

Program Description I

Program Title CRACK THE VAULT

Contributor's Name MATT BISHOP

Address 327 FORBES AVE

City SAN RAFAEL

State CA

Zip Code 94901

Program Description, Equations, Variables A VAULT ^{IN} A BANK CONTAINS
MILLIONS OF DOLLARS. YOU ARE THE HEAD TELLER, AND ~~THE~~ A TELLER
ACCIDENTALLY LOCKED THE VAULT.

THE VAULT'S LOCK IS REALLY A SERIES OF LOCKS, EACH OF
WHICH HAS A COMBINATION ON IT. IF TURNED TO THE RIGHT
~~THE~~ NUMBER, THE LOCK OPENS. TO OPEN THE VAULT, ALL LOCKS
MUST BE OPENED

YOU KNOW THE BOSS WILL FIRE YOU IF HE ~~SEES~~ ^{SEES THE} LOCKED
~~THE~~ VAULT. UNFORTUNATELY, HE IS COMING DOWN FROM HIS OFFICE
AND WILL SOON REACH THE VAULT. SO YOU HAVE ABOUT 1 MINUTE
TO OPEN IT. YOU CAN ONLY SPEND SO MUCH TIME ON ANY ONE
LOCK; THUS, YOU MUST OPEN EACH LOCK IN A SPECIFIED NUMBER
OF ~~THE~~ ATTEMPTS

GOOD LUCK.

YOU SPECIFY THE NUMBER OF LOCKS TO BE PICKED AND THE
NUMBER OF ATTEMPTS (2,3,OR 4) YOU MAY TAKE.

Operating Limits and Warnings BE SURE ~~D~~ $R_D \geq 0$ BEFORE YOU START.

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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Program Description II

Sketch(es)

Sample Problem(s) ① TRY SEED .0381426, WITH 5 LOCKS, 3 TRIES A LOCK.

FIRST LOCK: TRY 5, 2, 0. ON 0 IT OPENS

SECOND LOCK: TRY 5, 7. ON 7 IT OPENS

THIRD LOCK: TRY 6, 8, 7. ON 7 IT OPENS

FOURTH LOCK: TRY 5, 6. ON 6 IT OPENS

FIFTH LOCK: TRY 9, 7. ON 7 IT OPENS.

HENCE THE COMBINATION IS 07767. YOU WIN.

Solution(s) ① [C].0381426 [T] 5 [A] → 3, ON PAUSES, OFF.

ENTER	AND SEE (PRINT PAUSE)	THEN	ENTER	AND SEE (PRINT)	THEN
5	4614	2	7	45 LOCK 3 IS ALSO 7	3
2	4614	1	5	*07	2
0	45, LOCK 1 IS 0	3	6	45 LOCK 4 IS also 6	3
5	*07,	2	9	4614	2
7	45, LOCK 2 IS 7	3	7	45 LOCK 5 IS 7.	12
6	07	2		TOTAL NUMBER OF GUESSES: 12.	
8	4614	1			

Reference(s)

Sketch(es)

