,24,1C), RS(20,11,2), V1, V2,	SEXD 5
	2R(3,10), ASFR(7,10), GRR(10), EX(10,3), CBR(10), CDR(10), RNI(10),	SEXD 6
	4GFR(10), WPOP(11), WPOP(11), W(11), CW(11), DRAT(11), RNRR(11), B(10,3),	SEXD 7
	3PASFR(7,10), TFR(10), DEAD(10), C(7), KIRST, KASE1, KASE2, KYPE	SEXD 8
	COMMON LASS, LAST, IBASE1, IBASE2,                      IY(11), IX(11),	SEXD 9
	1NOTE(60),              LA(20), LB(20) ,N7,N8	SEXD 10
	13 FORMAT (/3X, 'MEDIAN', 11F11.2)	SEXD 11
	14 FORMAT (4X, 'AGE')	SEXD 12
	25 FORMAT (1E )	SEXD 13
	251 FORMAT (1HO, 'SEX RATIOS (MALES PER 1,000 FEMALES)'//1X, 'AGE/YEAR',	SEXD 14
	'111111)	SEXD 15
	253 FORMAT(//1X, 'PERCENTAGE DISTRIBUTION OF POPULATION'//2X, 'BOTH SEXES	SEXD 16
	S'/)	SEXD 17
	260 FORMAT(1X, 'ALL AGES', 11F11.2)	SEXD 18
	261 FORMAT (4X, I2, '-', I2, 11F11.2)	SEXD 19
	262 FORMAT (4X, I2, '+ ', 11F11.2)	SEXD 20
	341 FORMAT (1H1, 7A4, 60X, 2A4, ' VARIANT'//)	SEXD 21
	342 FORMAT (1X, 'PERCENTAGE DISTRIBUTION (THE TOTAL OF BOTH SEXES = 100	SEXD 22
	1)'//1X, 'MALES'//1X, 'AGE/YEAR', 11111)	SEXD 23
	344 FORMAT (//1X, 'FEMALES'/)	SEXD 24
	346 FORMAT (1X, 'PERCENTAGE DISTRIBUTION (THE TOTALS OF EACH SEX = 100)	SEXD 25
	'//2X, 'MALES'//1X, 'AGE/YEAR', 11111)	SEXD 26
C		SEXD 27
C		SEXD 28
	DO 250 J=1, LAST	SEXD 29
	DO 250 I=1, N8	SEXD 30
	RS(I,J,1)=AGE(I,J,1)/AGE(I,J,2)*100.0	SEXD 31
	250 RS(I,J,2)=AGE(I,J,3)/AGE(I,J,3)*100.0	SEXD 32

WRITE (6,341) C,V1,V2	SEXD 33
WRITE (6,251) (IY(I),I=1, LAST)	SEXD 34
DO 254 K=1,2	SEXD 35
IF (K.EQ.2) WRITE (6,253)	SEXD 36
WRITE (6,260)(RS(1,J,K),J=1, LAST)	SEXD 37
WRITE (6,25)	SEXD 38
DO 252 I=2,N7	SEXD 39
252 WRITE (6,261)LA(I),LB(I),(RS(I,J,K),J=1, LAST)	SEXD 40
254 WRITE (6,262) LA(N8),(RS(N8,J,K),J=1, LAST)	SEXD 41
WRITE (6,13) (DFT(I,3),I=1, LAST)	SEXD 42
WRITE (6,14)	SEXD 43
N=0	SEXD 44
248 DO 247 J=1, LAST	SEXD 45
DO 247 I=1,N8	SEXD 46
DO 247 K=1,2	SEXD 47
M=3	SEXD 48
IF (N.EQ.1) M=K	SEXD 49
247 RS(I,J,K)=AGE(I,J,K)/AGE(1,J,M)*100.0	SEXD 50
WRITE (6,341) C,V1,V2	SEXD 51
IF (N.EQ.0) WRITE (6,342) (IY(I),I=1, LAST)	SEXD 52
IF (N.EQ.1) WRITE (6,346) (IY(I),I=1, LAST)	SEXD 53
DO 343 K=1,2	SEXD 54
WRITE (6,25)	SEXD 55
IF (K.EQ.2) WRITE (6,344)	SEXD 56
WRITE (6,260)(RS(1,J,K),J=1, LAST)	SEXD 57
WRITE (6,25)	SEXD 58
DO 345 I=2,N7	SEXD 59
345 WRITE (6,261)LA(I),LB(I),(RS(I,J,K),J=1, LAST)	SEXD 60
WRITE (6,262) LA(N8),(RS(N8,J,K),J=1, LAST)	SEXD 61
IF (N.NE.1) GO TO 343	SEXD 62
WRITE (6,13) (DFT(I,K),I=1, LAST)	SEXD 63
WRITE (6,14)	SEXD 64
343 CONTINUE	SEXD 65
IF(N.EQ.1) GO TO 255	SEXD 66
N=1	SEXD 67
GO TO 248	SEXD 68
255 CONTINUE	SEXD 69
RETURN	SEXD 70
END	SEXD 71

	SUBROUTINE SPRAG (J,K)	SPRA 1
C	THIS PROGRAMME INTERPOLATES POPULATION AGES 5-24 BY SINGLE YEARS OF	SPRA 2
	IMPLICIT REAL*8 (A-H,O-Z), INTEGER (I-N)	SPRA 3
	COMMON AGE(40,11,3), DFT(11,3), SR(19,24,10), RS(20,11,2), V1,V2,	SPRA 4
	2R(3,10), ASFR(7,10), GRR(10), EX(10,3), CBR(10), CDR(10), RNI(10),	SPRA 5
	4GFR(10), WPOP(11), DPOP(11), W(11), CW(11), DRAT(11), RNRR(11), B(10,3),	SPRA 6
	3PASFR(7,10), TFR(10), DEAD(10), C(7), KIRST, KASE1, KASE2, KYPE	SPRA 7
	COMMON LASS, LAST, IBASE1, IBASE2, IY(11), IX(11),	SPRA 8
	INOTE(60), LA(20), LB(20), N7, N8	SPRA 9
	DIMENSION SM(5,5,3)	SPRA 10
	DATA SM/.3616,-.2768,.1488,-.0336,	SPRA 11
	10.0,.2640,-.0960,.0400,-.0080, 0.0,.1840,.0400,-.0320,.0080,0.0,	SPRA 12
	2.1200,.1360,-.0720,.0160,0.0,.0704,.1968,-.0848,.0176,0.0,	SPRA 13
	3.0336,.2272,-.0752,.0144,0.0,.0080,.2320,-.0480,.0080,0.0,	SPRA 14
	4.0030,.2160,-.0080,0.0,0.0,-.0160,.1840,.0400,-.0080,0.0,	SPRA 15
	5-.0176,.1408,.0912,-.0144,0.0,-.0128,.0848,.1504,-.0240,.0016,	SPRA 16
	6-.0016,.0144,.2224,-.0416,.0064,.0064,-.0336,.2544,-.0336,.0064,	SPRA 17
	7.0064,-.0416,.2224,.0144,-.0016,.0016,-.0240,.1504,.0848,-.0128/	SPRA 18
C	INTERPOLATE SINGLE YEARS OF AGE FROM AGE 5 TO 24 AND ASSIGN THEM TO	SPRA 19
C	AGE(I,J,K) WHERE I=21,40	SPRA 20
	402 IB=2	SPRA 21
	IE=5	SPRA 22
	M=2	SPRA 23
	DO 404 L=2,5	SPRA 24
	DO 400 IR=1,5	SPRA 25
	IC=1	SPRA 26
	E=0	SPRA 27
	DO 401 I=IB,IE	SPRA 28
	E=E+AGE(I,J,K)*SM(IC,IR,M)	SPRA 29
	401 IC=IC+1	SPRA 30
	N=10+IR+L*5	SPRA 31
	AGE(N,J,K)=E	SPRA 32
	400 CONTINUE	SPRA 33
	M=3	SPRA 34
	IF (L.GE.3) IB=IB+1	SPRA 35
	404 IE=IE+1	SPRA 36
	403 RETURN	SPRA 37
	END	SPRA 38

