Program Description I

Program Title BLACKJACK

Contributor's Name Michael W. FREEMAN

Address 25 Grant St., Apt. 1

City Cambridge State MA Zip Code 02138

Program Description, Equations, Variables The present program represents an improved version of the "GAME OF 21" (#00174D) in the HP-67/97 Games Pac 1. The major differences involved are the following:

1. BETS can be placed only after each player has been dealt one card (otherwise, an "Error" display appears). The calculator has the option of "doubling" the initial bet placed by the user. This then can be "redoubled" by the user.
2. A "natural" blackjack for the user pays twice the bet, instead of just 1 1/2 times.
3. Various attempts at "cheating" are forestalled, e.g. attempting to "reshuffle" the deck after the first cards of a hand have been dealt, requesting the value of an ACE to be changed even though one has never been dealt an ace,* inputing values for BETS and SEEDS outside specified bounds, etc. These all lead to an "Error" display (cf. also (1) above), which can be cancelled by pressing "CLX" (or any other key) and then taking up where one left off (but without cheating this time!).
4. The calculator automatically scores its own Aces to its best advantage, instead of always counting them as 1 (except for a blackjack) as in the original program.
5. The user has the option of supplying a new SEED whenever the cards are reshuffled. Note that this does not lead to any greater predictability, since our card-generator is more random than the one in the original program: it takes into account whatever might be in any of the registers at a given point in the game.
6. Because of space limitations (even after having expanded the program to two cards!), we have not included the "next card" option in our version. Nor have we provided for demarcative blank lines (SPACE) in the printed copy generated during play by the HP-97, or for the printing of values displayed in the X register when the program returns to user control: a user can always press the appropriate keys at that point for obtaining the desired printed copy. Note also that the "new player" option has been taken over by our "init" routine.
7. The second card of the program may be positioned in the caluculator during the initial deal, just after all bets have been placed; it will then be read in automatically at the right moment by the calculator. Otherwise, a repeatedly flashing "-6" supplies the prompt to load the second card.

* Our version also eliminates a bug in the original program which allowed one to increment or decrement the same ACE an unlimited number of times--not that one would normally ever wish to do such a thing! It also refuses to set an ACE = 11 if this immediately yields a count > 21.

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Program Description, Equations, Variables (cont.)

8. Displays have hopefully been made easier to follow:
   - i. HP's first card is displayed as "xx.00", whereas the user's first card is displayed simply as "xx." (i.e. with no zeroes after the decimal point);
   - ii. the user's initial hand is given in the form of "xx.yy", where: xx = card 1, and yy = card 2;
   - iii. after each hit, the new card is displayed, followed by the user's count at that point; if it is desired to see what the current bet is, then a "RCL B" has to be executed (followed by a "h R↓" or "RCL 8" to get back to the user's count);
   - iv. the end-game display consists of a "WHO WON" code (viz., "Oh•BLISS", if the calculator won, "I•LOSE", if the calculator lost. "0.000000000" for a blackjack tie (or "push"), "0.00" or "0." for any other type of push), followed by the final score in the form "xx.yy", where: xx = HP's count, and yy = user's count, followed by how much money is now in the user's account.

9. Current values can be retrieved as follows:
   - i. RCL B = current BET,
   - ii. RCL C = current SEED,
   - iii. RCL 3 = user's account ("winnings"),
   - iv. RCL 8 = user's initial hand: xx.yy (cf. (8ii) above),
   - v. RCL 9 = user's count in current hand,
   - vi. D (on card 1) = HP's card 1, then user's card 1,
   - vii. C (on card 2) = HP's card 1.user's count,
   - viii. A (on card 2) can be used not only to change the current score of an ACE, but also to determine if one holds an ACE: if one doesn't, then "Error" is displayed (cf. (3) above).

