

PROGRAM DESCRIPTION I

Program Title BASEBALL FEVERContributor's Name DAVID R. STAUFFERAddress 12 H GRADUATE CIRCLECity UNIVERSITY PARKState/Country PENNA.Zip Code 16802

Program Description, Equations, Variables FROM THE NATIONAL ANTHEM TO THE CHEERS OF THE FANS FOLLOWING THE FINAL OUT - IN EXTRA INNINGS IF NECESSARY - THIS UNBELIEVABLY COMPLETE, YET EASY-TO-PLAY GAME OF STRATEGY AND CHANCE INCLUDES BALLS, STRIKES, WALKS, STRIKEOUTS, SINGLES, DOUBLES, TRIPLES, HOME RUNS, GRAND SLAMS, FOUL BALLS, DOUBLE PLAYS, HIT-BATTERS, BUNT AND STEAL OPTIONS AND EVEN ERRORS. ANTICIPATING USER ERRORS, I INCLUDED IMPROPER-RESPONSE LOOPS TO ELIMINATE ANY USER DIFFICULTIES: FOR EXAMPLE, ATTEMPTING TO STEAL WITH BASES EMPTY GENERATES THE ERROR MESSAGE "RUNNER STAYS" AFTER WHICH THE "SWING?" PROMPT IS REPEATED.

TWO PLAYERS PRESS KEYS TO PITCH, SWING, TAKE (A PITCH), BUNT, STEAL AND OBTAIN ADDITIONAL GAME-RELATED INFORMATION. AFTER EVERY HIT OR OUT, THE PROGRAM AUTOMATICALLY TELLS THE PLAYERS WHAT BASES
(CONTINUED ON NEXT PAGE)

Necessary Accessories 4 MEMORY MODULES OR HP-41CV

Operating Limits and Warnings EXECUTE U (STEAL), O (BUNT), M (TAKE) OR N (SWING) ONLY WHEN YOU ARE PROMPTED WITH "SWING?". SINCE THE OPTIONAL KEYS Q (BASES), S (STATS), P (COUNT) AND SC (LAST INNING SCORE) RETURN
(CONTINUED ON NEXT PAGE)

Reference(s)

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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(CONTINUATION PAGE)

PROGRAM DESCRIPTION (CONT.)

ARE OCCUPIED. FOLLOWING EVERY BALL OR STRIKE, THE COUNT IS DISPLAYED. OPTIONAL KEYS MAY BE PRESSED TO OBTAIN THE OUTS AND THE NUMBER OF RUNS ACROSS SO FAR IN THE INNING. FURTHERMORE, THE COUNT, THE STATUS OF THE BASES OR THE LAST-INNING SCORE MAY BE OBTAINED FROM THE KEYBOARD. AFTER THE THIRD OUT, "SIDE RETIRED" SCROLLS ACROSS THE DISPLAY FOLLOWED BY THE MEN LEFT ON BASE, RUNS ACROSS IN THE HALF-INNING JUST COMPLETED, THE NUMBER OF INNINGS COMPLETED AND THE SCORE.

A SERIES OF RANDOM NUMBER GENERATORS MAKES THE GAME EXCITING, UNPREDICTABLE, AND MOST IMPORTANT - REALISTIC. STRATEGY IS ADDED TO CHANCE WHEN THE PLAYER BATTING MUST DECIDE WHETHER TO SWING, TAKE, SEND THE RUNNER, OR BUNT.

AMONG THE PROGRAM'S REALISTIC FEATURES, A TWO-STRIKE FOUL BALL WHILE BUNTING RESULTS IN A STRIKEOUT. FURTHERMORE, IF THE HOME TEAM (B) HAS THE LEAD AFTER 8.5 COMPLETE INNINGS, THE GAME IS OVER AND THE FINAL SCORE SCROLLS ACROSS THE DISPLAY. SIMILARLY, IN THE BOTTOM OF THE NINTH INNING OR THE BOTTOM OF ANY EXTRA INNING, THE GAME IS OVER AS SOON AS THE WINNING RUN CROSSES THE PLATE.

"BASEBALL FEVER" COMMUNICATES SO WELL WITH THE USERS THAT EVEN CHILDREN CAN ENJOY THE SOPHISTICATION OF THE GAME - INSTEAD OF FEELING LIKE THEY ARE OUT IN LEFT FIELD WHILE THE ADULTS HAVE ALL THE FUN.

THIS REALISTIC SIMULATION OF THE SEVENTH GAME OF THE WORLD SERIES PUTS ALL THE EXCITEMENT OF A CHAMPIONSHIP BASEBALL GAME AT YOUR FINGERTIPS. HOT DOGS AND COLD BEVERAGES ARE NOT INCLUDED.

OPERATING LIMITS AND WARNINGS (CONT.)

EXECUTION TO THE "PITCH?" PROMPT, USE THEM WHEN "PITCH?" IS IN THE DISPLAY, PREFERABLY BEFORE A NEW PITCH IS MADE. PRESSING AN OPTIONAL KEY WHEN "SWING?" IS PROMPTED FOR ONLY IGNORES THE PITCH JUST DELIVERED AND PROMPTS FOR ANOTHER PITCH.

THE STEAL KEY (LBL U) CAN ONLY BE USED TO STEAL SECOND BASE, PROVIDED NOONE IS ON SECOND (NO DOUBLE STEALS). IF A MAN IS ON THIRD, HE STAYS THERE. OTHERWISE, A STEAL ATTEMPT WILL RESULT WITH THE ERROR MESSAGE "RUNNER STAYS" AND THE "SWING?" PROMPT IS REPEATED.

A SINGLE ALWAYS SCORES A MAN ON SECOND AND ADVANCES A MAN ON FIRST TO SECOND. A DOUBLE ADVANCES ALL RUNNERS TWO BASES. A BUNT SINGLE ALSO SCORES A MAN FROM SECOND BASE.

HOME RUNS ARE HIT ONLY OFF FASTBALLS.

LBL M (TAKE) GIVES THE PLAYER BATTING THE OPTION TO INTENTIONALLY NOT SWING AT THE PITCH. PRESSING LBL N CAUSES THE PROGRAM TO DECIDE WHETHER THE PLAYER BATTING WILL SWING OR TAKE THE PITCH.

PROGRAM DESCRIPTION II

Sample Problem (Sketch if Desired)

- A. See "More about the Code..." on p. 8.
 B. See flowchart on p. 12.

