

01650D Program Description I

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Program Title Random Sequence of Numbers

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Program Description, Equations, Variables Program utilizes all of the numbers between one and N and randomly selects them, without repeating any numbers. Numbers can be selected in any of four ways:

1. One number at a time ("Next #")
2. All N numbers called out automatically. Using "Repeat", will repeat the same sequence of numbers with reduced cycle time. Program stops the sequence when all N numbers have been displayed.
3. Less than all N numbers can be called out automatically by keying-in the quantity Q, before calling for "All #'s". When the Q numbers have been displayed, the sequence stops. Note: Q can be larger than N, so if you wanted three sets of 10 number sequences, key in 30 before pressing "All #'s".
4. Because the "Repeat" call out more rapidly displays the numbers, an alternate function has been included that recalls all numbers without the one second pause to display each, which then is followed by displaying the sequence quite rapidly using "Repeat". This is particularly convenient if $N > 20$. Less than all N numbers can also be displayed this way by keying in the quantity Q, as above.

Operating Limits and Warnings

1. $1 \leq N \leq 100$
2. Once N is keyed in, it is retained until another N is entered.
3. If Q N, i.e. if more than one sequence of numbers is called for at the same time, only the last sequence generated will be displayed when the "Repeat" function is used.

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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01650D Program Description II

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Sketch(es)

Sample Problem(s)

1. Randomly sequence the numbers 1 through 8, calling them out automatically.

Output: 6, 4, 2, 1, 5, 8, 7, 3, then 0 showing end of sequence

2. Repeat the same sequence.

Output: 6, 4, 2, 1, 5, 8, 7, 3, then 0

3. In Keno, 20 balls are randomly selected from a set of 80. Select 20 numbers from a random sequence of 80. Enter the following seed at first: .1234554321

Output: 7, 64, 14, 22, 74, 73, 6, 25, 35, 34, 44, 36, 26, 32, 72, 10, 30, 15, 11, 27, 0 (end of sequence)

Solution(s) Keystrokes

1. 8 (C) → 8

(B) → 6, 4, 2, 1, 5, 8, 7, 3, 0 (end of sequence)

2. (E) → 6, 4, 2, 1, 5, 8, 7, 3, 0

3. 80 (C) → 80

.1234554321 (R/S) → $1.234554321 \times 10^{-1}$

20 (B) → 7, 64, 14, 22, 74, 73, 6, 25, 35, 34, 44, 36, 26, 32, 72, 10, 30, 15, 11, 27, 0 (end)

Reference(s) Program utilizes part of the H-P program, "The Dealer", no. 00188D.

NEXT # ALL #'S N; SEED SHUFFLE REPEAT

[illegible]

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL A	31 25 11	Random Number Generator		LST X	35 82	Place no. at end of group in place of selected no. Move end no. up one no.
	RCL B	34 12			RCL D	34 14	
	9	09			+	81	
	9	09		060	STO +(i)	33 61 24	
	7	07			RCL C	34 13	
	X	71			1	01	
	FRAC	32 83			-	51	
	STO B	33 12			STO C	33 13	
	RCL C	34 13			X < 0	31 71	
010	X	71			GSB D	31 22 14	
	INT	31 83	Scale no. to make it between 0 and N		RCL E	34 15	if N numbers used..shuffle.. Display selected number
	5	05			*LBL 5	31 25 05	
	+	81			1	01	
	ST I	35 33		070	+	61	
	FRAC	32 83			FIX	31 23	
	1	01			RTN	35 22	
	0	00			*LBL D	31 25 14	
	X	71			RCL A	34 11	
	10 ^x	32 53			FRAC	32 83	
020	STO D	33 14			EEX	43	
	RCL (i)	34 24	Remove digits to left of dec. point. Move dec. pt. to the right		3	03	Shuffle sequence
	X	71			X	71	
	FRAC	32 83			1	01	
	EEX	43		080	-	51	
	2	02			STO C	33 13	
	X	71			CLX	44	
	INT	31 83			RTN	35 22	
	STO E	33 15			*LBL C	31 25 13	
	RC I	35 34			EEX	43	
030	RCL C	34 13			3	03	
	5	05	Select number from end of group		CHS	42	Store N in R _A as a fraction
	+	81			X	71	
	ST I	35 33			STO A	33 11	
	FRAC	32 83		090	1	01	
	1	01			8	08	
	0	00			ST I	35 33	
	X	71			.	83	
	10 ^x	32 53			0	00	
	1/X	35 62			5	05	
040	LST X	35 82			0	00	
	RCL (i)	34 24	Put selected number at end of group		5	05	Load five possible numbers in R ₀ thru R ₉
	X	71			0	00	
	FRAC	32 83			5	05	
	EEX	43			0	00	
	2	02			5	05	
	X	71			0	00	
	INT	31 83			5	05	
	RCL E	34 15			CHS	42	
	-	51			ENT ↑	41	
050	EEX	43			ENT ↑	41	
	2	02	.....		ENT ↑	41
	+	81			.	83	
	X	71			9	09	
	STO-(i)	33 51 24		110	5	05	
	R ↑	35 54			9	09	
	ST I	35 33			6	06	

