

Program Description I

Program Title IS IT PRIME?

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Program Description, Equations, Variables

Program tests whether an integer N , $N > 2$, is prime.

It also finds the lowest prime number P , $N \leq P$, and if desired will continue to display successive primes indefinitely.

Operating Limits and Warnings

Program works only with integers which exceed 2 in value.

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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03055D Program Description II

Sketch(es)

Sample Problem(s)

A: Is this integer a prime?

input	4	output	"flashing" dot, then 0.00	answer	NO
"	31	"	31.00	"	YES
"	419	"	419.00	"	YES
"	692	"	"flashing" dot, then 0.00	"	NO

B: What is the smallest prime P not smaller than this integer?

input	61	output	61.00	
"	62	"	67.00	next outputs 71.00, 73.00, 79.00, etc.

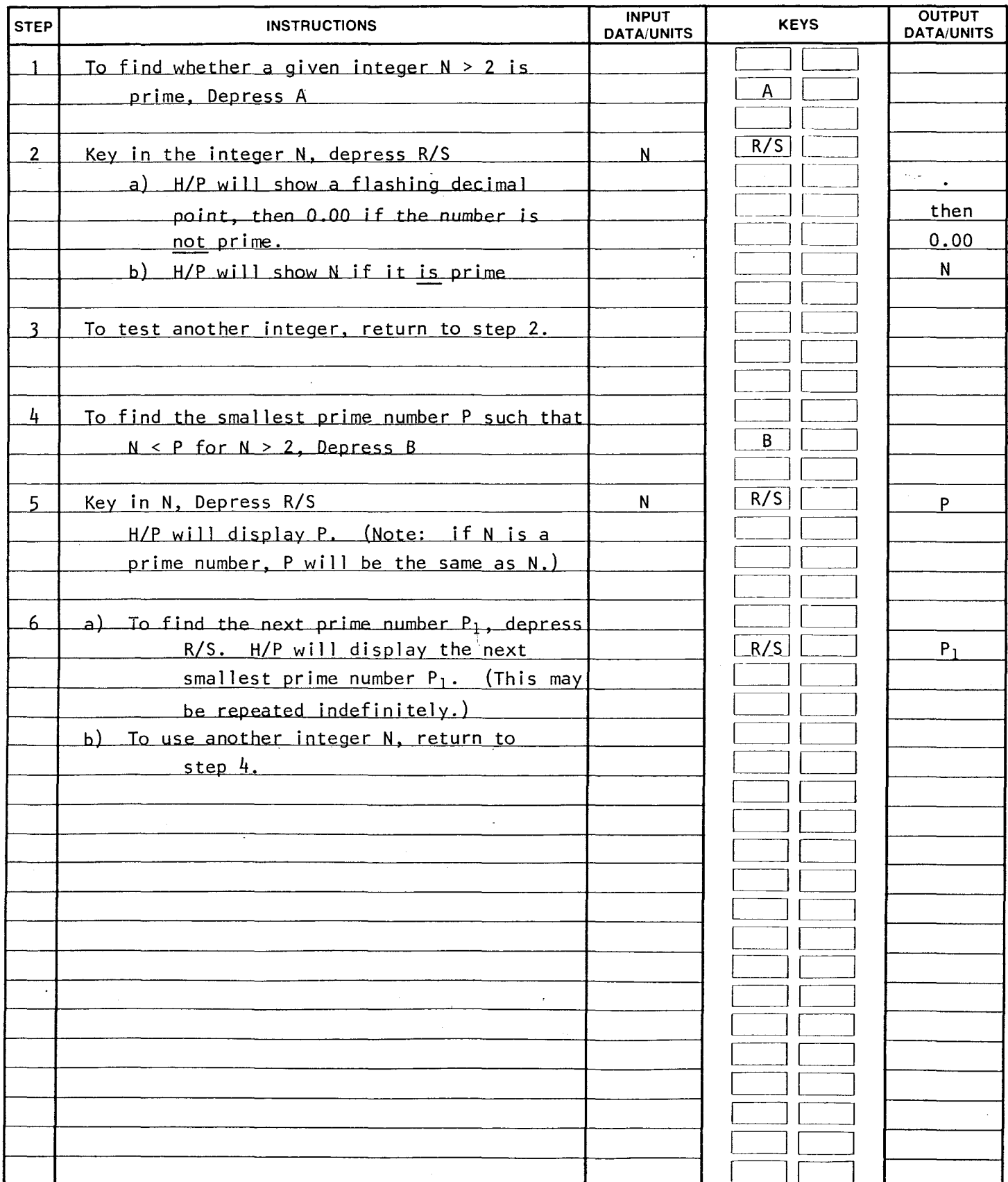
Solution(s) A: Keystrokes:

