

Program Description I

Program Title BASEBALL

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Program Description, Equations, Variables THIS PROGRAM SIMULATES A BASEBALL GAME.

ROLL 2 DICE TO SEE WHAT BATTER DOES:

<u>SUM OF DICE</u>	<u>ACTION BY BATTER</u>
2	HOME RUN
3	OUT
4	OUT UNLESS THE ROLL IS 2-2; THEN, A WALK
5	OUT
6	OUT UNLESS THE ROLL IS 3-3; THEN, DOUBLE PLAY*
7	OUT
8	OUT UNLESS THE ROLL IS 4-4; THEN, A WALK
9	SINGLE
10	DOUBLE
11	TRIPLE
12	HOME RUN

ON A SINGLE, DOUBLE, TRIPLE, OR HOME RUN, ALL MEN ON BASE ADVANCE 1, 2, 3, OR 4 BASES RESPECTIVELY. IF A MAN IS ON THIRD AND A DOUBLE IS HIT, HE GOES HOME; SIMILARLY IF THE SUM OF THE BASE A MAN IS ON AND A BASE HIT IS GREATER THAN 4, THE RUNNER GOES HOME. NO CREDIT FOR MEN LEFT ON BASE AT THREE OUTS.

* TWO OUTS.

Operating Limits and Warnings

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) USE 0.2369871 AS SEED. WE'LL PLAY THE FIRST INNING.

YOU BAT FIRST. PRESS **[A]**. DISPLAY SHOWS 1.50; REFERRING TO TABLE IN USERS' INSTRUCTIONS, THIS MEANS YOUR MAN WALKED (5) AND IS ON FIRST (1), AND NO OUTS (0). SIMILARLY, AFTER A PAUSE (PAUSE BETWEEN THE FOLLOWING)

11.10 MEN ON FIRST, SECOND; SINGLE HIT; NO OUTS

11.01 MEN ON FIRST, SECOND; STRIKEOUT; ONE OUT

AND SO ON. FINALLY

111.63 MEN ON FIRST, SECOND, THIRD; DOUBLE PLAY; THREE OUTS.

NOW MACHINE BATS. ITS OUTPUT IS TO BE READ SIMILARLY; THE "-" MEANS ONLY THAT THE MACHINE IS BATTING. AFTER IT STRIKES OUT, THEN THE DISPLAY SHOWS 1. - ^{NUMBER}~~INNING~~ OF INNING JUST PLAYED, 0. - MACHINE'S SCORE (NO. HOME RUNS), 0. - YOUR SCORE. [NORMALLY IF MACHINE HAD X RUNS, DISPLAY IS -X.]

TRY PLAYING OUT THE REST OF THE GAME. THE FINAL SCORE, AFTER 9 INNINGS, IS: MAN - 4, CALCULATOR - 6. YOU LOSE.

Solution(s) .2369871 **[STO]** **[9]** → 0.24

[A] → 1.50 (FLASHING.)	→ -110.02 (FLASHING.)
→ 11.10 "	→ -110.03 "
→ 11.01 "	→ 1, 0, 0. "
→ 111.11 "	⋮
→ 111.63 "	(END OF GAME: LAST DISPLAY)
→ -1.10 "	→ 4.006 (FLASHES)
→ -110.20 "	
→ -110.01 "	