	SUBROUTINE SUMMA (NN)	SUMM 1
C	THIS PROGRAMME GIVES A SUMMARY TO VARIOUS DEMOGRAPHIC MEASURES.	SUMM 2
	IMPLICIT REAL*8 (A-H, O-Z), INTEGER (I-N)	SUMM 3
	COMMON AGE(40, 11, 3), DFT(11, 3), SR(19, 24, 10), RS(20, 11, 2), V1, V2,	SUMM 4
	2R(3, 10), ASFR(7, 10), GRR(10), EX(11, 3), CBR(10), CDR(10), RNI(10),	SUMM 5
	4GFR(10), WPOP(11), DPOP(11), W(11), CW(11), DRAT(11), RNRR(11), B(10, 3),	SUMM 6
	3PASFR(7, 10), TFR(10), DEAD(10), C(7), KIRST, KASE1, KASE2, KYPE	SUMM 7
	COMMON LASS, LAST, IBASE1, IBASE2, IY(11), IX(11),	SUMM 8
	INOTE(60), LA(20), LB(20), N7, N8	SUMM 9
	DIMENSION Z(11)	SUMM 10
	WRITE (6, 100) C, V1, V2, KIRST, LASS	SUMM 11
100	FORMAT (1H1, 4X, 7A4, 60A, 2A4, ' VARIANT'//4X, 'DEMOGRAPHIC INDICATORS	SUMM 12
	1, 'I4, '- ', I4//)	SUMM 13
	WRITE (6, 113)	SUMM 14
113	FORMAT (32X, 'POPULATION (IN THOUSANDS)', 18X, 'DEPENDENCY', 3X, 'CHILDSSUMM 15	
	1-WOMEN', 8X, 'SEX', 10X, 'MEDIAN'/78X, 'RATIO ', 6X, 'RATIO ', 8X,	SUMM 16
	2'RATIO', 10X, 'AGE'/9X, 'YEAR', 12X, 'TOTAL', 9X, 'AGED 15-64' ,	SUMM 17
	27X, 'WOMEN 15-49', 8X, '(PER 1,000)', 2X, '(PER WOMAN)',	SUMM 18
	42X, '(PER 100 FEMALES)', 2X, '(YEARS)'/6X, 9(' - '), 4X, 52(' - '), 3X,	SUMM 19
	52(12(' - '), 2X), 16(' - '), 2X, 7(' - '))	SUMM 20
	DO 112 J=1, LAST	SUMM 21
	Z(J)=AGE(1, J, 1)/AGE(1, J, 2)*100.0	SUMM 22
112	WRITE (6, 111) IY(J), AGE(1, J, 3), WPOP(J), W(J), DRAT(J), CW(J), Z(J),	SUMM 23
	1Dft(J, 3)	SUMM 24
111	FORMAT (1H , 8X, I4, 3F18.3, 6X, F10.1, 3X, F10.3, 6X, F10.1, 4X, F10.2)	SUMM 25
	WRITE (6, 114)	SUMM 26
114	FORMAT ( //9X, 'YEAR', 8X, 'AVERAGE ANNUAL RATES', 14X, 'IMPLIED', SUMM 27	
	2'VITAL RATES', 16X, 'ESTIMATED NUMBERS OF'/21X, 'OF GROWTH (PERCENT)SUMM 28	
	3', 18X, '(PER 1,000)', 23X, '(IN THOUSANDS)'/19X, 'EXPONENTIAL COMPOU SUMM 29	
	4ND', 11X, 'NATURAL', 5X, 'CRUDE', 5X, 'CRUDE', 12X, 'BIRTHS', 9X, 'DEATHS' / SUMM 30	
	551A, 'INCREASE', 4X, 'BIRTH DEATH' /	SUMM 31
	66X, 9(' - '), 4X, 23(' - '), 7X, 28(' - '))	SUMM 32
	IE=LAST-1	SUMM 33

DO 11 J=1,IE	SUMM 34
IF (KYPE.EQ.3.AND.J.LT.IBASE1.OR.KYPE.EQ.5.AND.J.GE.IBASE1.	SUMM 35
10R.(J.GE.IBASE1.AND.J.LE.IBASE2).AND.KYPE.EQ.6.OR.KYPE.EQ.4)	SUMM 36
3 GO TO 12	SUMM 37
WRITE (6,101) IY(J),IY(J+1),(R(I,J),I=1,2),FNI(J),CBR(J),CDR(J),	SUMM 38
1B(J,3),DEAD(J)	SUMM 39
GO TO 11	SUMM 40
12 WRITE (6,102) IY(J),IY(J+1),(R(I,J),I=1,2)	SUMM 41
11 CONTINUE	SUMM 42
IF (KYPE.EQ.4) RETURN	SUMM 43
101 FORMAT (1H ,5X,I4,'-',I4,3X,2F10.3,10X,3F10.2,5X,2F15	SUMM 44
102 FORMAT (1H ,5X,I4,'-',I4,3X,2F10.3)	SUMM 45
WRITE (6,103)	SUMM 46
103 FORMAT (///21X,'REPRODUCTION RATES',12X,'TOTAL',7X,'GENERAL',	SUMM 47
113X,'EXPECTATION OF LIFE AT BIRTH'/49X,'FERTILITY FERTILITY',	SUMM 48
220X,'(YEARS)'/9X,'YEAR',10X,'GROSS',5X,'NET',15X,'RATE',9X,'RATE'/'	SUMM 49
350X,'(PER 1,000 WOMEN)',17X,'MALES',4X,'FEMALES',4X,'TOTAL'/'	SUMM 50
56X,9(' '),4X,23(' '),5X,12(' '),2X,12(' '),8X,31(' ')	SUMM 51
IF (KYPE.EQ.5) IE=IBASE1-1	SUMM 52
DO 13 I=1,IE	SUMM 53
IF (KYPE.EQ.3.AND.I.LT.IBASE1.OR.KYPE.EQ.6.AND.(I.GE.IBASE1.AND.	SUMM 54
11.LE.IBASE2)) GO TO 13	SUMM 55
IF(( KYPE.EQ.5.OR.KYPE.EQ.1). AND.NN.EQ.0) GO TO 14	SUMM 56
WRITE (6,104) IY(I),IY(I+1),GRR(I),RNRR(I),TFR(I),GFR(I),(EX(I,J),	SUMM 57
1J=1,3)	SUMM 58
GO TO 13	SUMM 59
14 WRITE (6,106) IY(I),IY(I+1),GFR(I),(EX(I,J),J=1,3)	SUMM 60
13 CONTINUE	SUMM 61
104 FORMAT (1H ,5X,I4,'-',I4,3X,2F10.3,5X,2(3X,F10.1),10X,3F10.2)	SUMM 62
106 FORMAT (1H ,5X,I4,'-',I4,44X,F10.1,10X,3F10.2)	SUMM 63
RETURN	SUMM 64
END	SUMM 65