A	4	R/S	→	Flashing ".", then 0.00
	31	R/S	→	31.00
	419	R/S	→	419.00
	692	R/S	→	Flashing ".", then 0.00

B: Keystrokes:

B	61	R/S	→	61.00	
B	62	R/S	→	67.00	→ R/S → 71.00 → R/S → 73.00

Reference(s)



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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	"IS THIS INTEGER A PRIME?"		GTO 4	22 04	
	h SF 1	35 51 01			f LBL 7	31 25 02	DISPLAYS "." TO SHOW
	f LBL 1	31 25 01	(SET F ₁)			83	"THIS N IS NOT
	f CLR F ₁	31 43		060	f -X-	31 84	PRIME."
	RS	84	ENTER INTEGER N		GTO 1	22 01	
	STO 0	33 00			f LBL 9	31 25 09	DISPLAY ROUTINE
	f LBL 2	31 25 02	SEE IF N IS A SQUARE.		RCL 0	34 00	FOR LABEL A.
	RCL 0	34 00			GTO 1	22 01	
	f $\sqrt{\quad}$	31 54					
010	g FRAC	32 83	IF SO, GOTO 3				
	f X=0?	31 51					
	GTO 3	22 03					
	2	02	INITIALIZE				
	STO 1	33 01		070			
	h SF 2	35 51 02					
	f LBL 4	31 25 04	IS N EVENLY DIVISIBLE BY CONTENTS OF R ₁ ?				
	RCL 0	34 00					
	RCL 1	34 01					
	÷	81					
020	g FRAC	32 83	IF SO, GOTO 3				
	f X=0?	31 51					
	GTO 3	22 03					
	h LSTX	35 82	IF NOT, IS DIVISOR R ₁ STILL < \sqrt{N} ?	080			
	RCL 1	34 01					
	g X<Y?	32 71	IF SO, GOTO 5				
	GTO 5	22 05					
	h F? 1	35 71 01	IF NOT, N IS PRIME. DISPLAY IT (GOTO 8 OR 9).				
	GTO 9	22 09					
	GTO 8	22 08					
030	f LBL B	31 25 12	"WHAT IS THE SMALLEST PRIME > N?"				
	h CF 1	35 61 01	(CLEAR F ₁)				
	GTO 1	22 01					
	f LBL 8	31 25 08	A DISPLAY ROUTINE FM LABEL B.	090			
	RCL 0	34 00					
	RS	84					
	f LBL 3	31 25 03	IF LABEL A, THEN N IS NOT PRIME; GOTO 7.				
	h F? 1	35 71 01	OTHERWISE, FIND NEXT PRIME.				
	GTO 7	22 07					
	1	01					
040	STO + 0	33 61 00					
	GTO 2	22 02					
	f LBL 5	31 25 05	THIS ROUTINE FIRST DIVIDES N BY 2, THEN 3, AND THEN SKIPS MULTIPLES OF 2 (4, 6, 8, 10, ...) AND OF 3 (6, 9, 12, ...) TO SPEED UP THE PROCESS.	100			
	h F? 2	35 71 02					
	GTO 6	22 06					
	2	02					
	STO + 1	33 61 01					
	f DSZ	31 33					
	GTO 4	22 04					
	3	03					
050	h STI	35 33					
	GTO 5	22 05					
	f LBL 6	31 25 06					
	1	01					
	STO + 1	33 61 01		110			
	3	03					
	h STI	35 33					

REGISTERS

0	1	2	3	4	5	6	7	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
A	B	C	D	E	I				