Sample Problem(s) ② TRY 3 LOCKS, WITH A SEED OF 0.110326, AND 3 TURNS A LOCK

FIRST LOCK: TRY 5,7,9, LOCK OPENS ON 9

SECOND LOCK: TRY 5,1,0 LOCK OPENS ON 0

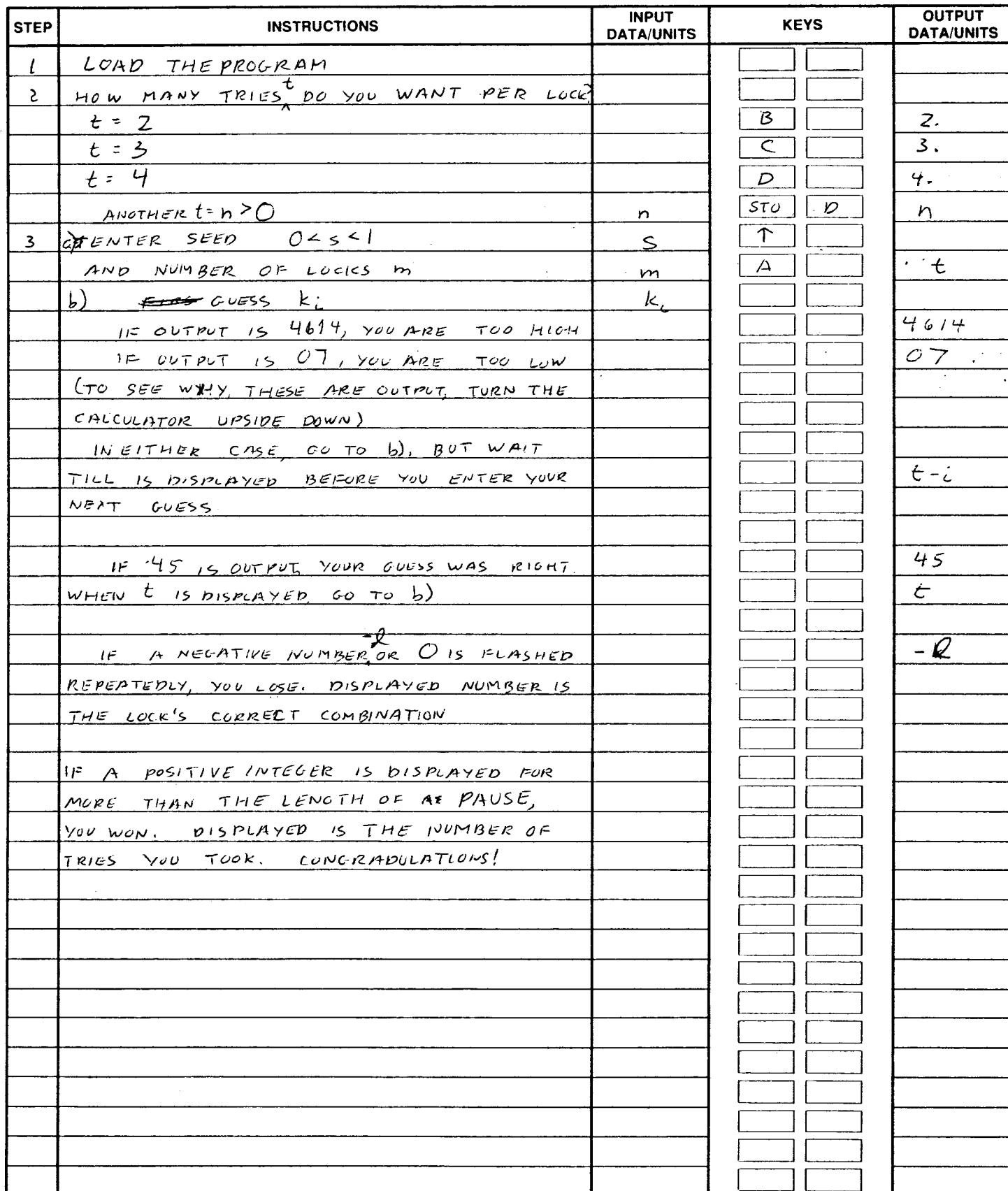
THIRD LOCK: TRY 3,5,7, LOCK DOESN'T OPEN ON THEM.

LOCK OPENS ON 8. YOU LOSE.

Solution(s) ② [C] .110326 [1] 3 [A] → 3 ON PAUSES

ENTER	AND SEE(PRINT)	THEN	ENTER	AND SEE(PRINT)	THEN
5	07	2	5	07	1
7	07	1	7	07	
9	45 (FIRST LOCK: 9)	3		SEE - 8 DISPLAYED	
5	4614	2		REPEATEDLY.	
1	4614	1			
0	45 (SECOND LOCK: 0)	3			
3	07	2			

Reference(s)



