



512

Program Description I

Program Title THESEUS AND MINOTAURUS

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Program Description, Equations, Variables

The program makes up a maze of 10×10 quadratic fields. Between the fields the calculator decides using a random number generator to 'build' a wall or not. The human located at field (a,b) can only see the walls (less or equal four) of his own position, so he knows whether he can go with his next step to the fields $(a+1,b)$, $(a-1,b)$, $(a,b+1)$ or $(a,b-1)$. At any time (probability increases with distance from start-position) the player finds Minotaurus and has to kill it; i.e. the calculator shows a number like 9, 99, ... 9999999999 and the player has immediately to enter the number of nines he sees which has to be between one and ten. If he fails, he lost the game, 'Error' will be displayed. If not, he can try to find the the way back to the startposition. Only if he reaches the point AND has killed Minotaurus, the game is over, and the calculator shows 0.000000000. After every step, the calculator shows a number of the form 0.bcde. Each of the digits b,c,d,e can be 0 or 1. 0 means 'here you can go', 1 the opposite. b stands for left, c for right, d for down and e for up.

Operating Limits and Warnings As the calculator makes up the maze randomly, it maybe a little bit curious, and sometimes you have a too little area of allowed steps. Than start with a new maze pressing [f][A]. If you try to pass a wall, calculator displays 'Error'. Press [Clx][h][RV] and choose another direction.

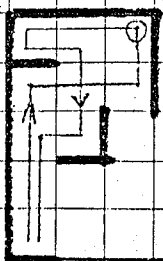
This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning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

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Sketch(es)

At this point, we met

Minotaurus


The way of the player
at this example.

Only the walls we could
see are shown

Sample Problem(s)

Let's try a game!

Press:

.5414643 [f][c]

0.0000

[f][a]

0.1010

[E]

0.1000

[E]

0.1000

[E]

0.1001

[C]

0.0000

[C]

0.0100

[E]

9999.

(pause)

(within 1 sec.) 4

0.0101

[B]

0.0001

[B]

0.1011

(trap!)

SOLUTION(S)

[C]

0.0001

[D]

0.0000

[D]

0.0110

[B]

0.1000

[D]

0.1000

[D]

0.000000000

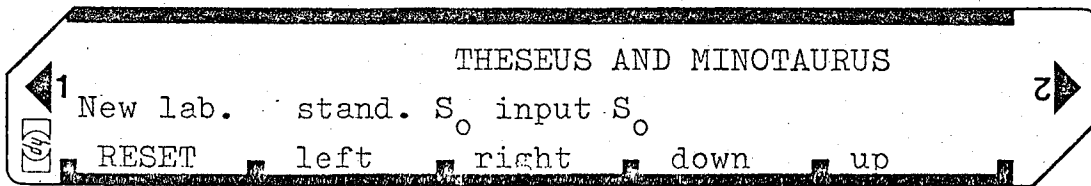
You won!

Reference(s)

Schwab: Die schönsten Sagen des klassischen Altertums

Reutlingen 1954

The random number generator of program SD-13 A is used



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Load program card both sides			0.0000
2	optional 2a or 2b			
2a	use standart seed		f b	0.0000
2b	use another seed S_0 between zero and one ($0 < S_0 < 1$)	S_0	f c	0.0000
3	make up a new labyrinth, you are located at the lower left corner, so you can move only up or right		f a	0.1010
4	move at any allowed direction:		B	0.bcde
	or		C	0.bcde
	or		D	0.bcde
	or		E	0.bcde
5	repeat step 4 until the output is a row of nine's and enter their number n ($1 \leq n \leq 10$) during the pause	n		99999.
	if you didn't find the correct answer 'Error' is shown, and you lost!			0.bcde
6	find back to your starting point by any allowed step		B	0.bcde
	or		C	0.bcde
	or		D	0.bcde
	or		E	0.bcde
7	repeat step 6 until the calculator shows which means, you reached starting position, so you won the game			0.00000000
8	if you want to try it again with the same maze, press		A	0.1010
	and go to step 4			
9	if you want another maze go to step 3			



