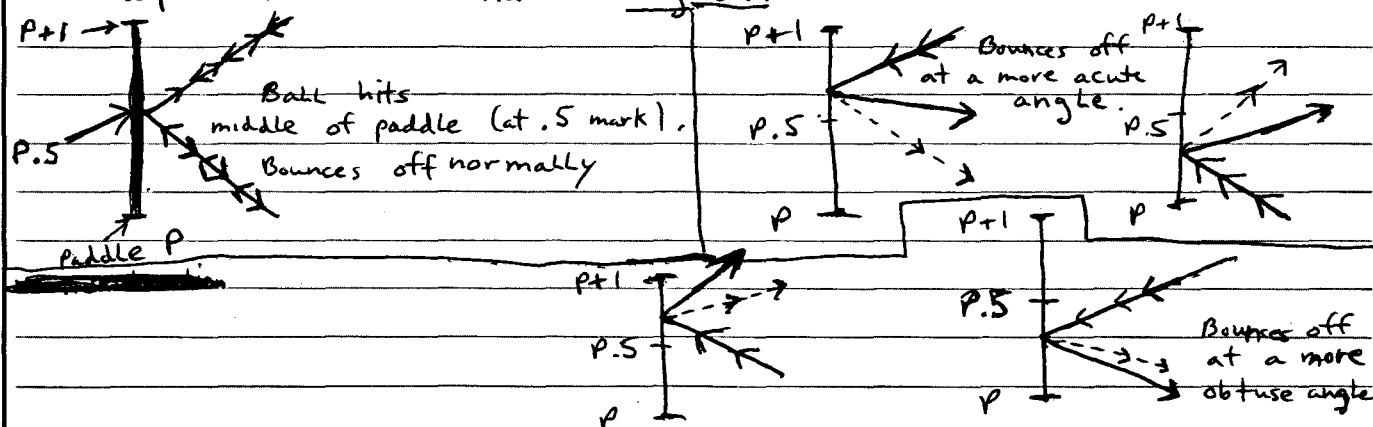


Program Title ELECTRONIC PING PONGContributor's Name LARRY SCHNEIDERAddress 1001 PROVINCIAL TOWER / 34 S. MAIN ST.City WILKES-BARREState PA.Zip Code 18701

Program Description, Equations, Variables This game is played on a grid marked off vertically in logarithmic units. The minimum value on the y axis is 1 and the maximum value is 6. The sample game board on ^{PAGE 4} ~~the following page~~ should be self explanatory. Note that a single unit on the x axis (-2 to -1 or 0 to 1) must be the same length as ^{the} line from 1 to 2 on the y axis. Each player has 5 paddles numbered 1 to 5 as shown at either end of the game board. The ball in motion will bounce off the top and bottom walls ($y = 6$, $y = 1$) normally but will bounce off a paddle with a "natural english." This is shown below:

**Summary of Ball Bouncings**

vertical direction of ball	relationship to .5 mark	Angle off the paddle
up/down	at .5	normal / normal
up/down	Below .5	more acute / more obtuse
up/down	above .5	more obtuse / more acute

HOWEVER, THIS INFORMATION IS NOT REQUIRED TO PLAY THE GAME!

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 I

Program Title PING PONG

Contributor's Name _____

Address _____

City _____

State _____

Zip Code _____

Program Description, Equations, Variables The position of the ball is given only at the points $x = -3, -2, -1, 0, 1, 2, 3$. Output is like so:

$\pm Y.YY \pm XX$ where $\pm Y.YY$ is the y coordinate and the exponent $\pm XX$ is the X coordinate. To see the ball bounce around by itself, do the following after reading in the program: Key in .123456789 STO C. Initialize the AUTO mode by hitting fc. (A "1" should now be displayed). The ball will start at $x = -3$ and, say, $y = 3$. The coordinates output after keying 3 A are: -3, 3; -2, 2.39; -1, 1.91; 0, 1.52; 1, 1.22; 2, 1.03; 3, 1.29 (after bouncing off bottom wall); 2, 1.51 and so on. Continue doing this and following the ball's path until you're familiar with the lay out of the board. Playing the game is easy. Initialize by hitting fc. Player 1 serves by using the A key, player 2 uses the E key. Before serving, player must input A paddle number which corresponds to the y coordinate where the ball begins ($y = 1, 2, 3, 4, 5$). The ball's position is given at 5 points. At the 5th point ($x = \pm 1$), the coordinates blink 4 times. During this time, the player receiving must input a paddle number; i.e. the one he thinks the ball will eventually hit. The ball continues moving. If the paddle number

~~Operating Limits and Warnings~~ chosen was incorrect the new score will flash. If correct, the game continues until one player misses. The player winning a point serves on the next volley. Note there are various ways to increase the game's difficulty: Decrease the number of blinks when $x = \pm 1$ (change step # 52 from 4 to 3) or blink the coordinates, stopping the ball at $x = 0$ * (change step # 48 from 4 to 3 and step # 67 from 2 to 3).