01497D

PROGRAM LISTING I

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STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	f LBL A	31 25 11			f LBL 3	31 25 03	INDICATE CORRECT. OUTPUT '45'
	h STI	35 33	#OF LOCKS $\rightarrow R_1, R_0$		4	04	
	STO O	33 00			5	05	
	h xzy	35 52	SEED $\rightarrow R_6$	060	f -x-	31 84	GO TO NEXT LOCK.
	STO E	33 15			f DSZ	31 33	
	f LBL C	31 25 06	GENERATE NUMBERS TO BE COMBO OF LOCKS		GTO 1	22 01	
	RCL E	34 15			RCL O	34 00	YOU WIN. OUTPUT NUMBER OF GUESSES.
	q	09			h RTN	35 22	
	q	09	$n_L \rightarrow R_L$		f LBL 5	31 25 05	INDICATE GUESS IS TOO LOW.
010	7	07			0	00	
	x	71			7	07	
	g FRAC	32 83			f -x-	31 84	
	STO E	33 15			GTO 6	22 06	
	1	01		070	f LBL B	31 25 12	2 TRIES PER LOCK
	0	00			2	02	
	x	71			STO D	33 14	
	f INT	31 83			h RTN	35 22	
	STO (i)	33 24			f LBL C	31 25 13	3 TRIES PER LOCK
	f DSZ	31 33			3	03	
020	GTO O	22 00			STO D	33 14	
	RCL O	34 00	INITIALIZE FOR OPENING		h RTN	35 22	
	h STI	35 33			f LBL D	31 25 14	4 TRIES PER LOCK
	0	00	NUMBER OF ROLLS		4	04	
	STO O	33 00		080	STO D	33 14	
	f LBL 1	31 25 01	NUMBER OF TRIES PER LOCK.		h RTN	35 22	
	RCL D	34 14	DEFAULT VALUE = 3				
	f x=0	31 51					
	3	03					
	STO E	33 15					
030	f LBL 2	31 25 02					
	h PSE	35 72	INPUT				
	1	01	NO. INPUTS NO. INPUTS+1				
	STO + O	33 61 00					
	h xzy	35 52		090			
	RCL (i)	34 24	IF GUESS IS TOO RIGHT ELSE , GO TO 3				
	g x=y	32 51					
	GTO 3	22 03					
	g x>y	32 81	IF GUESS IS TOO LOW, OUTPUT '07'				
	GTO 5	22 05					
040	4	04	OTHERWISE GUESS IS TOO HIGH. OUTPUT '4514'				
	6	06					
	1	01					
	4	04					
	f -x-	31 84		100			
	f LBL 6	31 25 06	REDUCE #OF TRIES LEFT BY 1.				
	RCL E	34 15					
	1	01					
	-	51					
	STO E	33 15					
050	f x=0	31 61	IF #OF TRIES LEFT IS 0, YOU LOSE. ELSE, TRY AGAIN.				
	GTO 2	22 02					
	f LBL 8	31 25 08					
	RCL (i)	34 24					
	CHS	42	LOSING LOOP				
	f -x-	31 84		110			
	GTO 8	22 08					

REGISTERS

USED	1	2	3	4	5	6	7	8	9
	LOCKS	IN $R_1 - R_7$	X	IS $x - R_1$	REGISTER	INPUT			
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
A	B	C	D	E	F	G	H	I	J
			# TRIES PER LOCK	USED				REGISTER CONTROL, COUNTER	

LABELS					FLAGS	SET STATUS		
A	B	C	D	E		FLAGS	TRIG	DISP
GO	2 TRIES	3 TRIES	4 TRIES		0	ON OFF		
a	b	c	d	e	1	0 <input type="checkbox"/> <input checked="" type="checkbox"/>	DEG <input checked="" type="checkbox"/>	FIX <input checked="" type="checkbox"/>
06 IN RATE LUCKS	1 INITIALIZE # TRIES	2 OPEN LOCK.	3 LOCK OPENER	4 GUESS TOO LOW	2	1 <input type="checkbox"/> <input checked="" type="checkbox"/>	GRAD <input type="checkbox"/>	SCI <input type="checkbox"/>
5	6 REDUCE # TRIES LEFT BY 1	7	8 YOU LOSE!	9	3	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 <u>0</u>