Appendix IV

LIFE TABLES SURVIVAL RATIOS OF THE UNITED NATIONS,  
AND THE "WEST", "NORTH", "EAST", AND "SOUTH" OF  
THE COALE AND DEMENY MODEL LIFE TABLES

These life table survival ratios are presented here in the form of computer card images. The first value on the first card of each model life table is the expectation of life at birth; the second value and all subsequent values on the same card are survival ratios, consecutively, for birth to ages 0-4 to ages 5-9, ages 5-9 to 10 to 14, ... and ages 40-44 to 45-49, corresponding to the given expectation of life at birth. The values on the second card are survival ratios, consecutively, for ages 45-49 to 50-54, ages 50-54 to 55-59, ... and age 75 and over to age 80 and over, corresponding to the same expectation of life at birth given in the first card. The values on the third and fourth cards, fifth and sixth cards, ... etc., contain respectively the expectation of life at birth and survival ratios for the corresponding age groups as the first and second cards for higher mortality levels.

All decimal points are omitted in the printouts. Thus, for example, on the first card of the United Nations model life table survival ratios, males, the expectation of life at birth of 1980 is actually 19.80 (years) and the survival ratio for birth to ages 0-4 of 60920 is actually 0.60920.

SURVIVAL RATIOS - U.N. MODEL, MALES

M1	1980	60920	76660	92690	93830	92340	90730	89060	86750	83570	79760
M1	76030	72190	67760	62210	53950	43030	25470				
M1	2215	63340	79530	93590	94440	92910	91410	89990	88050	85330	81980
M1	78500	74690	70110	64280	55820	44780	26890				
M1	2475	66220	82000	94360	94980	93460	92070	90880	89250	86920	83950
M1	80720	76980	72330	66330	57720	46600	28410				
M1	2723	68530	84050	95010	95470	93990	92710	91710	90360	88360	85720
M1	82710	79070	74430	68330	59630	48470	29950				
M 1	2957	70580	85770	95560	95900	94440	93260	92450	91300	89570	87220
M 1	84400	80860	76260	70110	61390	50230	31360				
M 1	3194	72480	87310	96060	96290	94870	93790	93130	92180	90680	88570
M 1	85940	82510	77980	71820	63120	52020	32830				
M 1	3442	74400	88680	96510	96660	95320	94340	93810	93010	91700	89800
M 1	87340	84060	79640	73550	64920	53860	34340				
M 1	3690	76260	89930	96910	97000	95740	94840	94400	93730	92580	90850
M 1	88540	85420	81130	75140	66600	55610	35770				
M 1	3924	77890	90980	97250	97290	96120	95300	94940	94370	93360	91800
M 1	89640	86640	82490	76600	68200	57320	37130				
M 1	4165	79500	91980	97570	97580	96480	95740	95450	94960	94080	92670
M 1	90620	87760	83750	77980	69720	58960	38430				
M 1	4405	81070	92870	97850	97830	96810	96150	95920	95510	94730	93420
M 1	91500	88770	84880	79240	71160	60540	39670				
M 1	4637	82560	93690	98110	98060	97120	96530	96340	95990	95290	94080
M 1	92260	89650	85870	80370	72460	61990	40800				
M 1	4872	84060	94450	98340	98270	97410	96880	96730	96440	95800	94670
M 1	92940	90450	86780	81410	73670	63340	41860				
M 1	5117	85570	95180	98560	98480	97720	97250	97120	96860	96280	95230
M 1	93590	91210	87670	82440	74870	64690	42910				
M 1	5357	87030	95840	98760	98670	97980	97580	97480	97250	96710	95750
M 1	94190	91890	88470	83380	75980	65940	43870				
M 1	5613	88770	96480	98930	98840	98240	97890	97810	97600	97110	96170



M 1	94690	92500	89190	84230	76980	67080	44740				
M 1	5882	90700	97080	99090	99000	98480	98190	98110	97920	97460	96580
M 1	95160	93060	89850	85020	77940	68160	45570				
M 1	6153	92620	97650	99240	99140	98710	98470	98400	98220	97790	96960
M 1	95580	93560	90440	85730	78810	69170	46330				
M 1	6411	94380	98180	99370	99280	98930	98730	98660	98490	98080	97280
M 1	95960	94000	90980	86390	79630	70120	47030				
M 1	6648	95800	98670	99490	99410	99130	98980	98910	98740	98350	97590
M 1	96320	94410	91480	87020	80420	71020	47700				
M 1	6856	96780	99080	99630	99550	99350	99240	99160	98970	98600	97860
M 1	96640	94810	91980	87650	81190	71920	48330				
M 1	7027	97440	99360	99740	99680	99530	99440	99350	99170	98810	98120
M 1	96960	95210	92490	88300	81970	72830	48940				
M 1	7160	97880	99540	99820	99770	99650	99570	99480	99300	98970	98350
M 1	97270	95580	92960	88900	82690	73720	49580				
M 1	7265	98170	99660	99860	99820	99740	99660	99560	99390	99070	98510
M 1	97520	95940	93410	89450	83350	74540	50210				