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* instead of blinking and stopping the ball at $x = \pm 1$

Program Description I

Program Title PING PONG

Contributor's Name _____

Address _____

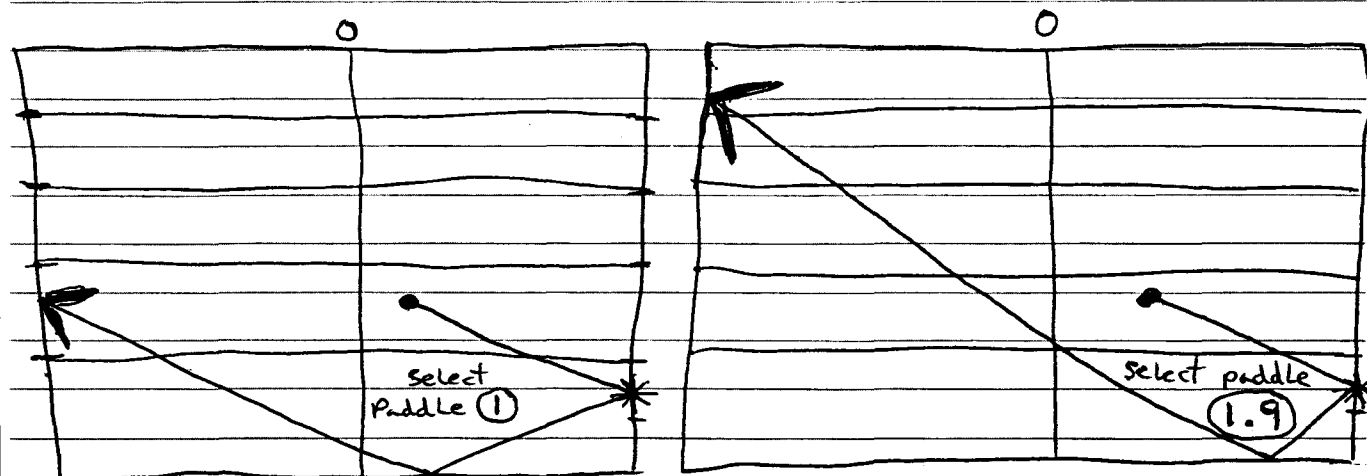
City _____

State _____

Zip Code _____

Program Description, Equations, Variables

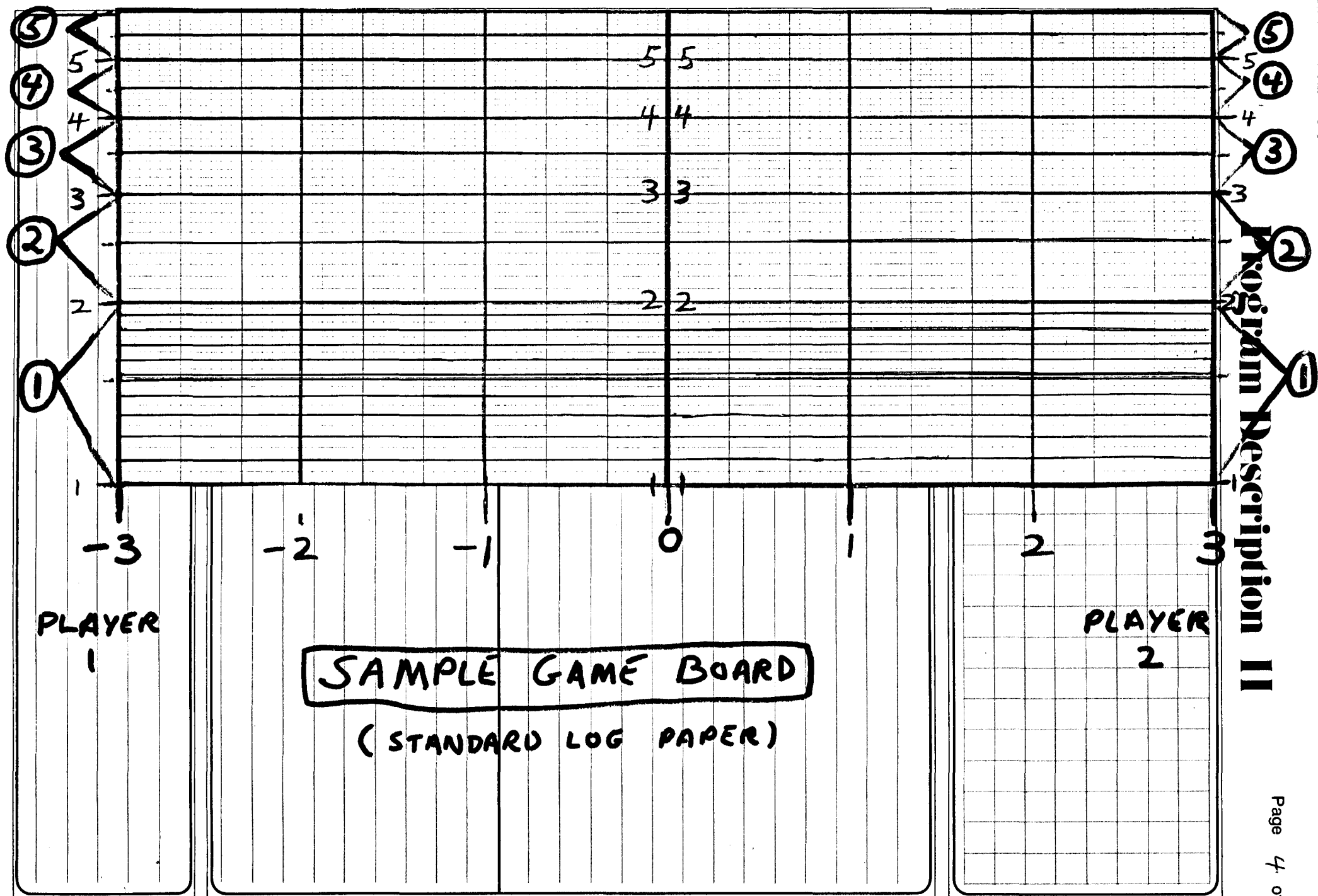
Players can also add their own english. In stead of specifying a paddle number as simply P, one can key in P.1 (bottom half from P to P.5) or P.9 (top half from P.5 to P+1). If you select the wrong "half", you've missed the ball and your opponent scores. If you are successful, the ball will ~~automatically~~ automatically head toward the High side of your opponent's end ($y=4$, $y=5$) where he'll find it more difficult to select the right paddle. Thus, compare the two paths of the ball:



Operating Limits and Warnings When serving, ~~the~~ Paddle selection inputs between 0 and 1 and greater than 6 default to paddle = $y=3$. Inputs less than 0 cause an ERROR. Also, when receiving, you may select a paddle, say, 3; the coordinates ^{will} end up being 3.00 ±0.3, and you still lose the point. This is because the y coordinate, 2.999..., rounded off to 3.00 in the display.

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00875D

Program Description II

Sketch(es)

Sample Problem(s) STORE SEED: .987654321 STO C f c

Player 1	Player 2	comment	OUTPUT
1	A	serve from (-3,1)	1.00 -03, 1.50 -02, 2.26 -01, 3.39 00, 5.10 01,
	3	Select Paddle 3	4.69 02, 3.12 03, 1.83 02, 1.08 01, 1.58 00,
			2.70 -01
5		Select Paddle 5	4.59 -02, 4.60 -03, 0.01 (score)
		WRONG: score is 0 to 1	
3	E	Player 2-serve from (3,3)	3.00 03, 3.75 02, 4.68 01, 5.84 00,
			4.93 -01
3		select Paddle 3	3.95 -02, 3.16 -03, 2.26 -02, 1.62 -01,
			1.16 00, 1.21 01
2.1		select bottom "half" of Paddle 2	1.69 02, 2.36 03, 2.72 02, 3.15 01,
			3.63 00, 4.20 -01
5		select Paddle 5	4.85 -02, 5.60 -03, 5.38 -02, 4.50 -01,
			3.77 00, 3.16 01
2.1		select bottom "half" of Paddle 2	2.64 02, 2.21 03, 1.42 02,
			1.10 01, 1.72 00, 2.70 -01
5.1		select bottom "half" of Paddle 5	4.21 -02, 5.47 -03
			3.20 -02, 1.87 -01, 1.09 00,
			1.57 01
4.9		select top "half" of Paddle 4	2.69 02, 4.61 03, 4.29 02,
			2.35 01, 1.29 00, 1.41 -01
4.1		select bottom "half" of Paddle 4	2.57 -02, 4.68 -03, 0.02 (score)

WRONG: Player 2 is winning by a score of 2 to nothing.
 Players decide beforehand what the winning total should be (11, for example).
 For doubles, Partners take turns selecting a paddle.
 For practice, one user can play "both ends of the table."

A diagram of a ping-pong table. The table is rectangular with a net in the center. On the left side, there is a label '1' and a small box containing the letter 'd'. Below these, the word 'SERVE' is written with an arrow pointing towards the center. On the right side, there is a label '2' and a small box containing the letter 'd'. Below these, the word 'SERVE' is written with an arrow pointing towards the center. In the center of the table, the words 'PING PONG' are written at the top, and 'f INIT' and 'f AUTO' are written below them. A box labeled 'SEED' is positioned between the two 'f' labels.