Operating Limits and Warnings

The program needs to be INITIALIZED (on card 1) just once, at the very beginning of a game. Any other action attempted before that will result in an "Error" display. As with other intended "Error" displays during the course of the game, the condition can be cleared by pressing any key and then proceeding in the requisite manner (cf. (3) above). If an "Error" display nevertheless continues to persist, then read in card 1 again (both sides), and start a new game.

Program Description II

PROGRAM DESCRIPTION (cont.): Play is between the calculator and user, and proceeds as follows. Both sides of card 1 are read in. Initialization need be performed only the first time this is done, or when it is desired to clear the user's account, as for a "new player". If not performed in the beginning, however, any other action will lead to an "Error" display (cf. "Operating Limits and Warnings" above). The user then has the option of "shuffling" the cards (with or without supplying a new "SEED"). Otherwise, one has the calculator immediately make the first "deal": one card (face-up) to itself (displayed as "xx.00") and one to the user (displayed as "xx."). The user must then place a "bet", which the calculator may "double" (and the user "redouble"). Both sides of card 2 should be read in as soon as a flashing "-6" prompt appears: the user can then decide whether to be "hit" or not (i.e., dealt one or more cards). The goal is to finish with a hand whose total count is 21 or below, but closer to 21 than the dealer's. If one goes over 21, one is "busted" (i.e., loses).

When cards are dealt, the King is indicated by 13, the Queen by 12, and the Jack by 11, but all count just 10 points each. The other cards count their face value, except for the ACE, which counts 1 unless you change it to 11 by pressing A (on card 2). In the latter case, if a subsequent card you draw makes you score over 21, the calculator will automatically change your ACE back to 1. (You can also change it back to 1 by pressing A again. Normally, one decides on what value to assign an Ace just before "standing".) A "blackjack" is a 2-card hand totaling 21, i.e. a 10, Jack, Queen, or King plus an ACE (with a value of 11). Your best win is a blackjack, since you get twice your bet then. In the case of a tie (or "push"), nobody wins.

A user can request to be "hit" (by pressing D) as many times as desired, until "busted" (i.e., over 21) or "standing pat" (signaled by pressing E). The calculator will then show its hand. If 16 or less, it draws and continues to do so until it goes over 17. Since a "blackjack" consists of just a 2-card hand, this forestalls either player from being "hit" on that round: the calculator immediately goes to its end-game display at that point. The format of the end-game display is described in (8iv) above, as well as in step 12 of the directions below.

EXAMPLE:

Keystrokes:	Outputs:	Comments:
Load CARD 1, sides 1 and 2.		
A ---------->	0.53	Default SEED & BET.
Shuffle (with your own seed):		
.138562947 C		Display will not stabilize until R/S is pressed.
Wait 10 or 15 seconds:		
R/S		Ignore output.
To reproduce the example below, store ".7869501" in register C, either after the above steps or right after initialization.		
Deal:		
D ---------->	3.00 ***	HP's 1st. card.
	3.	User's 1st. card.
Enter bet:		
50 B -------->	50.00 ***	Bet not doubled.
	3.10 ***	User's initial hand, a 3 and a 10.
	-6.	Flashes as prompt to read in card 2.
Load CARD 2, sides 1 & 2 ->	13.	User's count (= 3 + 10).
Hit:		
D ---------->	3. ***	User's 3rd. card.
	16.	User's count.

*** Shown by PRINT on HP-97 and by PAUSE on HP-67.

EXAMPLE (cont.)