SURVIVAL RATIOS - U.N. MODEL, FEMALES

F1	2020	62900	76370	92120	93010	91460	89650	87790	85810	83900	82030
F1	79650	76630	72380	66270	57820	46360	27360				
F1	2272	65580	79320	93090	93700	92090	90410	88840	87200	85630	84000
F1	81750	78720	74370	68110	59520	47990	28770				
F1	2525	68010	81790	93920	94320	92710	91150	89830	88490	87190	85760
F1	83640	80640	76260	69930	61250	49700	30230				
F1	2777	70240	83870	94620	94870	93300	91860	90760	89670	88610	87340
F1	85330	82410	78050	71710	63000	51430	31710				
F1	3040	72420	85700	95240	95390	93900	92590	91650	90770	89890	88750
F1	86860	84070	79810	73550	64870	53300	33290				
F1	3308	74470	87320	95790	95860	94460	93270	92490	91780	91060	90030
F1	88250	85600	81450	75300	66680	55190	34900				
F1	3560	76270	88700	96270	96280	94950	93870	93220	92650	92040	91100
F1	89420	86880	82850	76820	68300	56890	36330				
F1	3814	78020	89960	96700	96660	95410	94420	93880	93420	92890	92020
F1	90430	88000	84110	78220	69830	58530	37670				
F1	4074	79690	91050	97070	97010	95870	95000	94560	94190	93720	92900
F1	91400	89100	85380	79670	71450	60290	39120				
F1	4344	81350	92090	97420	97340	96310	95550	95200	94900	94480	93690
F1	92290	90120	86550	81040	72990	61970	40500				
F1	4636	82920	93000	97730	97640	96710	96060	95770	95500	95130	94390
F1	93040	90980	87610	82300	74430	63580	41790				
F1	4866	84430	93840	98010	97920	97090	96510	96280	96040	95700	95000
F1	93730	91780	88590	83480	75780	65110	43000				
F1	5131	85940	94630	98280	98190	97450	96940	96740	96540	96220	95560
F1	94370	92520	89490	84590	77100	66620	44160				
F1	5394	87390	95370	98520	98430	97780	97350	97180	97000	96690	96060
F1	94930	93180	90300	85590	78320	68040	45230				
F1	5652	88820	96070	98740	98650	98090	97710	97560	97390	97100	96500
F1	95430	93770	91040	86530	79480	69400	46240				
F1	5921	90360	96690	98950	98860	98380	98070	97920	97770	97490	96910
F1	95890	94330	91750	87430	80590	70730	48100				
F1	6205	92080	97310	99140	99060	98650	98390	98260	98110	97830	97270

F 1	96310	94820	92380	88250	81620	71970	48100					
F 1	6491	93800	97910	99320	99250	98910	98690	98580	98420	98140	97590	
F 1	96580	95290	92980	89030	82590	73160	48950					
F 1	6757	95350	98440	99480	99410	99140	98960	98840	98680	98410	97880	
F 1	97000	95700	93510	89710	83450	74220	49700					
F 1	6999	96600	98920	99620	99560	99350	99200	99090	98930	98660	98140	
F 1	97310	96090	94020	90360	84290	75290	50410					
F 1	7180	97440	99250	99720	99670	99520	99400	99290	99130	98860	98350	
F 1	97540	96370	94370	90830	84900	76020	50940					
F 1	7324	98010	99480	99810	99760	99650	99560	99450	99290	99030	98530	
F 1	97750	96610	94660	91220	85490	76770	51430					
F 1	7434	98380	99630	99860	99820	99740	99660	99560	99410	99150	98680	
F 1	97920	96800	94910	91610	86090	77640	51920					
F 1	7519	98840	99730	99900	99870	99800	99730	99630	99480	99230	98790	
F 1	98060	96950	95100	91960	86680	78520	52560					

## SURVIVAL RATIOS - WEST MODEL, MALES

M 2	1803	51868	78598	94169	94345	92179	90238	88887	87123	84849	82416
M 2	79287	75187	69526	61358	51778	39625	25301				
M 2	2044	56434	80839	94684	94829	92837	91067	89837	88220	86118	83839
M 2	80869	76956	71503	63655	54306	42345	26873				
M 2	2285	59820	82791	95148	95265	93431	91815	90695	89209	87262	85121
M 2	82296	78551	73290	65731	56591	44808	28222				
M 2	2526	62913	84513	95568	95662	93971	92495	91474	90198	88302	86287
M 2	83595	80002	74918	67621	58675	47056	29415				
M 2	2767	65796	86049	95953	96025	94466	93117	92187	90932	89255	87354
M 2	84784	81330	76410	69354	60586	49121	30496				
M 2	3008	68493	87431	96306	96359	94921	93690	92844	91690	90132	88336
M 2	85830	82553	77786	70952	62349	51027	31500				
M 2	3248	71026	88684	96633	96668	95343	94220	93452	92392	90944	89245
M 2	86895	83684	79061	72432	63983	52796	32449				
M 2	3489	73413	89828	36937	96955	95735	94712	94017	93044	91699	90090
M 2	87838	84736	80247	73809	65504	54443	33363				
M 2	3730	75667	90877	97220	97223	96101	95172	94544	93653	92404	90878
M 2	88719	85718	81355	75096	66925	55984	34254				
M 2	3971	77801	91845	97484	97474	96443	95602	95038	94222	93064	91616
M 2	89544	86637	82393	76301	68257	57428	35131				
M 2	4212	79826	92741	97732	97710	96765	96006	95501	94758	93683	92399
M 2	90319	87501	83369	77433	69510	58787	36002				
M 2	4452	81752	93574	97966	97932	97067	96386	95937	95261	94267	92962
M 2	91048	88313	84289	78501	70690	60068	36872				
M 2	4711	83749	94494	98222	98161	97353	96740	96343	95730	94815	93584
M 2	91762	89117	85193	79540	71826	61291	37770				
M 2	4956	85583	95280	98434	98360	97625	97083	96739	96183	95328	94140
M 2	92358	89760	85904	80353	72714	62243	38543				
M 2	5183	87196	95941	98620	98536	97870	97392	97094	96591	95792	94643
M 2	92904	90354	86569	81117	73552	63147	39303				
M 2	5414	88750	96562	98798	98706	98107	97692	97438	96987	96246	95141

M 2	93452	90957	87248	81901	74417	64084	40116				
M 2	5647	90214	97174	98969	98872	98338	97982	97770	97370	96688	95632
M 2	93998	91563	87938	82702	75305	65050	40982				
M 2	5884	91630	97737	99133	99031	98561	98262	98089	97739	97117	96113
M 2	94541	92170	88634	83514	76210	66039	41897				
M 2	6123	92995	98257	99289	99184	98776	98530	98395	98093	97531	96583
M 2	95075	92774	89331	84332	77127	67045	42858				
M 2	6364	94309	98738	99437	99331	98981	98787	98687	98432	97929	97038
M 2	95599	93370	90925	85149	78047	68059	43857				
M 2	6602	95585	99139	99570	99467	99181	99033	98957	98743	98292	97458
M 2	96090	93949	90724	85990	79012	69132	44914				
M 2	6856	96717	99433	99688	99598	99375	99269	99220	99052	98677	97941
M 2	96701	94703	91664	87149	80383	70702	46356				
M 2	7119	97739	99665	99793	99720	99557	99490	99462	99340	99046	98427
M 2	97344	95530	92728	88493	82002	72585	48056				
M 2	7390	98614	99831	99880	99825	99720	99682	99610	99590	99379	98896
M 2	98004	96425	93927	90051	83933	74882	50071				