[illegible]

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	g LBL e	32 25 15	Auto mode		h F? 3	35 71 03	
	h SF 2	35 51 02			GTU 5	22 05	
	g LBL c	32 25 13	Initialize		RCL 7	34 07	Check Auto Flag to skip
	0	00		060	f X# 0	31 61	XXXXXXXXXX
	STO 0	33 00			GTU 5	22 05	
	h F? 2	35 71 02	Auto mode set?		f D52	31 33	
	1	01	Yes - set R7 flag		GTU 4	22 04	
	STO 7	33 07	No - clear R7 flag.		0	00	No input - Automatic miss.
	h RTN	35 22			f LBL 5	31 25 05	
010	f LBL A	31 25 11	Player 1 serves -		STO 4	33 04	Save paddle number
	h SF 0	35 51 00	Set Flag 0 ($x < 0$)		2	02	
	GTU 5	22 05	($x = -3$)		h ST I	35 33	
	f LBL E	31 25 15	Player 2 serves		f GSB 6	31 22 06	Continue displaying
	h CF 0	35 61 00	Clear Flag 0 ($x > 0$)	070	h Pause	35 72	coordinates
	f LBL 5	31 25 05	($x = +3$)		RCL 7	34 07	check auto flag -
	f INT	31 83			f X# 0	31 61	if on, skip the
	g SC1	32 23			GTU 2	22 02	paddle no. check
	f X=0	31 51	Paddle input = 0?		.	83	check for
	3	03	Default to 3		5	05	Paddle # inputs:
020	ENTER T	41			RCL 4	34 04	
	5	05	Paddle input		g frac	32 83	
	h X=y	35 52	greater than 6?		g X>y	32 81	P.9?
	g X>y	32 81			GTU fb	22 31 12	Yes - Goto fb
	3	03	Default to 3	080	f X# 0	31 61	P.1?
	f LN	31 52	Paddle number = Y		GTU fa	22 31 11	Yes - Goto fa
	STO 2	33 02	STORE LN(Y) in R2		RCL 6	34 06	otherwise simply P.
	f GSB 9	31 22 09	Random number.		f INT	31 83	
	.	83			RCL 4	34 04	
	3	03			g X#y	32 61	Paddle # correct?
030	X	71			GTU 7	22 07	No - opponent scores
	.	83			f LBL 2	31 25 02	Yes - Apply
	2	02			RCL 6	34 06	natural english.
	+	61			g frac	32 83	
	STO 3	33 03	Random ΔY	090	.	83	
	f GSB 9	31 22 09			5	05	
	h CF 1	35 61 01			-	51	
	.	83			3	03	
	5	05	Randomize to get		÷	81	
	g X>y	32 81	initial vertical		h F? 1	35 71 01	
040	h SF 1	35 51 01	direction (Flag 1 set -		CH5	42	
	3	03	down; Flag 1 clear - up)		RCL 3	34 03	
	STO 1	33 01	Initialize X .		+	61	
	1	01			.	83	
	h ST I	35 33			1	01	
	f GSB 1	31 22 01		100	g X≤y	32 71	
	h Pause	35 72	Display first set of		h X=y	35 52	
	f LBL 8	31 25 08	coordinates.		.	83	
	4	04			6	06	
	h ST I	35 33			g X>y	32 81	
050	f GSB 6	31 22 06	Continue displaying		h X=y	35 52	
	h CF 3	35 61 03	coordinates		GTU 0	22 00	
	4	04			g LBL a	32 25 11	Continue at LBL 0.
	h ST I	35 33			RCL 6	34 06	Paddle # = P.1
	f LBL 4	31 25 04			RCL 4	34 04	(lower half)
	h R↓	35 53		110	f INT	31 83	check if
	h Pause	35 72	Await Paddle # input		g X>y	32 81	successful.

REGISTERS

0 SCORE	1 X	2 LN(Y)	3 ΔY	4 Paddle Guess	5	6 Y	7 "AUTO" FLAG	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
A	B	C seed	D	E	F	G	H	I used	J

LABELS					FLAGS	SET STATUS		
A	B	C	D	E		FLAGS	TRIG	DISP
SERVE →				← SERVE	0 on: 4X → off: 4X ←	ON OFF		
a ✓	b ✓	c IN IT	d ✓	e AUTO	1 on: 4y ↓ off: 4y ↑	0 ☐ ☒	DEG ☒	FIX ☒
0 ✓	1 ✓	2 ✓	3 ✓	4 ✓	2 used	1 ☐ ☒	GRAD ☐	SCI ☐
5 ✓	6 ✓	7 ✓	8 ✓	9 ✓	3 used	2 ☐ ☒	RAD ☐	ENG ☐
						3 ☐ ☒		n <u>2</u>