Keystrokes:	Outputs:	Comments:
Stand:		
E ---------->	3.04 ***	HP's initial hand, a 3 and a 4.
	9. ***	HP's 3rd. card.
	5. ***	HP's 4th card.
	"0h'BLISS" ***	Upside-down WHO WON code: HP won!
	21.16 ***	Final score: HP's count.user's count.
	-50.00	User's account.
Play another hand:		
Load CARD 1,		
sides 1 & 2 ->	-50.00	User's account still in X register.
Try to enter "premature" bet:		
100 B ------->	Error	
Recover, by pressing:		
CLX --------->	100.00	Ignore.
Deal:		
D ---------->	11.00 ***	HP's 1st. card.
	6.	User's 1st. card.
Bet:		
50 B -------->	100.00	HP doubles.
Don't redouble:		
B ---------->	100.00 ***	Final bet.
	6.10 ***	User's initial hand, a 6 and a 10.
	-6.	Flashes, as prompt to read in card 2.
Load CARD 2,		
sides 1 & 2 ->	16.	User's count (= 6 + 10).
Hit:		
D ---------->	10. ***	User's 3rd. card.
	"0h'BLISS" ***	User is bust.
	20.26 ***	Final score: HP's count.user's count
	-150.00	User's account.
Play one more hand: load CARD 1,		
sides 1 & 2 ->	-150.00	User's account still in X register.
Deal:		
D ---------->	12.00 ***	HP's 1st. card.
	4.	User's 1st. card.
Try to "reshuffle" at this point:		
C ---------->	Error	
Recover, by pressing:		
CLX --------->	4.	User's 1st. card still in X register.
Bet:		
100 B ------->	200.00	HP doubles.
Redouble:		
2 B --------->	400.00 ***	Note that ANY number (including "0") can be pressed here: it simply means "redouble".
	4.03 ***	User's initial hand, a 4 and a 3.
	-6.	Flashes, as prompt to read in card 2.
Load CARD 2,		
sides 1 & 2 ->	7.	User's count (= 4 + 3).
Try to rescore an ACE you don't have:		
A ---------->	Error	
Recover, by pressing:		
CLX -------->	7.	User's count still in X register.

EXAMPLE (concluded):

Hit:

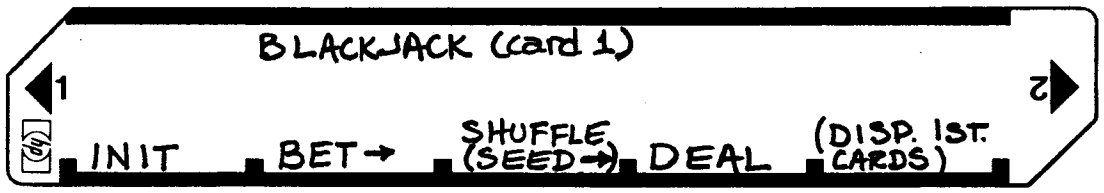
D ---------->	9.00 ***	User's 3rd. card.
	16.	User's count.
Stand:		
E ---------->	12.10 ***	HP's initial hand.
	"Oh BLISS" ***	HP has won again!
	20.16 ***	Final score: HP's count.user's count.
	-550.00	User is $550.00 in the hole!
		Try your luck now ....
		Remember: it doesn't pay to cheat!

To see the effect of current game values on the cards dealt, try the above example again from the beginning, after storing ".7869501" in register C, but without re-initializing (or with different values for the bets).

*** Shown by PRINT on HP-97 and by PAUSE on HP-67.

User Instructions (card 1)