SURVIVAL RATIOS - WEST MODEL, FEMALES

F 2	2000	57278	78860	93457	93471	91748	90310	89135	87970	87076	86333
F 2	84177	80192	73821	65292	55399	42645	27271				
F 2	2250	60627	81044	94052	94053	92473	91155	90077	89004	88166	87440
F 2	85395	81655	75655	67576	57994	45547	28901				
F 2	2500	63713	82959	94587	94579	93126	91916	90926	89937	89148	88438
F 2	36494	82975	77314	69639	60344	48173	30141				
F 2	2750	66574	84658	95073	95056	93720	92607	91698	90785	90040	89345
F 2	87494	84176	78826	71518	62488	50567	31351				
F 2	3000	69239	86180	95518	95493	94263	93241	92404	91561	90857	90174
F 2	88409	85276	80212	73240	64457	52765	32475				
F 2	3250	71731	87556	95927	95896	94764	93823	93055	92275	91608	90938
F 2	89253	86289	81491	74828	66274	54793	3354				
F 2	3500	74073	83806	96304	96268	95227	94363	93656	92935	92304	91644
F 2	90034	87227	82677	76299	67960	56673	34570				
F 2	3750	76273	89951	96655	96614	95658	94864	94216	93549	92950	92300
F 2	90760	88100	83781	77607	69530	58424	35577				
F 2	4000	73353	91004	96983	96937	96059	95332	94738	94122	93552	92912
F 2	91438	88914	84813	78946	70999	60060	36574				
F 2	4250	80321	92977	97289	97240	96135	95769	95226	94658	94116	93484
F 2	92072	89676	85780	80144	72375	61594	37567				
F 2	4500	82189	92880	97576	97524	96789	96180	95685	95162	94646	94022
F 2	92669	90393	86639	81269	73670	63036	38561				
F 2	4750	83964	93720	97846	97791	97121	96567	96117	95636	95144	94528
F 2	93230	91067	87547	82330	74891	64395	39558				
F 2	5000	85661	94528	98100	98043	97430	96927	96518	96077	95608	94998
F 2	93753	91695	88344	83317	76029	65661	40550				
F 2	5250	87369	95381	98368	98286	97691	97213	96846	96452	96011	95406
F 2	94201	92209	89018	84131	76938	66670	41439				
F 2	5500	88895	96125	98603	98523	97998	97572	97236	96864	96421	95810

F 2	94636	92742	89661	84916	77830	67648	42345					
F 2	5750	90332	96818	98821	98744	98285	97908	97605	97258	96829	96209	
F 2	95071	90259	90312	85715	78746	68656	43303					
F 2	6000	91708	97441	99024	98950	98553	98223	97953	97633	97218	96600	
F 2	95502	93775	90968	86524	79681	69691	44309					
F 2	6250	93024	98003	99213	99143	98803	98518	98281	97990	97592	96981	
F 2	95928	94289	91624	87338	80629	70747	45358					
F 2	6500	94282	98514	99389	99323	99036	98794	98590	98328	97951	97352	
F 2	96347	94796	92276	88152	81584	71816	46443					
F 2	6750	95486	98981	99554	99491	99254	99053	98880	98649	98294	97710	
F 2	96755	95294	92919	88959	82537	72889	47556					
F 2	7000	96618	99358	99695	99647	99470	99309	99168	98968	98633	98066	
F 2	97164	95798	93574	89788	83536	74021	48700					
F 2	7250	97564	99605	99800	99764	99648	99539	99425	99253	98960	98449	
F 2	97639	96412	94402	90885	84926	75670	50255					
F 2	7500	98395	99787	99884	99859	99785	99713	99633	99503	99267	98829	
F 2	98133	97067	95308	92113	86518	77592	51971					
F 2	7750	99070	99904	99943	99928	99888	99846	99796	99709	99537	99191	
F 2	98630	97752	96283	93481	88360	79891	53919					

SURVIVAL RATIOS - NORTH MODEL, MALES

M 3	1755	55824	72799	90159	93418	92013	90361	89748	88676	86762	84281
M 3	81466	77374	71176	62556	49805	33804	20717				
M 3	1994	59234	75499	91058	93979	92662	91147	90587	89604	87848	85558
M 3	82921	79080	73260	65081	52937	37609	23534				
M 3	2234	62371	77875	91863	94482	93245	91852	91340	90438	88823	86707
M 3	84229	80614	75137	67358	55775	41062	25800				
M 3	2475	65274	79991	92589	94938	93773	92491	92022	91194	89707	87748
M 3	85415	82008	76841	69429	58366	44218	27701				
M 3	2717	67973	81891	93249	95354	94256	93075	92645	91884	90515	88700
M 3	86498	83281	78400	71326	60746	47120	29350				
M 3	2959	70495	83613	93853	95736	94699	93610	93217	92518	91257	89574
M 3	87493	84452	79834	73073	62945	49802	30827				
M 3	3202	72859	85182	94409	96089	95109	94105	93745	93103	91943	90381
M 3	88412	85535	81160	74690	64985	52292	32186				
M 3	3446	75082	86621	94924	96416	95489	94564	94235	93647	92579	91131
M 3	89265	86541	82392	76193	66886	54612	33465				
M 3	3690	77179	87947	95402	96720	95843	94991	94691	94153	93171	91829
M 3	90059	87478	83541	77596	68663	56781	34691				
M 3	3935	79161	89175	95847	97004	96174	95390	95117	94625	93725	92481
M 3	90802	88355	84615	78909	70330	58816	35883				
M 3	4180	81040	90315	96264	97271	96485	95764	95516	95069	94244	93093
M 3	91498	89177	85623	80142	71897	60730	37056				
M 3	4427	82819	91376	96654	97521	96776	96115	95891	95484	94731	93667
M 3	92156	89980	86620	81349	73430	62614	38264				
M 3	4672	84579	92480	97039	97744	97019	96406	96200	95831	95147	94171
M 3	92726	90633	87403	82288	74607	64028	39263				
M 3	4907	86165	93471	97392	97958	97255	96704	96515	96174	95539	94617
M 3	93214	91193	88077	83102	75634	65266	40199				
M 3	5146	87691	94380	97724	98166	97507	96997	96826	96513	95928	95061
M 3	93704	91761	88765	83937	76692	66545	41198				
M 3	5389	89135	95239	98036	98368	97744	97284	97130	96846	96311	95502