SOLUTION: THIS IS A SAMPLE FIRST INNING OF "BASEBALL FEVER":

Input	Function	Display	Comments
	(USER) (XEQ) SIZE 015 (XEQ) BBF	****WORLD*** ***SERIES*** AND THE HOME OF THE... BRAVE. SEED?	Set USER mode Minimum size Flashes 3 times Words and melody Input seed for random number generator
.4	(R/S)	GAME 7... PLAYBALL	Note that flag 0 set indicates top of inning Press key to pitch
	[XEQ] 'L'	PITCH? SLIDER SWING?	Type of pitch Press key to swing, take, bunt or steal
	[XEQ] 'N'	BALL: INSIDE COUNT: 1-0 PITCH?	One ball and no strikes
	[XEQ] 'L'	KNUCKLE BALL SWING?	
	[XEQ] 'N'	BALL: INSIDE COUNT: 2-0 PITCH?	
	[XEQ] 'L'	KNUCKLE BALL SWING?	
	[XEQ] 'U'	RUNNER STAYS	Improper steal attempt (bases empty)
	[XEQ] 'N'	SWING? BALL: OUTSIDE COUNT: 3-0 PITCH?	
	[XEQ] 'L'	CURVE BALL SWING?	

(CONTINUATION PAGE)

Input	Function	Display	Comments
	[XEQ] 'M'	TAKE... BALL: OUTSIDE WALK MAN ON FIRST PITCH?	Take a pitch (don't swing)
	[XEQ] 'L'	KNUCKLE BALL SWING?	
	[XEQ] 'N'	CALLED STRIKE COUNT: 0-1 PITCH?	
	[XEQ] 'L'	CHANGE-UP SWING?	
	[XEQ] 'U'	RUNNER GOING SAFE MAN ON SECOND PITCH?	Attempt to steal Stolen base* *If the batter had swung, he would hit a grounder, forcing an out at second Strategy changes outcomes
	[XEQ] 'L'	CURVE BALL SWING?	
	[XEQ] 'N'	BALL: INSIDE COUNT: 1-1 PITCH?	
	[XEQ] 'L'	KNUCKLE BALL SWING?	
	[XEQ] 'N'	BALL: INSIDE COUNT: 2-1 PITCH?	
	[XEQ] 'L'	SCREWBALL SWING?	
	[XEQ] 'N'	***SINGLE*** MAN ON FIRST PITCH?	Flashes 3 times Man on second scored
	[XEQ] 'S'	RUNS ACROSS: 1 OUTS: 0 PITCH?	Check stats
	[XEQ] 'L'	FASTBALL SWING?	
	[XEQ] 'N'	LINE DRIVE: CAUGHT MAN ON FIRST PITCH?	
	[XEQ] 'L'	KNUCKLE BALL BUNT ATTEMPT GOOD SACRIFICE MAN ON SECOND PITCH?	Bunting Man advanced to second by sacrificing an out
	[XEQ] 'S'	RUNS ACROSS: 1 OUTS: 2 PITCH?	Check stats
	[XEQ] 'L'	KNUCKLE BALL SWING?	
	[XEQ] 'N'	BALL: OUTSIDE COUNT: 1-0 PITCH?	
	[XEQ] 'L'	KNUCKLE BALL SWING?	
	[XEQ] 'N'	BALL: OUTSIDE	

(CONTINUATION PAGE)

Input	Function	Display	Comments
		COUNT: 2-0	
		PITCH?	
[XEQ]	'L'	FASTBALL	
		SWING?	
[XEQ]	'N'	***SINGLE***	Flashes 3 times
		MAN ON FIRST	Man on second scored
		PITCH?	Check stats
[XEQ]	'S'	RUNS ACROSS: 2	
		OUTS: 2	
		PITCH?	
[XEQ]	'L'	SLIDER	
		SWING?	
[XEQ]	'N'	SWING AND MISS	
		COUNT: 0-1	
		PITCH?	
[XEQ]	'L'	KNUCKLE BALL	
		SWING?	
[XEQ]	'N'	BALL OUTSIDE	
		COUNT: 1-1	
		PITCH?	
[XEQ]	'Q'	MAN ON FIRST	Forgot status of bases
		PITCH?	
[XEQ]	'L'	SCREWBALL	
		SWING?	
[XEQ]	'N'	CALLED STRIKE	
		COUNT: 1-2	
		PITCH?	
[XEQ]	'L'	CURVE BALL	
		SWING?	
[XEQ]	'N'	BALL: INSIDE	
		COUNT: 2-2	
		PITCH?	
[XEQ]	'L'	SCREWBALL	
		SWING?	
[XEQ]	'U'	RUNNER GOING	Stealing
		OUT	Thrown out (3 outs)
		SIDE RETIRED	
		INNINGS COMPLETE	
		D: 0.5	
		LEFT ON BASE:	
		BASES EMPTY	
		RUNS ACROSS: 2	
		TEAM A: 2	Visiting team score
		TEAM B: 0	Home team score
		PLAYBALL	Other team now at bat
		PITCH?	Note flag 0 clear in
[XEQ]	'L'	SCREWBALL	bottom of any inning
		SWING?	
[XEQ]	'N'	GROUNDOUT	
		BASES EMPTY	
		PITCH?	
[XEQ]	'L'	SLIDER	
		SWING?	
[XEQ]	'N'	CALLED STRIKE	
		COUNT: 0-1	

(CONTINUATION PAGE)

Input	Function	Display	Comments
		PITCH?	
[XEQ]	'L'	CHANGE-UP	
		SWING?	
		FLYOUT	
		BASES EMPTY	
		RUNS ACROSS: 0	
		OUTS: 2	
		LAST INNING:	Forgot score, so check it*
		TEAM A: 2	*This score does not in-
		TEAM B: 0	clude runs scored during
		PITCH?	current at bat. For total
		FASTBALL	score, XEQ (S) to get runs
		SWING?	across in current half-inn-
		BALL: INSIDE	ing and add to score from
		COUNT: 1-0	(SC).
		PITCH?	
		SCREWBALL	
		SWING?	
		GROUNDOUT	That makes 3 outs
		SIDE RETIRED	
		INNINGS COM-	
		PLETED: 1.0	
		LEFT ON BASE:	
		BASES EMPTY	
		RUNS ACROSS: 0	Note that OUTS are skipped
		TEAM A: 2	in LBL S since we know there
		TEAM B: 0	are 3 to retire the side.
		PLAYBALL	(Change of team at bat)
		PITCH?	Note that flag 0 set indic-
		.	ates top of inning or Team
		.	A is at bat.
		.	
		.	

More about the Code...

The word "code" is computer jargon for the language that the computer understands in order to execute a program. This section will discuss some of the logic and reasoning I used when I wrote the code for "Baseball Fever".

Upon inspection, you will find that short form numeric labels are used wherever possible to conserve memory. Furthermore, utilizing the way the computer searches for a short form numeric label, I am able to use one particular short form numeric label many times.

However, I use global labels in the loops for the flashing messages such as single and double. If I use another label type, the first time this code is reached, the flashing message is stalled while the computer searches for the label at the beginning of the loop. After the first pass through, the computer records the jump; and the message continues to flash at even time intervals. To avoid this problem, I use one-letter global labels in these loops. Furthermore, global labels—rather than local alpha labels—are used for those subroutines to be assigned to the keyboard; this gives the user the option to change the key assignments. Unfortunately, to conserve memory and still be able to assign them to the keys, single letter global labels are used. Since these label names are not very descriptive, please refer to the user instructions for clarification.