Reference(s) SCARNE ON DICE, JOHN SCARNE, STACKPOLE BOOKS, ©1962 p. 362

Program Listing I

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STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	f LBL 0	31 25 00	CONTROL FOR DOUBLE		1	01	
	2	02	ROLL: 1-1, 2-2, 3-3, 4-4		STO+4	33 61 04	
	RCL 7	34 07			0	00	
	g x=y	32 51		060	STO 3	33 03	
	GTO 4	22 04			STO 2	33 02	
	6	06			STO 1	33 01	
	g x*y	32 61			GTO E	22 15	
	GTO 5	22 05			f LBL 5	31 25 05	WALK
	h STI	35 33	DOUBLE PLAY		5	05	
010	2	02			h STI	35 33	
	STO+5	33 61 05			RCL 3	34 03	
	GTO E	22 15			f x=0	31 51	
	f LBL 1	31 25 01	SINGLE		h SF 1	35 51 01	
	RCL 3	34 03		070	RCL 2	34 02	
	STO+4	33 61 04			f x=0	31 51	
	RCL 2	34 02			h SF 2	35 51 02	
	STO 3	33 03			RCL 1	34 01	
	RCL 1	34 01			f x=0	31 51	
	STO 2	33 02			h SF 3	35 51 03	
020	1	01			1	01	
	STO 1	33 01			STO 1	33 01	
	GTO E	22 15			h F 3?	35 71 03	
	f LBL 2	31 25 02	DOUBLE		GTO E	22 15	
	RCL 3	34 03		080	STO 2	33 02	
	STO+4	33 61 04			h F 2?	35 71 02	
	RCL 2	34 02			GTO E	22 15	
	STO+4	33 61 04			STO 3	33 03	
	RCL 1	34 01			h F 1?	35 71 01	
	STO 3	33 03			GTO E	22 15	
030	1	01			STO+4	33 61 04	
	STO 2	33 02			GTO E	22 15	ENDING SEQUENCE
	0	00			f LBL 7	31 25 07	
	STO 1	33 01			0	00	
	GTO E	22 15		090	STO 1	33 01	
	f LBL 3	31 25 03	TRIPLE		STO 2	33 02	
	RCL 3	34 03			STO 3	33 03	
	STO+4	33 61 04			STO 4	33 04	
	RCL 2	34 02			STO 5	33 05	
	STO+4	33 61 04			h CF 1	35 61 01	
040	RCL 1	34 01			h F 0?	35 71 00	IF END OF INNING
	STO+4	33 61 04			GTO f2	22 31 11	DISPLAY SCORES
	1	01			f LBL C	31 25 13	MACHINE'S TURN
	STO 3	33 03			h SF 0	35 51 00	AT BAT
	0	00		100	GTO 9	22 09	
	STO 2	33 02			f LBL 8	31 25 08	ADD RUNS MADE
	STO 1	33 01			RCL B	34 12	BY MACHINE DURING
	GTO E	22 15			+	61	THIS INNING
	f LBL 4	31 25 04	HOME RUN		STO B	33 12	
	4	04			h RTIV	35 22	
050	h STI	35 33			f LBL A	31 25 11	MAN'S TURN AT BAT
	RCL 3	34 03			h CF 0	35 61 00	
	STO+4	33 61 04			f LBL 9	31 25 09	BATTING ROUTINE
	RCL 2	34 02			g GSB fe	32 22 15	
	STO+4	33 61 04		110	g GSB fe	32 22 15	
	RCL 1	34 01			g x=y	32 51	
	STO+4	33 61 04			h SF 2	35 51 02	

REGISTERS

0	1 FIRST BASE	2 SECOND BASE	3 THIRD BASE	4 HOME RUNS	5 OUTS	6 INNING S	7	8	9 SEED
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
A MAN'S SCORE		B CALCULATOR'S SCORE		C		D		E	
								I CONTROL/STATUS	