M 3	94194	92834	89462	84789	77775	67862	42261				
M 3	5634	90519	96029	98329	98561	97976	97564	97427	97171	96686	95937
M 3	94683	92908	90164	85652	78879	69208	43383				
M 3	5882	91844	96756	98603	98747	98200	97835	97714	97487	97052	96362
M 3	95165	93480	90866	86520	79995	70573	44558				
M 3	6133	93111	97425	98860	98924	98417	98096	97992	97792	97407	96777
M 3	95639	94044	92564	87387	81114	71948	45779				
M 3	6385	94321	98044	99101	99093	98625	98347	98258	98085	97748	97178
M 3	96102	94599	92251	88246	82228	73321	47035				
M 3	6640	95475	98620	99328	99253	98823	98585	98512	98366	98075	97565
M 3	96549	95139	92923	89090	83326	74681	48313				
M 3	6889	96573	99164	99538	99406	99016	98818	98759	98639	98392	97912
M 3	96930	95593	93492	89829	84309	75922	49526				
M 3	7160	97468	99472	99685	99564	99273	99132	99075	98957	98733	98312
M 3	97430	96231	94323	90936	85809	77851	51240				
M 3	7443	98301	99711	99810	99698	99475	99375	99333	99243	99070	98730
M 3	97973	96942	95269	92230	87594	80189	53242				

SURVIVAL RATIOS - NORTH MODEL, FEMALES

F 3	2000	60427	74013	90046	93258	92796	91764	90378	88861	87762	87058
F 3	85598	81946	75526	66234	53581	38882	24663				
F 3	2250	63540	76570	90969	93854	93414	92462	91199	89815	88796	88120
F 3	86733	83325	77347	68612	56612	42510	26859				
F 3	2500	66397	78829	91795	94388	93969	93090	91936	90673	89724	89073
F 3	87752	84565	78988	70756	59355	45794	28774				
F 3	2750	69037	80846	92540	94873	94471	93659	92605	91450	90565	89937
F 3	88675	85691	80478	72707	61856	48790	30408				
F 3	3000	71487	82663	93218	95315	94930	94178	93215	92160	91332	90726
F 3	89519	86720	81841	74495	64151	51541	31881				
F 3	3250	73773	84314	93838	95720	95351	94654	93775	92812	92037	91450
F 3	90293	87666	83096	76141	66268	54079	33246				
F 3	3500	75914	85821	94409	96095	95740	95095	94293	93414	92688	92119
F 3	91009	88541	84256	77665	68232	56433	34540				
F 3	3750	77925	87206	94938	96443	96101	95503	94773	93972	93291	92739
F 3	91673	89353	85334	79083	70060	58624	35789				
F 3	4000	79819	88485	95429	96766	96437	95883	95221	94492	93853	93316
F 3	92291	90110	86339	80406	71768	60671	37009				
F 3	4250	81609	89670	95886	97068	96751	96239	95639	94979	94378	93856
F 3	92869	90818	87280	81644	73369	62590	38214				
F 3	4500	83303	90772	96314	97351	97045	96572	96031	95434	94870	94361
F 3	93410	91483	88162	82807	74873	64393	39409				
F 3	4750	84907	91799	96715	97617	97321	96885	96298	95862	95331	94835
F 3	93918	92106	88997	83912	76316	66155	40636				
F 3	5000	86486	92878	97125	97860	97553	97148	96714	96235	95727	95235
F 3	94345	92638	89706	84825	77469	67498	41680				
F 3	5250	87942	93907	97519	98110	97812	97432	97042	96610	96118	95618
F 3	94737	93105	90313	85613	78471	68672	42674				
F 3	5500	89312	94851	97879	98346	98055	97705	97358	96972	96500	95998
F 3	95131	93576	90929	86417	79499	69883	43725				
F 3	5750	90620	95700	98207	98567	98288	97967	97663	97321	96872	96372
F 3	95523	94050	91550	87233	80548	71127	44828				
F 3	6000	91867	96464	98507	98774	98508	98217	97953	97655	97231	96738

F 3	95911	94522	92173	88055	81613	72396	45980				
F 3	6250	93055	97155	98782	98967	98717	98455	98231	97975	97576	97095
F 3	96294	94990	92793	88879	82686	73682	47171				
F 3	6500	94137	97785	99035	99149	98914	98682	98494	98278	97907	97440
F 3	96668	95451	93406	88697	83757	74974	48393				
F 3	8750	95265	98361	99271	99319	99100	98896	98744	98566	98224	97773
F 3	97032	95902	94007	90504	84820	76262	49634				
F 3	7000	96292	98894	99490	99478	99275	99098	98979	98839	98524	98092
F 3	97383	96339	94592	91294	85865	77536	50883				
F 3	7250	97280	99401	99701	99632	99444	99292	99207	99103	98816	98400
F 3	97725	96745	95114	92013	86827	78721	52089				
F 3	7500	98034	99650	99818	99765	99639	99528	99456	99365	99119	98741
F 3	98119	97257	95815	93011	88220	80511	53681				
F 3	7750	98713	99823	99902	99858	99768	99689	99641	99579	99386	99073
F 3	98539	97815	96597	94154	89855	82668	55484				

SURVIVAL RATIOS - EAST MODEL, MALES

M 4	1743	45851	78452	94851	95982	94076	92847	92331	91007	89055	86851
M 4	84314	80826	75468	67179	55936	42600	26692				
M 4	1993	49757	80717	95289	96295	94530	93399	92925	91703	89888	87805
M 4	85359	81971	76791	68801	57899	44797	27947				
M 4	2243	53400	82685	95687	96581	94944	93903	93467	92338	90648	88676
M 4	86313	83015	77999	70285	59694	46808	29066				
M 4	2492	56814	84420	96051	96843	95324	94365	93965	92922	91346	89476
M 4	87188	83975	79110	71650	61347	48662	30086				
M 4	2739	60024	85969	96387	97085	95675	94791	94424	93461	91992	90215
M 4	87997	84862	80137	72914	62878	50380	31036				
M 4	2986	63053	87364	96698	97310	96001	95187	94850	93961	92590	90902
M 4	88748	85686	81091	74090	64302	51978	31933				
M 4	3232	65920	88630	96987	97519	96306	95556	95248	94428	93149	91541
M 4	89448	86453	81981	75187	65631	53471	32794				
M 4	3477	68639	89788	97257	97715	96590	95901	95619	94864	93671	92139
M 4	90103	87172	82814	76215	66878	54872	33628				
M 4	3720	71223	90852	97510	97899	96857	96225	95968	95274	94162	92701
M 4	90717	87846	83597	77182	68049	56189	34444				
M 4	3962	73685	91835	97748	98072	97109	96529	96297	95659	94623	93230
M 4	91295	88481	84534	78092	69153	57430	35248				
M 4	4207	76085	92840	97985	98221	97328	96800	96592	96012	95050	93716
M 4	91822	89056	84991	78891	70102	58485	35989				
M 4	4438	78302	93728	98195	98368	97539	97054	96863	96328	95421	94127
M 4	92254	89514	85514	72532	70874	59344	36635				
M 4	4669	80440	94541	98394	98511	97744	97301	97128	96637	95786	94535
M 4	92688	89978	86046	80186	71664	60227	37317				
M 4	4902	82498	95288	98582	98649	97945	97543	97387	96939	96143	94938
M 4	93122	90447	86586	80853	72471	61131	38036				
M 4	5135	34478	95976	98761	98783	98140	97778	97639	97233	96493	95336
M 4	93554	90918	87132	81530	73292	62055	38792				
M 4	5368	86379	96612	98930	98913	98329	98005	97883	97518	96834	95728