Naturally, if two or more parts of the program use the

same code, subroutines are used. Different subroutines even share the same code: LBL O (bunt) uses a subset of the labels called by LBL N (swing or take). Since many subroutines ended with "XEQ Q GTO K", I combined these two steps into LBL 75; therefore, replacing this pair of steps with GTO 75 saves memory.

A faster-running, memory-conserving method is used in LBL L, LBL N, LBL O, and LBL M. Rather than search through a series of labels one by one to find a certain label, the label of interest is executed indirectly. Furthermore, note how LBL M uses a flag in order to share the code of LBL N.

How realistic the simulation of the game is depends on the statistics one uses to parameterize the outcome of a pitch, swing, take, bunt or steal.

Half of the parameterization used in LBL N (swing or take) is based on the probability of "rolling" a particular sum from two theoretical dice (done by a random number generator). When this total is 6, 7 or 8, the probability of "rolling" one of these totals is at least 5/36. See the table that follows:

<u>Two Dice Total</u>	<u>Combinations</u>	<u>No. of Combinations</u>
2	1 and 1	1
3	1 and 2, 2 and 1	2
4	1 and 3, 2 and 2, 3 and 1	3
5	1 and 4, 2 and 3, 3 and 2, 4 and 1	4
6	1 and 5, 2 and 4, 3 and 3, 4 and 2, 5 and 1	5
7	1 and 6, 2 and 5, 3 and 4, 4 and 3, 5 and 2, 6 and 1	6
8	2 and 6, 3 and 5, 4 and 4, 5 and 3, 6 and 2	5
9	⋮	4
⋮	⋮	⋮
12	6 and 6	1

		<u>LBL O (BUNT)</u>	
IIIIa.	(1/2)	<u>IIIIb.</u>	(1/2)
1/5	A. On with an error	A.	a. If first is empty or a man on second,
1/5	B. Foul ball		1. Ball: outside
1/5	C.		2. Called strike
1/2	a. Ball: outside		b. If already 2 outs, then groundout
1/2	b. Called strike		ELSE...
1/5	D. Line drive: caught		
1/5	E. Single		
		1/2	c.
		1/2	1. Ball: outside
		1/2	2. Called strike
		1/2	d. Good sacrifice

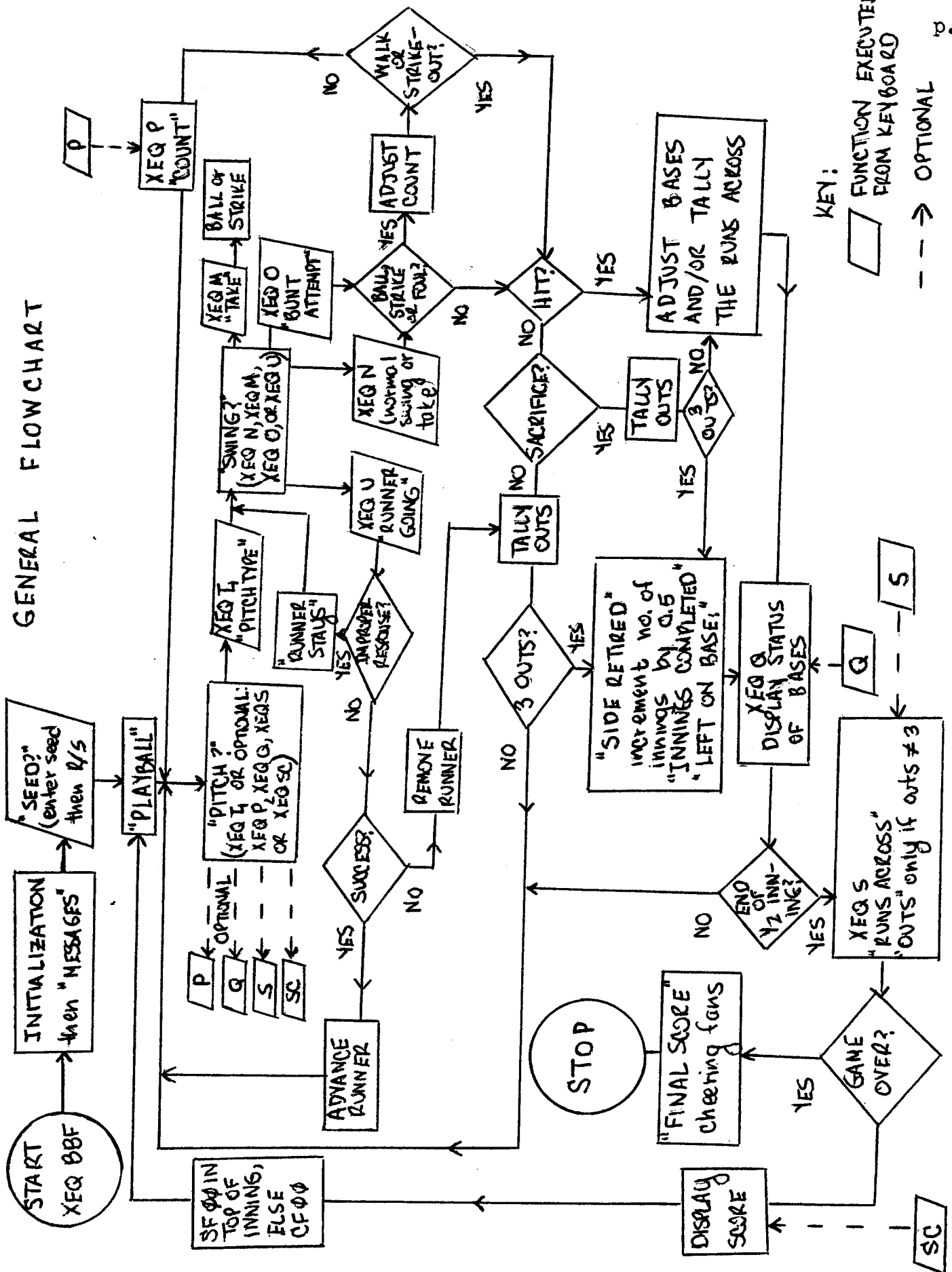
		<u>LBL M (TAKE)</u>	
IVa.	(1/2)	<u>IVb.</u>	(1/2)
19/50A.	Ball: inside	A.	a. Ball: outside
2/5	B. Called strike	1/2	b. Called strike
1/50	C. Hit batter, take first	1/2	
1/5	D. Ball: outside		

		<u>LBL U (STEAL)</u>	
V. IF first is empty or a man is on second, "RUNNER STAYS"			
ELSE...			
1/4	A. Safe		
1/4	B. Out		
1/4	C. No throw: safe		
1/4	D. Rundown		
3/4	a. Tagged out		
1/4	b. Safe		

A general flowchart (see next page) may help you to understand the overall logic. Parallelograms are used to denote where a function must be executed from the keyboard by the users. The dashed lines represent the execution of the optional keys for additional game-related information.