REGISTERS

0	.0001+	1	.0506+	2	.1011+	3	.1516+	4	.2021+	5	.2526+	6	.3031+	7	.3536+	8	.4041+	9	.4546+
S0	.5051+	S1	.5556+	S2	.6061+	S3	.6566+	S4	.7071+	S5	.7576+	S6	.8081+	S7	.8586+	S8	.9091+	S9	.9596+
A	used		B	seed		C	used		D	used		E	used		I	hole			

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
	9	09			2	02	
	7	07		170	X	71	
	9	09			INT	31 83	
	8	08			GSB 5	31 22 05	.....
	9	09			1	01	Stop sequence
	9	09			X=Y	32 51	when all
	STO 9	33 09			GSB 1	31 22 01	no's displayed
120	P=S	31 42			X>Y	35 52	Display no's
	*LBL 7	31 25 07			PAUSE	35 72	.....
	+	61			RCL C	34 13	Where Q < N,
	STO(i)	33 24			RCL D	34 14	is review
	DSZ	31 33		180	1	01	complete?
	GTO 7	22 07			-	51	
	+	61			STO D	33 14	
	STO 0	33 00	.....		X=Y	32 61	Display last
	.	83	Store		GTO 4	22 04	value when
	5	05	initial		R↓	35 53	Q < N
130	2	02	seed		R↓	35 53	
	8	08			RTN	35 22	Set flag to
	4	04			*LBL B	31 25 12	.....
	1	01			SF 0	35 51 00	pause for no's
	6	06			*LBL 3	31 25 03	Was Q entered?
	3	03			F? 3	35 71 03	.....
	STO B	33 12			GTO 8	22 08	
	GSB D	31 22 14	Shuffle		RCL A	34 11	
	RCL A	34 11	Recall N and		FRAC	32 83	
	EEX	43	display it		EEX	43	
140	3	03			3	03	If not,
	X	71			X	71	recall N
	RTN	35 22			*LBL 8	31 25 08	
	STO B	33 12			RCL A	34 11	
	CF 3	35 61 03	If seed input,	200	FRAC	32 83	
	RTN	35 22	store it.		+	61	
	*LBL E	31 25 15			STO A	33 11	
	CF 1	35 25 01	Set registers		GSB A	31 22 11	Display numbers
	RCL C	34 13	for review		F? 0	35 71 00	automatically
	GSB D	31 22 14	of numbers		PAUSE	35 72	
150	R↓	35 53	selected		RCL A	34 11	
	RCL C	34 13			INT	31 83	When all N
	STO D	33 14			1	01	(or Q, if used)
	X>Y	35 52			-	51	displayed, stop
	STO C	33 13	.....	210	X > 0	31 81	
	*LBL 4	31 25 04			GTO 8	22 08	
	RCL D	34 14	Recall		RTN	35 22	.....
	5	05	numbers in		*LBL b	32 25 12	Eliminate
	+	81	order		CF 0	35 61 00	pause during
	ST I	35 33	previously		GTO 3	22 03	call out
160	FRAC	32 83	selected for		*LBL 2	31 25 02	
	1	01	display		CLX	44	
	0	00			R/S	84	
	X	71			*LBL 1	31 25 01	Used to stop
	10 ^x	32 53		220	F? 1	35 71 01	cycle when all
	RCL(i)	34 24			GTO 2	22 02	N numbers
	X	71			SF 1	35 51 01	repeated
	FRAC	32 83			RTN	35 22	
	EEX	43					

LABELS					FLAGS		SET STATUS		
A Next #	B All #'s	C N; seed	D Shuffle	E Repeat	0 X	1 X	FLAGS	TRIG	DISP
a	b No pause	c	d	e	1 X	2	ON OFF		
0	1 X	2 X	3 X	4 X	2	3	0 <input type="checkbox"/> <input checked="" type="checkbox"/>	DEG <input checked="" type="checkbox"/>	FIX <input checked="" type="checkbox"/>
5 X	6	7 X	8 X	9	3 X	4	1 <input type="checkbox"/> <input checked="" type="checkbox"/>	GRAD <input type="checkbox"/>	SCI <input type="checkbox"/>
							2 <input type="checkbox"/> <input checked="" type="checkbox"/>	RAD <input type="checkbox"/>	ENG <input type="checkbox"/>
							3 <input type="checkbox"/> <input checked="" type="checkbox"/>		n 0