

HP-41C PROGRAM DESCRIPTION

PROGRAM TITLE

POPUL

AUTHOR(S)

J Dale

DATE

30/09/2026

Program description, equations, variables:

This is a mathematical model emulating the growth of a population of organisms from generation to generation. For simplicity the population contains three types of individual;

1. Juveniles - generally pre-reproductive (Juv),
2. Adults - the main reproductive phase (Adult),
3. Seniles - generally post-reproductive (Sen).

In addition, each type of individual has several parameters, these being **Fecundity**, the number of offspring produced in a generation, **Mortality**, the percentage that die in a generation and **Sex Ratio**, the ratio of males:females, which is a characteristic of the organism as a whole.

The formulae used by the model are as follow;

$$P_n = Juv_n + Adult_n + Sen_n$$

$$Juv_{(n+1)} = Juv_n \times (1-JuvMortality) \times JuvFecundity \times SexRatio + Adult_n \times (1-AdultMortality) \times AdultFecundity \times SexRatio + Sen_n \times (1-SenMortality) \times SenFecundity \times SexRatio$$

$$Adult_{(n+1)} = Juv_n \times (1-JuvMortality)$$

$$Sen_{(n+1)} = Adult_n \times (1-AdultMortality) + Sen_n \times (1-SenMortality)$$

Necessary accessories:

Printer compatible.

Operating limits and warnings:

References:

HP-41C USER INSTRUCTIONS	
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[illegible]

REGISTERS							NOTES
0	1	2	3	4	5	6	
Gen	Juvn	Adultn	Senn	JuvTemp	AdultTemp	SenTemp	
7	8	9	10	11	12	13	
Pop			Juv0	Adult0	Sen0	JuvMort	
14	15	16	17	18	19	20	
AdultMort	SenMort	JuvFec	AdultFec	SenFec	SexRatio		
USER KEYS							
A	Set up parameters			F			
B	Next Generation			G			
C				H			
D				I			
E				J	Reset model		

HP-41C PROGRAM NAME:		POPUL
DATE:	30/09/2026	Purpose: Model population
AUTHOR:	J Dale	
STEP	PROGRAM STATEMENT	DESCRIPTION
0001	LBL 'POPUL'	
0002	LBL A	
0003	'JUV?'	
0004	PROMPT	
0005	STO 10	
0006	'ADULTS?'	
0007	PROMPT	
0008	STO 11	
0009	'SENILES?'	
0010	PROMPT	
0011	STO 12	
0012	'JUVMORT?'	
0013	PROMPT	
0014	STO 13	
0015	'ADMORT?'	
0016	PROMPT	
0017	STO 14	
0018	'SENMORT?'	
0019	PROMPT	
0020	STO 15	
0021	'JUVFEC?'	
0022	PROMPT	
0023	STO 16	
0024	'ADFEC?'	
0025	PROMPT	
0026	STO 17	
0027	'SENFEC?'	
0028	PROMPT	
0029	STO 18	
0030	'SEXRATIO?'	
0031	PROMPT	
0032	STO 19	
0033	XEQ 01	
0034	'READY'	
0035	AVIEW	
0036	RTN	
0037	LBL 01	
0038	LBL J	
0039	RCL 10	
0040	STO 01	
0041	RCL 11	
0042	STO 02	
0043	RCL 12	

0044	STO 03	
0045	0	
0046	STO 00	
0047	RTN	
0048	LBL B	
0049	RCL 01	
0050	1	
0051	RCL 13	
0052	-	
0053	*	
0054	RCL 16	
0055	*	
0056	RCL 19	
0057	*	
0058	RCL 02	
0059	1	
0060	RCL 14	
0061	-	
0062	*	
0063	RCL 17	
0064	*	
0065	RCL 19	
0066	*	
0067	+	
0068	RCL 03	
0069	1	
0070	RCL 15	
0071	-	
0072	*	
0073	RCL 18	
0074	*	
0075	RCL 19	
0076	*	
0077	+	
0078	STO 04	
0079	RCL 01	
0080	1	
0081	RCL 13	
0082	-	
0083	*	
0084	STO 05	
0085	RCL 02	
0086	1	
0087	RCL 14	
0088	-	
0089	*	
0090	RCL 03	

0091	1	
0092	RCL 15	
0093	-	
0094	*	
0095	+	
0096	STO 06	
0097	1	
0098	ST+ 00	
0099	RCL 04	
0100	STO 01	
0101	RCL 05	
0102	STO 02	
0103	RCL 06	
0104	STO 03	
0105	RCL 04	
0106	RCL 05	
0107	+	
0108	RCL 06	
0109	+	
0110	STO 07	
0111	FIX 00	
0112	'GEN: '	
0113	ARCL 00	
0114	AVIEW	
0115	FIX 04	
0116	'JUV: '	
0117	ARCL 01	
0118	AVIEW	
0119	'ADT: '	
0120	ARCL 02	
0121	AVIEW	
0122	'SEN: '	
0123	ARCL 03	
0124	AVIEW	
0125	'POP: '	
0126	ARCL 07	
0127	AVIEW	
0128	RTN	
0129	END	
0130		
0131		
0132		
0133		
0134		
0135		
0136		
0137		