Finally, since the search for global labels starts at the end of program memory and works forward, LBL X, the very important random number generator, is positioned last in program memory for quick access.

GENERAL FLOWCHART



USER INSTRUCTIONS

				SIZE: (HP-41C) 015
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1	Set the size.		(XEQ) SIZE	(min. size)
2	Set USER mode if you want to use the default key assignments.		(USER)	
3	Load program (read in the cards) (If "NO ROOM", make sure the only key assignments are those used by this program)			
4	If you skipped step 2, refer to steps 8 and 9 for function label names for key assignments, then set USER mode.		(USER)	
5	Run program (All initialization of flags and registers is done by the program).		(XEQ) BBF	"WORLD SERIES"
6	Enter seed (a number between 0 and 1 for the random number generator, LBL X). (optional) To start game in the top of the nth inning for a shorter game duration time, when prompted "PITCH?":	number	(R/S)	SEED?
7	To pitch:	n - 1	(STO 06) (L)	n - 1 (pitch type)
8	To swing or take (computer decides outcome): OR To take a pitch (not swing): OR		(N) (M)	(outcome) "TAKE..."

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USER INSTRUCTIONS

(continued)

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 SIZE:
(HP-41C) 015

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
	To bunt:		(O)	"BUNT ATTEMPT"
	OR			
	To steal second base:		(U)	"RUNNER GOING"
	GO TO STEP 7 OR 9			
9	These are optional keys used to get additional game-related in- formation:			
	For status of bases:		(Q)	(men on base)
	OR			
	For the count:		(P)	"COUNT: a-b"
	OR			
	For the stats:		(S)	"RUNS ACROSS: c"
				"OUTS: d"
	OR			
	For last inning score:		(SC)	(score)

PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
01	LBL "BBF"		Begin	42	PSE		
02	CF 21		Clear printer	43	LBL "K"		Program loops
03	3		enable flag	44	CF 09		here after
04	STO 03			45	CF 10		each batter
05	LBL "V"			46	CF 15		
06	"*****WOR			47	RCL 06		If number of
LD****"			Flashes 3	48	FRC		complete inn-
07	AVIEW		times	49	X=0?		ings is an in-
08	"****SERI			50	SF 00		teger, set
ES****"				51	RCL 06		flag 0; this
09	AVIEW			52	FRC		tells players
10	DSE 03			53	X=0?		that they are
11	GTO "V"			54	CF 00		in top of inn.
12	CF 03			55	"PITCH?"		Prompt for a
13	CF 05			56	PROMPT		pitch
14	CF 06			57	LBL "L"		(PITCH)
15	CF 07		Clear only	58	6		
16	CF 08		those flags	59	XEQ "X"		Random no. gen.
17	CF 29		which must be	60	X=0?		
18	CLRG		cleared	61	6		
19	FIX 0		Clears all	62	STO 03		Decide pitch
20	"AND THE		registers	63	XEQ IND		type:
21	HOME"			03			
22	AVIEW		National	64	LBL 01		
23	TONE 0		Anthem:	65	"SCREWBA		
24	TONE 1		Words and	LL"			
25	TONE 2		melody	66	AVIEW		
26	PSE			67	PSE		
27	"OF THE.			68	GTO 07		
28	AVIEW			69	LBL 02		
29	TONE 3			70	"CURVE B		
30	TONE 1			ALL"			
31	"BRAVE."			71	AVIEW		
32	AVIEW			72	PSE		
33	TONE 0			73	GTO 07		
34	PSE			74	LBL 03		
35	"SEED?"		Input seed for	75	"SLIDER"		
36	PROMPT		random number	76	AVIEW		
37	STO 00		generator	77	PSE		
38	"GAME 7			78	GTO 07		
39	AVIEW			79	LBL 04		
40	PSE			80	"CHANGE-		
41	"PLAY BA			UP"			
42	LL"			81	AVIEW		
43	AVIEW			82	PSE		
44				83	GTO 07		
45				84	LBL 05		
46				85	"KNUCKLE		
47				BALL"			

PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
86	AVIEW			132	+		Add 7 for
87	PSE			133	STO 03		label no.
88	GTO 07			134	2		
89	LBL 06			135	MOD		If even, go to
90	"FASTBAL			136	X=0?		good sacrifice
L"				137	GTO 44		Else...
91	AVIEW			138	XEQ IND		Decide bunt
92	PSE			03			outcome
93	LBL 07			139	LBL 09		
94	"SWING?"		Prompt for	140	LBL 48		
95	PROMPT		swing, take,	141	"ON WITH		
96	LBL 44		bunt or steal	AN ERRO"			
97	RCL 09			142	"FR"		
98	1			143	AVIEW		
99	X=Y?		Man on second?	144	PSE		
100	GTO 13			145	RCL 10		
101	RCL 08			146	1		
102	X=0?		First base	147	X=Y?		Man on third?
103	GTO 13		empty?	148	XEQ 10		
104	2			149	GTO 49		
105	XEQ "X"			150	LBL 10		
106	X=0?			151	0		Man on third
107	GTO 13			152	STO 10		scores
108	RCL 12			153	1		Add 1 to runs
109	2			154	ST+ 11		across
110	X=Y?		Two outs?	155	RTN		
111	GTO 08			156	LBL "M"		(TAKE)
112	"GOOD SA			157	"TAKE..."		
CRIFICE"							
113	AVIEW			158	AVIEW		
114	CF 07		Bases not full	159	SF 10		To use code of
115	0		Advance man	160	GTO 00		LBL N (SWING
116	STO 08		from first to	161	LBL "N"		OR TAKE)
117	1		second base	162	6		
118	STO 09			163	XEQ "X"		Program
119	GTO 47		Tally outs	164	X=0?		decides
120	LBL "0"		(BUNT)	165	6		
121	SF 09			166	RCL 03		Add swing in-
122	"BUNT AT			167	+		indicator no. to
TEMPT"				168	STO 04		pitch indica-
123	AVIEW			169	LBL 00		tor number
124	5			170	9		
125	XEQ "X"		Compute bunt	171	XEQ "X"		
126	X=0?		indicator no.	172	53		Add 53 for
127	5			173	+		label number
128	RCL 03			174	STO 03		
129	+		Add to pitch	175	2		If even, go to
130	STO 04		indicator no.	176	MOD		series of hit/
131	7			177	X=0?		out labels

PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
178	GTO 46			219	LBL 67		
179	XEQ IND		Decide result	220	1		Increment
03			of pitch:	221	ST+ 01		balls by one
180	LBL 53			222	RCL 01		
181	"BALL: I			223	4		
NSIDE"				224	X=Y?		Four balls?
182	AVIEW			225	GTO 74		Walk
183	PSE			226	LBL "P"		
184	GTO 67			227	"COUNT:		
185	LBL 55			"			
186	FS? 10		If taking,	228	RCL 01		To determine
187	GTO 59		called strike	229	3		if full count:
188	"SWING A			230	X=Y?		
ND MISS"				231	SF 05		
189	AVIEW			232	RCL 01		
190	PSE			233	RCL 02		
191	GTO 68			234	+		
192	LBL 57			235	5		
193	10			236	X=Y?		
194	XEQ "X"			237	GTO 00		
195	X=0?			238	LBL 65		
196	GTO 53			239	ARCL 01		
197	"HIT BAT		Rare 1/10	240	"I--"		
TER, TAK"			probability	241	ARCL 02		
198	"HE FIRS			242	AVIEW		Display count
T"				243	PSE		
199	AVIEW			244	GTO "K"		Loop back for
200	PSE			245	LBL 00		next batter
201	XEQ 66		Clear count	246	FS? 05		
202	GTO 85			247	GTO 01		
203	LBL 59		Similar in out-	248	GTO 65		
204	"CALLED		come to walk,	249	LBL 01		
STRIKE"			so share code	250	"FULL CO		
205	AVIEW			UNT"			
206	PSE			251	AVIEW		
207	LBL 68			252	PSE		
208	1		Increment	253	GTO "K"		Loop to PITCH?
209	ST+ 02		strikes by one	254	LBL 46		
210	RCL 02			255	FS? 10		Taking pitch?
211	3		Three strikes?	256	GTO 13		
212	X=Y?			257	RCL 04		
213	GTO 60		Strikeout	258	7		Add 7 for
214	GTO "P"		Show count	259	+		label number
215	LBL 61			260	STO 03		
216	"BALL: 0			261	XEQ IND		Decide outcome:
UTSIDE"				03			
217	AVIEW			262	LBL 09		
218	PSE			263	XEQ 66		Clear count
				264	3		

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
265	STO 03			312	1		
266	LBL "W"			313	STO 09		
267	****TRIP			314	RTN		
	LE***"			315	LBL 11		
268	AVIEW		Flashes 3	316	"FOUL BA		
269	DSE 03		times		LL"		
270	GTO "W"			317	AVIEW		
271	CF 07		Bases not full	318	PSE		
272	RCL 08		Man on first,	319	RCL 02		
273	RCL 09		second,	320	2		
274	+			321	X=Y?		Two strikes?
275	RCL 10		and third	322	GTO 00		
276	+			323	1		Increment
277	ST+ 11		score.	324	ST+ 02		strikes
278	1			325	GTO "P"		Show count
279	STO 10		Put man on	326	LBL 00		
280	LBL 69		third base	327	FS? 09		Bunting?
281	0			328	GTO 60		
282	STO 08		Clear first	329	GTO "P"		
283	STO 09		and second	330	LBL 12		
284	GTO 75		bases	331	RCL 08		
285	LBL 10		Show bases and	332	1		
286	LBL 17		loop back	333	X=Y?		Man on first?
287	3			334	XEQ 56		
288	STO 03			335	GTO 08		
289	LBL "Y"			336	LBL 42		
290	****SING			337	"GROUNDE		
	LE***"				R"		
291	AVIEW		Flashes 3	338	AVIEW		
292	DSE 03		times	339	PSE		
293	GTO "Y"			340	2		
294	LBL 62			341	XEQ "X"		
295	CF 07		Bases not full	342	X=0?		
296	XEQ 66		Clear count	343	GTO 48		
297	RCL 10		Man on third	344	"OUT AT		
298	RCL 09		and second		SECOND"		
299	+			345	AVIEW		
300	ST+ 11		score.	346	PSE		
301	0			347	0		
302	STO 09		Clear second	348	STO 09		Second empty
303	STO 10		and third	349	CF 07		Bases not full
304	RCL 08		bases	350	GTO 47		Tally outs
305	1			351	LBL 08		
306	X=Y?		Man on first?	352	"GROUND0		
307	XEQ 00		Move to second		UT"		
308	1		Else put man	353	AVIEW		
309	STO 08		on first	354	PSE		
310	GTO 75			355	GTO 47		Tally outs
311	LBL 00			356	LBL 13		

PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
357	2			404	XEQ 66		Clear count
358	XEQ "X"			405	FS? 07		Bases loaded?
359	X=0?			406	GTO 76		
360	GTO 61		Ball: outside	407	5		
361	GTO 59		Called strike	408	STO 03		
362	♦LBL 14			409	♦LBL "Z"		
363	♦LBL 16			410	****HOME		
364	"FLYOUT"				RUN**"		
365	AVIEW			411	AVIEW		Flashes 5
366	PSE			412	DSE 03		times
367	GTO 47		Tally outs	413	GTO "Z"		
368	♦LBL 15			414	BEEP		
369	"LINE DR			415	♦LBL 78		
	IVE: CAU"			416	CF 07		Bases not full
370	"FIGHT"			417	RCL 08		
371	AVIEW			418	RCL 09		
372	PSE			419	+		
373	GTO 47		Tally outs	420	RCL 10		
374	♦LBL 18			421	+		
375	XEQ 66		Clear count	422	1		
376	3			423	+		
377	STO 03			424	ST+ 11		Tally runs
378	♦LBL "R"			425	0		
379	****DOUB			426	STO 10		Clear all of
	LE***"			427	GTO 69		the bases
380	AVIEW		Flashes 3	428	♦LBL 66		Clears count
381	DSE 03		times	429	CF 05		for the next
382	GTO "R"			430	0		batter
383	CF 07		Bases not	431	STO 01		
384	RCL 09		loaded anymore	432	STO 02		
385	RCL 10			433	RTN		
386	+			434	♦LBL 76		
387	ST+ 11		Tally runs	435	3		
388	0			436	STO 03		
389	STO 10			437	♦LBL 35		
390	RCL 08			438	**GRAND		
391	1				SLAM**"		
392	X=Y?		Man on first?	439	AVIEW		Flashes 3
393	XEQ 00		Move him to	440	DSE 03		times
394	1		third	441	GTO 35		
395	STO 09		Man on second	442	BEEP		
396	0			443	BEEP		
397	STO 08		First empty	444	CF 07		
398	GTO 75		Show bases and	445	GTO 78		Tally runs
399	♦LBL 00		loop back	446	♦LBL 60		
400	1			447	"STRIKEO		
401	STO 10				UT"		
402	RTN			448	AVIEW		
403	♦LBL 19			449	PSE		

PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
450	LBL	47		498	TONE	3	
451	XEQ	66	Clear count	499	TONE	0	
452	FS?	04	Double play?	500	GTO	37	Tally outs
453	GTO	37		501	LBL	00	
454	1		Increment outs	502	2		
455	ST+	12	by one	503	XEQ	"X"	
456	LBL	38		504	X=0?		50/50 chance
457	RCL	12		505	SF	04	of double play
458	3			506	RTN		
459	X=Y?		Three outs?	507	LBL	"SC"	(SCORE)
460	SF	06	Half inning	508	"LAST IN		
461	FS?	06	completed?	509	AVIEW		
462	GTO	20		510	SF	15	To share code
463	GTO	75	Loop back	511	GTO	95	of LBL 95
464	LBL	37		512	LBL	"S"	(STATS)
465	XEQ	66	Clear count	513	FIX	0	
466	2		Increment outs	514	"RUNS AC		Runs across in
467	ST+	12	by two	515	ARCL	11	half-inning
468	RCL	09		516	AVIEW		(so far)
469	1			517	PSE		
470	X=Y?		Man on second?	518	FS?	06	End of half-
471	XEQ	01		519	GTO	86	inning?
472	0		Clear first and	520	"OUTS: "		If it is, we
473	STO	08	second bases	521	ARCL	12	know outs, so
474	STO	09		522	AVIEW		skip this code
475	GTO	38		523	PSE		
476	LBL	01	Man on second	524	GTO	"K"	Loop back
477	1		went to third	525	LBL	21	
478	STO	10		526	13		R13, team A
479	RTN			527	STO	05	Indirect reg.
480	LBL	56		528	GTO	05	
481	RCL	10		529	LBL	20	
482	1			530	FS?	00	Top of inning?
483	X=Y?		Man on third?	531	GTO	21	
484	GTO	42		532	14		R14, team B
485	RCL	12		533	STO	05	Indirect reg.
486	2			534	LBL	05	
487	X>Y?		Outs less than	535	"SIDE RE		
488	XEQ	00	2?	536	TIRED"		
489	FS?	04	Double play?	537	AVIEW		
490	GTO	02		538	RCL	11	Add runs across
491	RTN			539	RCL	IND	to teams' total
492	LBL	02		540	STO	IND	score
493	CF	04		541	FIX	1	
494	CF	07	Unload bases				
495	"DOUBLE						
496	PLAY"						
497	AVIEW						
498	PSE						

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PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
542	.5		Increment inn-	587	STO 11		Clear the runs
543	ST+ 06		ings completed	588	STO 12		Clear the outs
544	"INNINGS		by .5 and dis-	589	GTO "K"		Loop back
	COMPLET"		play:	590	LBL 31		Innings complete
545	"FED: "			591	SF 08		exceeds 8.5
546	ARCL 06			592	RCL 13		
547	AVIEW			593	RCL 14		Team B score
548	PSE			594	X>Y?		exceed Team A?
549	FS? 06			595	GTO 91		Game over
550	XEQ "Q"		Left on base?	596	GTO 95		Display score
551	LBL 86			597	LBL 25		
552	FS?C 06			598	RCL 13		
553	CF 07		Unload bases	599	RCL 14		
554	RCL 06			600	X=Y?		Tie score?
555	8.5			601	GTO 99		
556	X=Y?		Innings complete	602	LBL 91		
557	GTO 31		equal 8.5?	603	FIX 0		Display final
558	LBL 77			604	"FINAL S		score
559	RCL 06				CORE: "		
560	9			605	AVIEW		
561	X=Y?		Innings complete	606	PSE		
562	GTO 25		equal 9.0?	607	"TEAM A:		
563	FIX 1				"		
564	9			608	ARCL 13		
565	RCL 06			609	AVIEW		
566	X>Y?		Extra innings?	610	PSE		
567	GTO 98			611	"TEAM B:		
568	LBL 95				"		
569	FIX 0			612	ARCL 14		
570	"TEAM A:			613	AVIEW		
	"			614	PSE		
571	ARCL 13			615	RCL 13		
572	AVIEW		Display score	616	RCL 14		
573	PSE			617	X>Y?		Team B win?
574	"TEAM B:			618	GTO 00		
	"			619	"WORLD C		Team A won:
575	ARCL 14				HAMPIONS"		
576	AVIEW			620	AVIEW		
577	PSE			621	PSE		
578	FS? 15		Executed from	622	"TEAM A"		
579	GTO "K"		keyboard?	623	AVIEW		
580	"PLAY BA		Team at bat has	624	PSE		
	LL"		changed	625	BEEP		
581	AVIEW			626	GTO 01		
582	PSE			627	LBL 00		
583	0		Clear the bases	628	"WORLD C		Team B won:
584	STO 08				HAMPIONS"		
585	STO 09			629	AVIEW		
586	STO 10			630	PSF		

PROGRAM LISTING

□ 67 □ 97 ☒ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
631	"TEAM B"			677	GTO 00		
632	AVIEW			678	GTO 90		
633	PSE			679	LBL 00		
634	BEEP			680	FS? 08		Greater than 8.5 complete?
635	LBL 01			681	GTO 01		
636	5			682	GTO 90		
637	STO 03			683	LBL 01		Put Team B's total score in R14
638	LBL "T"			684	RCL 07		
639	"*YEAH, TEAM*"		The fans are cheering:	685	STO 14		
640	AVIEW			686	GTO 91		
641	TONE 8			687	LBL 90		
642	TONE 8			688	RCL 08		
643	DSE 03			689	RCL 09		
644	GTO "T"			690	+		
645	STOP		Program done	691	RCL 10		
646	LBL 58			692	+		
647	"LEFT ON BASE:"			693	3		
648	AVIEW			694	X=Y?		Bases loaded?
649	RTN			695	SF 07		
650	LBL 99			696	RCL Y		
651	"EXTRA I NNINGS"			697	3		
652	AVIEW			698	X=Y?		Bases not full?
653	PSE			699	CF 07		
654	GTO 95		Extra inn. sco.	700	FS? 07		Bases loaded?
655	LBL 97			701	GTO 28		
656	FS? 00		Top of inning?	702	RCL Y		
657	GTO 95		Display score	703	X=0?		Bases empty?
658	GTO 91			704	GTO 29		
659	LBL 98			705	RCL 08		
660	RCL 13			706	1		
661	RCL 14			707	X=Y?		Man on first?
662	X=Y?		Score not tie?	708	XEQ 23		
663	GTO 97			709	RCL 09		
664	GTO 95			710	1		
665	LBL "Q"		(BASES)	711	X=Y?		On second?
666	FS? 06		End of half- inning?	712	XEQ 24		
667	XEQ 58			713	RCL 10		
668	FS? 00		Top of inning?	714	1		
669	GTO 90			715	X=Y?		On third?
670	RCL 11			716	XEQ 26		
671	RCL 14			717	GTO 41		
672	+			718	LBL 23		
673	STO 07		In extra inn- ings, compute Team B's in- stantaneous score	719	"MAN ON FIRST"		
674	RCL 13		Is this score greater than Team A's?	720	AVIEW		
675	RCL 07			721	PSE		
676	X>Y?			722	RTN		
				723	LBL 24		
				724	"MAN ON SECOND"		

PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
725	AVIEW			768	"SAFE"		Stolen base
726	PSE			769	AVIEW		
727	RTN			770	PSE		
728	LBL 26			771	0		Move man from
729	"MAN ON			772	STO 08		first to
	THIRD"			773	1		second base:
730	AVIEW			774	STO 09		
731	PSE			775	GTO "Q"		Display bases
732	RTN			776	LBL 80		Runner is out
733	LBL 28			777	"OUT"		
734	"BASES L			778	AVIEW		
	OADED"			779	PSE		
735	AVIEW			780	0		Remove him
736	PSE			781	STO 08		from base
737	GTO 41		If end of half	782	GTO 47		Tally outs
738	LBL 29		inning show	783	LBL 81		
739	"BASES E		stats, then	784	"NO THRO		Easy stolen
	MPTY"		loop back		W: SAFE"		base
740	AVIEW			785	AVIEW		
741	PSE			786	PSE		
742	LBL 41			787	0		Move runner
743	FS? 06			788	STO 08		from first to
744	XEQ "S"		Display stats	789	1		second base
745	GTO "K"		Loop back	790	STO 09		
746	LBL "U"		(STEAL)	791	GTO "Q"		Display bases
747	RCL 08			792	LBL 82		
748	X=0?		First empty?	793	"RUN-DOW		Caught in a
749	GTO 00		Can't steal		N..."		run-down...
750	RCL 09			794	AVIEW		
751	1			795	PSE		
752	X=Y?		Man on second?	796	4		
753	GTO 00		No double steal	797	XEQ "X"		
754	"RUNNER			798	X=0?		1/4 chance of
	GOING"			799	GTO 79		safe at second
755	AVIEW			800	"TAGGED		3/4 chance of
756	PSE				OUT"		tagged out
757	4			801	AVIEW		
758	XEQ "X"			802	PSE		
759	79		Add 79 for	803	0		Remove him
760	+		label number:	804	STO 08		from base
761	STO 03			805	GTO 47		Tally outs
762	XEQ IND		Stolen base?	806	LBL 74		
03				807	XEQ 66		Clear count
763	LBL 00			808	"WALK"		
764	"RUNNER		Error message	809	AVIEW		
	STAYS"			810	PSE		
765	AVIEW			811	LBL 85		Bases loaded?
766	GTO 07		Loop to SWING?	812	FS? 07		
767	LBL 79			813	GTO 02		

PROGRAM LISTING

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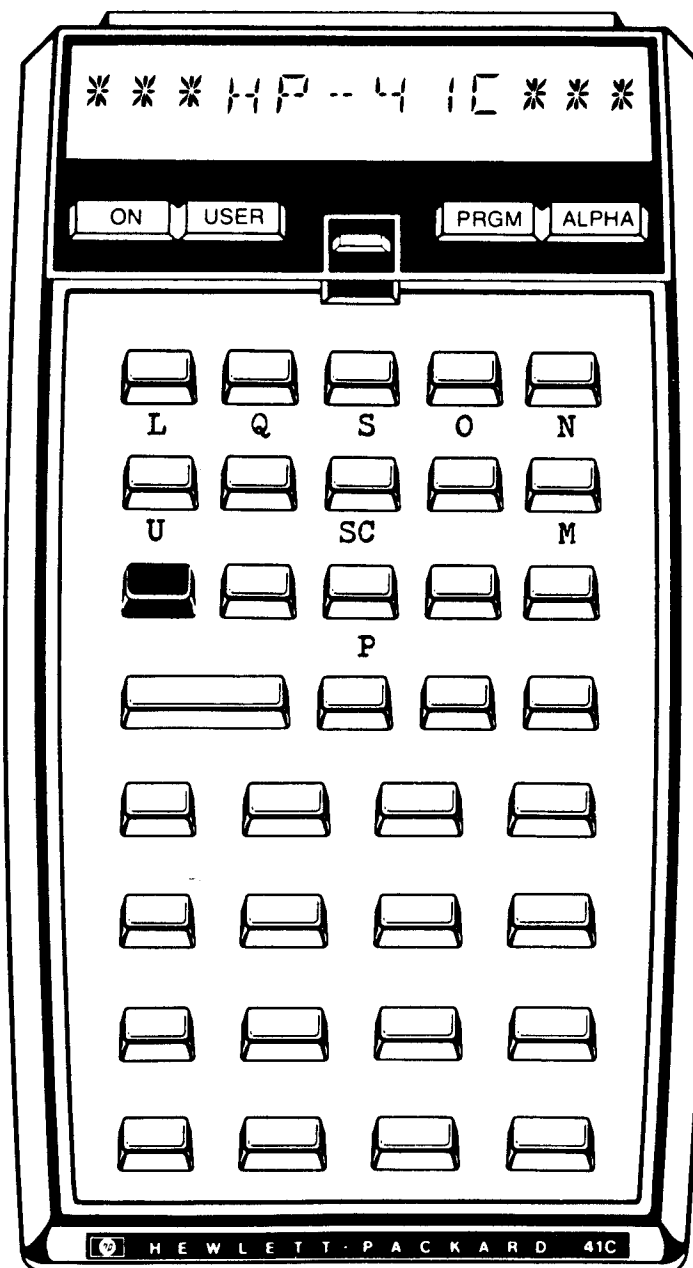
STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
814	LBL	49		51			
815	RCL	08					
816	1						
817	X=Y?		Man on first?				
818	GTO	03					
819	1		Put man on				
820	STO	08	first				
821	GTO	75	Show bases and				
822	LBL	02	loop back				
823	1		Increment runs	60			
824	ST+	11	by one				
825	GTO	75					
826	LBL	03					
827	RCL	09					
828	1						
829	X=Y?		Man on second?				
830	GTO	04					
831	1		Put men on first				
832	STO	09	and second	70			
833	STO	08					
834	GTO	75					
835	LBL	04					
836	1		Put men on all				
837	STO	10	three bases:				
838	STO	09					
839	STO	08					
840	LBL	75					
841	XEQ	"Q"	Display bases				
842	GTO	"K"	Loop back	80			
843	LBL	93	This is the				
844	RCL	00	random number				
845	9821		generator				
846	*		from the				
847	.211327		Games Pack				
848	+						
849	FRC						
850	STO	00					
851	RTN						
852	LBL	"X"		90			
853	XEQ	93					
854	*						
855	INT						
856	RTN						
857	.END.						
50				00			