M 4	93983	91390	87682	82214	74124	62993	39584				
M 4	5602	88205	97202	99090	99038	98512	98226	98119	97795	97165	96111
M 4	94407	91860	88233	82901	74964	63943	40410				
M 4	5835	89927	97780	99242	99158	98639	98438	98346	98061	97486	96484
M 4	94824	92326	88782	83588	75805	64898	41265				
M 4	6068	91555	98343	99386	99273	98858	98642	98565	98318	97796	96847
M 4	95232	92786	89326	84271	76642	65853	42146				
M 4	6300	93124	98856	99523	99384	99020	98837	98775	98563	98093	97197
M 4	95629	93236	89861	84945	77472	66801	43047				
M 4	6530	94588	99205	99628	99498	99198	99045	98985	98801	98381	97552
M 4	96056	93744	90487	85756	78501	68009	44134				
M 4	6774	95928	99490	99731	99608	99367	99247	99200	99053	98699	97962
M 4	96577	94390	91299	86816	79850	69608	45533				
M 4	7022	97131	99704	99818	99711	99528	99438	99403	99292	99006	98374
M 4	97123	95094	92205	88015	81398	71468	47144				
M 4	7274	98162	99851	99889	99804	99674	99613	99589	99511	99294	98779
M 4	97692	95863	93224	89387	83198	73674	49020				

## SURVIVAL RATIOS -- EAST MODEL, FEMALES

F 4	2000	52370	79507	94279	95269	93782	92338	91272	90461	89887	89329
F 4	87467	83062	75735	65406	52732	38597	24369				
F 4	2250	55858	81567	94778	95665	94297	92972	91993	91239	90690	90135
F 4	88360	84229	77248	67566	55394	41566	26215				
F 4	2500	59107	83383	95232	96027	94766	93550	92650	91948	91422	90870
F 4	89176	85295	78824	69543	57835	41289	27812				
F 4	2750	62148	85005	95648	96359	95197	94080	93254	92600	92094	91545
F 4	89925	86275	80182	71369	60086	46802	29236				
F 4	3000	65005	86466	96031	96666	95595	94571	93812	93201	92715	92168
F 4	90517	87181	81440	73059	62172	49132	30538				
F 4	3250	67700	87792	96387	96950	95965	95026	94329	93760	93291	92746
F 4	91260	88024	82609	74632	64115	51302	31755				
F 4	3500	70247	89003	96717	97216	96309	95450	94812	94280	93828	93285
F 4	91859	88810	83701	76103	65931	53331	32914				
F 4	3750	72661	90117	97026	97464	96631	95846	95263	94767	94330	93789
F 4	92420	89546	84725	77482	67635	55234	34035				
F 4	4000	74955	91145	97315	97697	96934	96219	95687	95223	94801	94262
F 4	92947	90237	85687	78779	69238	57025	35131				
F 4	4250	77138	92099	97587	97916	97219	96570	96085	95653	95244	94707
F 4	93443	90888	86593	80002	70750	58715	36213				
F 4	4500	79266	93069	97855	98108	97458	96866	96433	96037	95643	95103
F 4	93878	91463	87396	81076	72058	60167	37211				
F 4	4750	81275	93968	98115	98318	97729	97196	96798	96417	96018	95463
F 4	94265	91964	88084	81989	73162	61369	38109				
F 4	5000	83197	94783	98356	98514	97985	97507	97145	96781	96381	95817
F 4	94650	92464	88774	82910	74281	62595	39057				
F 4	5250	85036	95527	98579	98698	98225	97801	97474	97129	96733	96163
F 4	95032	92962	89464	83835	75413	63844	40054				
F 4	5500	86794	96207	98786	98870	98452	98078	97786	97462	97073	96503
F 4	95409	93456	90151	84761	76553	65110	41100				
F 4	5750	88474	96831	98978	99032	98665	98340	98081	97779	97401	96833

F 4	95780	93945	90832	85684	77697	66388	42190					
F 4	6000	90033	97459	99157	99184	90866	98587	98361	98082	97716	97155	
F 4	96144	94426	91506	86601	78840	67674	43320					
F 4	6250	91522	98040	99325	99327	99055	98820	98625	98370	98018	97466	
F 4	96499	94897	92168	87506	79974	68958	44484					
F 4	6500	92958	93567	99483	99462	99233	99040	98876	98644	98308	97767	
F 4	96844	95356	92814	98395	81094	70233	45673					
F 4	6750	94340	99048	99631	99589	99401	99248	99113	98904	98584	98055	
F 4	97178	95802	92444	83263	82194	72492	46880					
F 4	7000	95638	99372	99741	99710	99575	99456	99338	99147	98848	98348	
F 4	97535	96288	94139	90251	83498	73038	43290					
F 4	7250	96764	99611	99829	99739	99701	99615	99524	99369	99111	98563	
F 4	97938	96848	94958	91442	85115	75020	50005					
F 4	7500	97757	99734	99897	99872	99907	99748	99684	99564	99354	98969	
F 4	98345	97424	95812	92712	86890	77259	51893					
F 4	7750	98591	99897	99946	99928	99839	99754	99812	99728	99569	99259	
F 4	98749	98009	96694	94060	88845	79819	53970					