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STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	LBL b	32 25 12			GTO 3	22 03	
	.	83			RCL 0	34 00	
	5	05			RCL 1	34 01	
	2	02		060	X	71	
	8	08			1	01	
	4	04			x ≠ y ?	32 61	not home again?
	1	01			SF 2	35 51 02	
	6	06	S ₀		RCL 2	34 02	
	3	03			F? 2	35 71 02	
010	LBL c	32 25 13			RTN	35 22	
	STO E	33 15			DSP 9	23 09	
	Clx	44			Clx	44	human has won
	RTN	35 22			RTN	35 22	
	LBL a	32 25 11		070	LBL 3	31 25 03	
	9	09			GSB 6	31 22 06	
	STO I	35 33			RCL 0	34 00	
	LBL 0	31 25 00			x ²	32 54	
	GSB 8	31 22 08			RCL 1	34 01	
	GSB 8	31 22 08			x ²	32 54	
020	EEX	43	new maze		+	61	
	3	03			√x	31 54	
	÷	81			9	09	
	+	61			9	09	
	STO (i)	33 24		080	÷	81	human meets Minotaurus?
	DSZ I	31 33			x ≤ y ?	32 71	
	GTO 0	22 00			SF 2	35 51 02	
	GSB 8	31 22 08			RCL 2	34 02	
	GSB 7	31 22 07			F? 2	35 71 02	
	GSB 8	31 22 08			RTN	35 22	
030	GSB 7	31 22 07			GSB 6	31 22 06	
	EEX	43			9	09	
	3	03			X	71	
	÷	81			INT	31 83	
	+	61		090	1	01	
	STO 0	33 00			+	61	
	P+S	31 42			DSP 0	23 00	
	LBL A	31 25 11			ENT ↑	41	
	SF 0	35 51 00			10x	32 53	random number of nine's
	1	01			1	01	
040	STO 0	33 00			-	51	
	STO 1	33 01			PAUSE	35 72	
	LBL 4	31 25 04			PAUSE	35 72	
	RCL 0	34 00			x=y	35 52	
	RCL 1	34 01		100	RV	35 53	
	GSB 1	31 22 01	program looks for walls around the (x,y) field		x ≠ y ?	32 61	guess okay?
	STO 2	33 02			GTO 9	22 09	Error
	RCL 1	34 01			RCL 2	34 02	
	RCL 0	34 00			CF 0	35 61 00	
	SF 2	35 51 02			DSP 4	23 04	human has killed Minotaurus
050	GSB 1	31 22 01			RTN	35 22	
	EEX	43			LBL E	31 25 15	
	2	02			3	03	
	÷	81			GTO 5	22 05	step codes
	STO + 2	33 61 02		110	LBL D	31 25 14	
	DSP 4	23 04	Minotaurus alive?		2	02	
	F? 0	35 71 00			GTO 5	22 05	

REGISTERS									
0	1	2	3	4	5	6	7	8	9
POS. x	POS. y	aux	aux						
S0 maze	S1 maze	S2 maze	S3 maze	S4 maze	S5 maze	S6 maze	S7 maze	S8 maze	S9 maze
A		B		C		D		E seed control	



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Program Listing II

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STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
7	LBL C	31 25 13			2	02	
	1	01		170	x↔y	35 52	
	GTO 5	22 05			y↔x	35 63	
	LBL B	31 25 12			÷	81	
	0	00			FRAC	32 83	
	LBL 5	31 25 05			2	02	
	STO 3	33 03			X	71	
120	10 ^x	32 53			INT	31 83	
	RCL 2	34 02			x ≠ 0 ?	31 61	
	X	71			GTO 2	22 02	
	FRAC	32 83			.	83	
	1	01		180	0	00	
	0	00			1	01	
	X	71			STO + 3	33 61 03	
	INT	31 83	step allowed?		LBL 2	31 25 02	
	x ≠ 0 ?	31 61			LST x	35 82	
	GTO 9	22 09	Error		FRAC	32 83	
130	RCL 3	34 03			2	02	
	2	02			X	71	
	+	81			INT	31 83	
	INT	31 83			x ≠ 0 ?	31 61	
	STO I	35 33		190	GTO 2	22 02	
	RCL 3	34 03			.	83	
	1	01			1	01	
	.	83			STO + 3	33 61 03	
	5	05			LBL 2	31 25 02	
	-	51			RCL 3	34 03	
140	x < 0 ?	31 71			RTN	35 22	
	SF 2	35 51 02			LBL 6	31 25 06	random number
	ABS	35 64			SF 2	35 51 02	between 0 and 1
	1	01			LBL 8	31 25 08	
	-	51		200	RCL E	34 15	random number
	2	02			9	09	between 0 and
	X	71			9	09	512
	F? 2	35 71 02			7	07	
	CHS	42			X	71	
	STO +(i)	33 61 24	new position		FRAC	32 83	
150	GTO 4	22 04			STO E	33 15	
	LBL 1	31 25 01			F? 2	35 71 02	
	0	00			RTN	35 22	
	STO 3	33 03			5	05	
	R V	35 53	subroutine	210	1	01	
	9	09	looks for		2	02	
	+	61	walls		X	71	
	STO I	35 33			INT	31 83	
	Clx	44			RTN	35 22	
	RCL (i)	34 24			LBL 7	31 25 07	subroutine clear
160	F? 2	35 71 02			4	04	walls near the
	GTO 5	22 05			+	81	starting point
	FRAC	32 83			INT	31 83	
	EEX	43			4	04	
	3	03		220	X	71	
	X	71			3	03	
	LBL 5	31 25 05			+	61	
	INT	31 83			RTN	35 22	
	x↔y	35 52			R/S	84	

LABELS					FLAGS	SET STATUS		
A RESET	B left	C right	D down	E up	Minot.	FLAGS	TRIG	DISP
a new lab.	b stand. S	c inp. S	d	e	1	ON OFF	DEG ☒	FIX ☒
0 loop	1 walls?	2 multi.	3 M.alive	4 walls?	2 used	0 ☐ ☒	GRAD ☐	SCI ☐
5 st.allowed	6? rand.	7 way SBR	8 random2	9 dummy	3	1 ☐ ☒	RAD ☐	ENG ☐
						2 ☐ ☒		n 4
						3 ☐ ☒		