REGISTERS, STATUS, FLAGS, ASSIGNMENTS

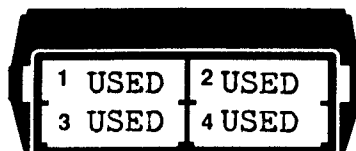
DATA REGISTERS			STATUS		
00	Random number generator seed		SIZE 015	TOT. REG. 317	USER MODE
01	No. of balls		ENG	FIX	SCI
02	No. of strikes		DEG	RAD	GRAD
03	General use		ON X OFF		
04	General use		ON X OFF		
05	Indirect register for R13 or R14		ON X OFF		
06	No. of innings completed		ON X OFF		
07	In extra innings, Team B's instantaneous score		ON X OFF		
08	1 if man on first base 0 if empty		ON X OFF		
09	1 if man on second 0 if empty		ON X OFF		
10	1 if man on third 0 if empty		ON X OFF		
11	No. of runs in half inning		ON X OFF		
12	No. of outs in half inning		ON X OFF		
13	Team A runs		ON X OFF		
14	Team B runs		ON X OFF		
			FLAGS		
			#	INIT S/C	CLEAR INDICATES
			00	C	Top of inning Bottom of inn.
			04	C	Double play No double play
			05	C	Count has 3 balls (used to determine if full count) Count not 3 balls
			06	C	End of half-inning (used in LBL Q) Half inning not over
			07	C	Bases loaded Bases not loaded
			08	C	At least 8.5 inn. completed Less than 8.5 inn. completed
			09	C	Bunting Not bunting
			10	C	Taking a pitch Not taking
			15	C	Score requested from keyboard Score used by program automatically
			ASSIGNMENTS		
			FUNCTION	KEY	FUNCTION KEY
			L (PITCH)	Σ+	
			N (SWING)	LN	
			Q (BASES)	1/X	
			S (STATS)	√X	
			P (COUNT)	STO	
			O (BUNT)	LOG	
			M (TAKE)	TAN	
			U (STEAL)	X:Y	
			SC (LAST INN SCORE)	SIN	

KEYBOARD CARD LABELING

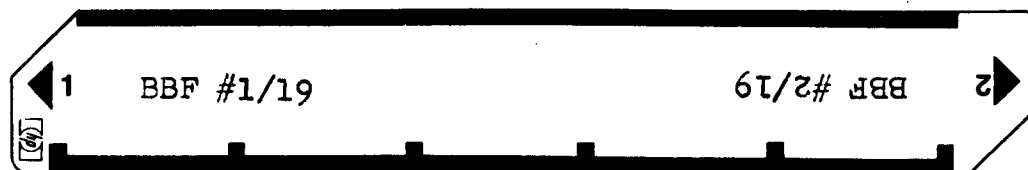
KEYBOARD



SYSTEM
CONFIGURATION



CARD



PROGRAM REGISTERS NEEDED: 303

ROW 1 (1:5)



ROW 2 (5:6)



ROW 3 (6:8)



ROW 4 (8:13)



ROW 5 (13:20)



ROW 6 (20:21)



ROW 7 (22:26)



ROW 8 (26:30)



ROW 9 (30:34)



ROW 10 (35:37)



ROW 11 (38:41)



ROW 12 (42:47)



ROW 13 (48:55)



ROW 14 (55:59)



ROW 15 (60:65)



ROW 16 (65:70)



ROW 17 (70:75)



ROW 18 (75:80)



ROW 19 (80 : 85)



ROW 20 (85 : 86)



ROW 21 (87 : 90)



ROW 22 (91 : 96)



ROW 23 (97 : 105)



ROW 24 (106 : 112)



ROW 25 (112 : 114)



ROW 26 (115 : 121)



ROW 27 (121 : 122)



ROW 28 (122 : 132)



ROW 29 (133 : 141)



ROW 30 (141 : 141)



ROW 31 (141 : 148)



ROW 32 (149 : 156)



ROW 33 (156 : 159)



ROW 34 (160 : 165)



ROW 35 (166 : 175)



ROW 36 (176 : 181)



ROW 37 (181 : 184)



ROW 38 (184 : 188)



ROW 39 (188 : 191)



ROW 40 (191 : 196)



ROW 41 (197 : 197)



ROW 42 (197 : 199)



ROW 43 (200 : 204)



ROW 44 (204 : 207)



ROW 45 (207 : 214)



ROW 46 (215 : 216)



ROW 47 (216 : 224)



ROW 48 (225 : 227)



ROW 49 (227 : 236)



ROW 50 (237 : 243)



ROW 51 (244 : 250)



ROW 52 (250 : 253)



ROW 53 (253 : 261)



ROW 54 (261 : 267)



ROW 55 (267 : 268)



ROW 56 (269 : 277)



ROW 57 (277 : 286)



ROW 58 (286 : 290)



ROW 59 (290 : 293)



ROW 60 (293 : 300)



ROW 61 (301 : 310)



ROW 62 (310 : 316)



ROW 63 (316 : 324)



ROW 64 (325 : 330)



ROW 65 (331 : 337)



ROW 66 (337 : 342)



ROW 67 (343 : 344)



ROW 68 (344 : 350)



ROW 69 (351 : 354)



ROW 70 (355 : 361)



ROW 71 (361 : 365)



ROW 72 (366 : 369)



ROW 73 (369 : 370)



ROW 74 (370 : 377)



ROW 75 (378 : 379)



ROW 76 (379 : 383)



ROW 77 (384 : 393)



ROW 78 (394 : 403)



ROW 79 (404 : 409)



ROW 80 (409 : 410)



ROW 81 (410 : 416)



ROW 82 (417 : 427)



ROW 83 (427 : 436)



ROW 84 (437 : 438)



ROW 85 (438 : 445)



ROW 86 (445 : 447)



ROW 87 (447 : 453)



ROW 88 (454 : 462)



ROW 89 (462 : 467)



ROW 90 (468 : 476)



ROW 109 (569 : 572)



ROW 110 (573 : 576)



ROW 111 (577 : 580)



ROW 112 (580 : 589)



ROW 113 (589 : 596)



ROW 114 (596 : 603)



ROW 115 (604 : 604)



ROW 116 (604 : 608)



ROW 117 (608 : 612)



ROW 118 (612 : 619)



ROW 119 (619 : 621)



ROW 120 (622 : 627)



ROW 121 (628 : 628)



ROW 122 (628 : 632)



ROW 123 (633 : 639)



ROW 124 (639 : 641)



ROW 125 (642 : 647)



ROW 126 (647 : 649)



ROW 127 (650 : 651)



ROW 128 (651 : 657)



ROW 129 (657 : 663)



ROW 130 (664 : 667)



ROW 131 (668 : 677)



ROW 132 (677 : 683)



ROW 133 (684 : 693)



ROW 134 (694 : 701)



ROW 135 (701 : 708)



ROW 136 (709 : 717)



ROW 137 (717 : 719)



ROW 138 (719 : 724)



ROW 139 (724 : 727)



ROW 140 (728 : 729)



ROW 141 (729 : 734)



ROW 142 (734 : 738)



ROW 143 (738 : 739)



ROW 144 (740 : 746)



ROW 145 (746:753)



ROW 146 (754:764)



ROW 147 (755:763)



ROW 148 (764:764)



ROW 149 (765:771)



ROW 150 (772:778)



ROW 151 (779:784)



ROW 152 (784:787)



ROW 153 (788:793)



ROW 154 (793:797)



ROW 155 (798:800)



ROW 156 (800:807)



ROW 157 (807:813)



ROW 158 (813:821)



ROW 159 (822:830)



ROW 160 (831:840)



ROW 161 (841:845)



ROW 162 (846:852)



ROW 163 (852 : 857)