## SURVIVAL RATIOS - SOUTH MODEL, MALES

M 5	1992	55939	74480	93998	95242	92878	91397	91454	91146	89966	88331
M 5	86008	82284	76025	66691	54323	39163	24362				
M 5	2230	58919	77054	94540	95648	93481	92129	92166	91857	90751	89199
M 5	86983	83437	77502	68639	56749	41948	26104				
M 5	2466	61681	79313	95028	96015	94027	92790	92810	92500	91458	89984
M 5	87865	84481	78840	70405	58952	44477	27602				
M 5	2700	64255	81318	95471	96349	94524	93393	93395	93086	92103	90699
M 5	88668	85432	80061	72019	60969	46791	28929				
M 5	2933	66664	83116	95877	96656	94981	93945	93932	93623	92694	91354
M 5	89406	86305	81183	73503	62826	48922	30134				
M 5	3165	68928	84739	96250	96939	95402	94454	94427	94119	93240	91959
M 5	90086	87111	82220	74875	64545	50894	31251				
M 5	3394	71062	86216	96595	97201	95793	94926	94885	94578	93745	92520
M 5	90717	87859	83183	76151	66144	52728	32304				
M 5	3623	73079	87567	96916	97446	96156	95366	95312	95005	94216	93042
M 5	91394	88555	84081	77340	67637	54439	33311				
M 5	3842	74990	88810	97215	97674	96497	95776	95711	95405	94656	93530
M 5	91853	89206	84921	78453	69036	56042	34285				
M 5	4063	76733	89911	97512	97878	96786	96123	96048	95743	95028	93943
M 5	92325	89773	85648	79407	70224	57404	35153				
M 5	4286	78457	91663	97785	98084	97093	96494	96396	96071	95383	94334
M 5	92766	90290	86307	80278	71302	58619	35975				
M 5	4511	80118	92116	98038	98273	97394	96856	96742	96419	95760	94740
M 5	93207	90800	86960	81143	72388	59849	36823				
M 5	4737	81717	93082	98274	98462	97676	97196	97070	96750	96121	95132
M 5	93637	91301	87605	82000	73467	61077	37721				
M 5	4562	83256	93971	98495	98635	97942	97516	97380	97065	96466	95511
M 5	94057	91793	88241	82846	74537	62299	38637				
M 5	5186	84736	94791	98701	98799	98192	97817	97673	97365	96797	95877
M 5	94465	92275	88865	83679	75594	63512	39579				
M 5	5410	86159	95550	98894	98954	98427	98099	97951	97650	97112	96228



M 5	94860	92744	89476	84497	76635	64711	40545				
M 5	5633	87526	96255	99075	99100	98648	98366	98213	97920	97413	96566
M 5	95243	93201	90072	85296	77656	65893	41530				
M 5	5857	88840	96929	99247	99240	98859	98619	98463	98178	97702	96892
M 5	95615	93648	90657	86082	78664	67063	42538				
M 5	6125	90331	97668	99406	99381	99100	98907	98749	98496	98059	97291
M 5	96061	94172	91344	87032	79924	68553	43832				
M 5	6366	91601	98193	99534	99500	99281	99126	98979	98752	98356	97647
M 5	96490	94711	92070	88032	81259	70174	45209				
M 5	6608	92829	98649	99646	99608	99442	99321	99188	98988	98638	97995
M 5	96923	95265	92825	89079	82669	71906	46693				
M 5	6854	94011	99034	99742	99704	99584	99493	99377	99206	98905	98333
M 5	97357	95834	93609	90178	84171	73784	48303				
M 5	7104	95143	99350	99822	99788	99706	99641	99544	99404	99154	98660
M 5	97791	96419	94428	91336	85779	75841	50054				
M 5	7360	96218	99556	99887	99858	99807	99764	99688	99579	99381	98972
M 5	98223	97020	95282	92560	87514	78118	51961				

SURVIVAL RATIOS - SOUTH MODEL, FEMALES

F 5	2000	57447	73046	92985	94323	92649	91543	91063	90657	90368	90076
F 5	88425	84772	77684	66780	52977	36503	22202				
F 5	2250	60405	75838	93648	94835	93304	92290	91847	91468	91181	90876
F 5	89316	85910	79308	69094	55948	40002	24655				
F 5	2500	63148	78287	94245	95298	93896	92965	92555	92201	91914	91598
F 5	90122	86939	80779	71195	58653	43191	26702				
F 5	2750	65705	80460	94788	95720	94435	93579	93200	92868	92583	92256
F 5	90857	87878	82124	73117	61132	46116	28475				
F 5	3000	68099	82407	95284	96107	94930	94143	93791	93479	93195	92860
F 5	91531	88739	83360	74886	63419	48815	30060				
F 5	3250	70349	84166	95741	96464	95386	94663	94336	94044	93760	93416
F 5	92153	89535	84504	76523	65540	51318	31517				
F 5	3500	72439	85765	96163	96795	95810	95145	94842	94567	94284	93932
F 5	92729	90273	85567	78045	67514	53648	32886				
F 5	3750	74474	87228	96556	97104	96204	95594	95313	95054	94771	94412
F 5	93267	90961	86558	79466	69358	55827	34197				
F 5	4000	76375	88573	96922	97392	96572	96013	95752	95509	95226	94860
F 5	93769	91604	87486	80797	71088	57870	35469				
F 5	4250	78187	89862	97293	97647	96892	96379	96142	95919	95635	95265
F 5	94236	92211	88367	82056	72684	59737	36690				
F 5	4500	79874	91067	97632	97923	97244	96774	96546	96325	96032	95642
F 5	94644	92724	89102	83100	74030	61296	37780				
F 5	4750	81495	92169	97943	98177	97570	97142	96925	96708	96409	96005
F 5	95040	93224	89821	84126	75362	62849	38909				
F 5	5000	83055	93178	98229	98412	97873	97484	97279	97069	96767	96353
F 5	95424	93712	90524	85133	76675	64391	40074				
F 5	5250	84553	94177	98492	98629	98153	97804	97612	97410	97108	96688
F 5	95795	94187	91210	86118	77969	65919	41274				
F 5	5500	85994	94964	98736	98831	98415	98102	97924	97732	97432	97009
F 5	96154	94647	91877	87080	79238	67428	42502				
F 5	5750	87378	95758	98963	99019	98659	98302	98217	98036	97739	97317

F 5	96501	95092	92523	88015	80479	68912	43754					
F 5	6000	88685	96520	99174	99195	98687	98644	98493	98323	98032	97611	
F 5	96834	95522	93149	88923	81691	70368	45025					
F 5	6250	89940	97244	99369	99362	99103	98892	98755	98597	98311	97894	
F 5	97148	95925	93729	89768	82858	71791	46296					
F 5	6500	91188	97832	99506	99509	99311	99137	99003	98843	98572	98167	
F 5	97463	96336	94334	90668	84121	73387	47703					
F 5	6750	92373	98339	99630	99625	99469	99327	99211	99069	98821	98443	
F 5	97796	96781	94993	91659	85535	75208	49271					
F 5	7000	93513	98772	99734	99725	99606	99492	99395	99273	99052	98707	
F 5	98122	97222	95651	92661	86994	77131	50913					
F 5	7250	94606	99133	99818	99807	99720	99634	99556	99454	99264	98957	
F 5	98440	97659	96306	93673	88501	79169	52629					
F 5	7500	95648	99423	99884	99874	99814	99752	99691	99611	99453	99190	
F 5	98748	98088	96955	94690	90058	81344	54414					
F 5	7750	96630	99647	99933	99924	99886	99845	99802	99742	99619	99404	
F 5	99040	98504	97592	95708	91668	83676	56265					