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
	+	61			3	03	IF LESS THAN 3 OUTS
	STO 7	33 07		170	g x > y	32 81	DO NOTHING
	9	09	IF ROLL > 9		h RTN	35 22	
	g x < y	32 71	G TO B		.	83	ADD .5 TO NUMBER
	G TO B	22 12			5	05	OF INNINGS
	h F 2?	35 71 02	IF NOT, BUT A DOUBLE, GO TO 0		STO +6	33 61 06	
120	G TO 0	22 00			h SE 1	35 51 01	SET INDICATOR
	0	00	OTHERWISE, IS AN OUT.		RCL 4	34 04	ADD RUNS MADE THIS TIME AT BAT TO APPROPRIATE SCORE
	h ST I	35 33			h F O?	35 71 00	
	1	01			G TO 8	22 08	
	STO +5	33 61 05			RCL A	34 11	
	f LBL E	31 25 15	DISPLAY BATTING RESULTS.	180	+	61	
	h CF 1	35 61 01			STO A	33 11	
	h CF 2	35 61 02			h RTN	35 22	
	f G S B D	31 22 14	3 OUTS YET		g LBL fa	32 25 11	DISPLAY INNING SCORE
	DSP 2	23 02			DSP 0	23 00	INNING NUMBER
	RCL 2	34 02			RCL 6	34 06	
130	RCL 3	34 03			h PSE	35 72	
	RCL 4	34 04			9	09	IF 9 INNINGS HAVE BEEN PLAYED, DISPLAY FINAL SCORE
	1	01			g x < y	32 71	
	0	00			G TO fb	22 31 12	DISPLAY MACHINE SCORE
	x	71		190	RCL B	34 12	
	+	61			CHS	42	
	1	01			f -x-	31 84	DISPLAY MAN'S SCORE
	0	00			RCL A	34 11	
	x	71			f -x-	31 84	
	+	61			R/S	84	ROLL DIE
140	1	01			g LBL fe	32 25 15	
	0	00			RCL 9	34 04	
	x	71			9	09	
	RCL 1	34 01			9	09	
	+	61			7	07	
	h RCI	35 34		200	x	71	
	1	01			g FRAC	32 83	
	0	00			STO 9	33 09	
	÷	81			6	06	
	+	61			x	71	
150	RCL 5	34 05			1	01	
	EEX	43			+	61	
	2	02			f INT	31 83	
	÷	81			h RTN	35 22	
	+	61		210	g LBL fb	32 25 12	DISPLAY FINAL SCORE
	h F O?	35 71 00	IF MACHINE AT BAT, DISPLAY IS NEGATIVE		RCL B	34 12	
	CHS	42	DISPLAY IT		EEX	43	
	f -x-	31 84			3	03	
	h F 1?	35 71 01	IF 3 OUTS OR MORE, INITIAL- IZE FOR NEXT TEAM		÷	81	
	G TO 7	22 07			RCL A	34 11	
160	G TO 9	22 09	ELSE GO BACK FOR NEXT BATTER		+	61	
	f LBL B	31 25 12	CONTROL FOR ROLL > 9		DSP 3	23 03	INITIALIZE FOR NEXT GAME
	-	51			f CLREG	31 43	
	1	01			f LBL 6	31 25 06	DISPLAY FINAL SCORE
	+	61		220	h PSE	35 72	
	h STI	35 33			G TO 6	22 06	
	G TO (i)	22 24					
	f LBL D	31 25 14	3 OUTS?				
	RCL 5	34 05					

LABELS					FLAGS	SET STATUS		
YOUR TURN AT BAT	B CONTROL FOR A 9, 10, 11, 12	C MACHINE'S TURN AT BAT	D END OF TURN AT BAT	E DISPLAY ROL- TIME: BATTER	F WHOSE TURN AT BAT?	FLAGS	TRIG	DISP
1 DISPLAY ROUTINE: INNINGS	2 DISPLAY ROUTINE FINAL SCORE	3	4	5 RANDOM NUMBER GENERATOR	6 END OF INNINGS MAN ON THIRD	0 ☐ ON ☒ OFF	DEG ☒	FIX ☒
0 CONTROLS DOUBLE ROLL < 8	1 SINGLE	2 DOUBLE	3 TRIPLE	4 HOME RUN	2 ROLL = ROLL 2?	1 ☐ ON ☒ OFF	GRAD ☐	SCI ☐
5 WALK	6 DISPLAY FINAL SCORE	7 END OF TURN AT BAT	8 MACHINE'S SCORE	9 BATTING ROUTINE	3 MAN ON SECOND	2 ☐ ON ☒ OFF	RAD ☐	ENG ☐
					MAN ON FIRST	3 ☐ ON ☒ OFF		n 2