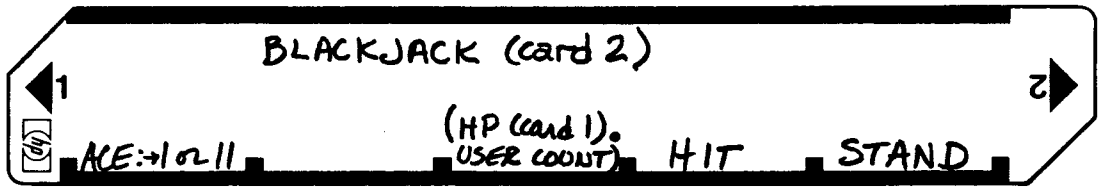
01370D



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	READ in CARD 1, sides 1 and 2.			0.00
2	INITIALIZE: just first time card 1 is read in*			
	or when you wish to clear you account, as for			
	a "new player":		A	0.53**
3	SHUFFLE: either with or without supplying			
	your own "seed" (0 < seed < 1):***	(0.xxxxxx)	C	
4	End shuffle (ignore output):		R/S	(ignore)
5	DEAL: HP's 1st. card blinked/printed,		D	xx.00
	followed by your 1st. card.			xx.
6	BET:+ (0 < bet < 10,000):***	(xxx)	B	xxx.xx
	-- if previous bet is to be kept,++ simply			
	press B; otherwise, first key in new			
	bet, then press B;			
	-- if HP "doubles", then new value is dis-			
	played and you may "redouble" by press-			
	ing ANY number (including "0"), then B;			
	if you do not want to redouble, simply			
	press B;			
	-- final bet is blinked/printed,			
	followed by display of your initial hand			
	"xx.yy" (where: xx = card 1, and			xx.yy
	yy = card 2), followed by flashing "-6."			-6.
	This is the prompt to read in CARD 2.			
	* If initialization is not performed at the start of a new game, then any other action will lead to an "Error" display. Press "CLX" and then "A" to correct.			
	** "0.53" represents both the default "bet", and the rounded off default "seed".			
	*** If stated bounds for BET or SEED are not observed, then "Error" is displayed. Press "CLX" and correct.			
	+ If a bet is entered before a deal, "Error" is displayed: press "CLX" and then continue in the correct order. Similarly, if you attempt to "reshuffle" or "redeal" once a legitimate deal is in progress, "Error" will be displayed. Correct as above.			
	++ Previous bet can be viewed by pressing "RCL B"; to return to current display, press "h R↓".			

User Instructions (card 2)

01370D



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
7	READ in CARD 2, sides 1 and 2:			
	-- if user doesn't have blackjack, then user's			
	count is displayed;			user's count
	otherwise, "I•LOSE" is blinked/printed, along			
	with the rest of the display cycle in step 12.*			
8	HIT: draw another card if desired:		D	xx. (= new
	--if not "busted", then your new count is			card)
	displayed;			user's count
	otherwise, "0h•BLISS" is blinked/printed,			
	along with the rest of the display cycle			
	in step 12.			
9	Repeat step 8 until you are "busted" or wish			
	to "stand".			
10	To RESCORE your ACE, either as 1 or 11:		A	user's count
	-- if you've not been dealt an ace, "Error"			(updated)
	will be displayed: press "CLX" and continue;			
	-- note that each successive pressing of "A"			
	reverses the effect of the previous one.**			
11	To review current deal:		C	HP's card.
				user's count
12	STAND: indicates you don't want any more cards:		E	**HP's hand**
	-- "WHO WON" code blinked/printed			& hits
	("0h•BLISS", if calculator won,			"WHO WON"
	"I•LOSE", if calculator lost,			
	"0.000000000", if both have blackjack,			
	"0.00" or "0." for other ties ("pushes");			
	-- final score: HP vs. user;			HP's count.
	-- your current account ("winnings").			user's count user's ac-
				count
13	For a new game, go to step 1.			
	* If both you and HP have blackjack, then no one wins,			
	and "0.000000000" is blinked, along with the rest of			
	the display cycle in step 12.			
	** If you go "bust" (on a subsequent "hit") with an ACE			
	scored at 11, the calculator will automatically reset			
	it to 1. Similarly, if scoring an ACE as 11 immediately			
	yields a count > 21, the calculator will refuse to do it.			

Program Listing I (card 1)

STEP	KEY ENTRY	KEY CODE	COMMENTS
001 *	f LBL 1	31 25 01	SHUFFLE (card-generator)
	RCL A	34 11	=21
	RCL 2	34 02	=13
	RCL (i)	34 24	= previous cards, seed, bet, account etc.
	f X=0	31 51	
	h R↓	35 53	
	x	71	
	RCL 3	34 03	= user's account
	RCL B	34 12	= bet
010	h π	35 73	
	x	71	
	+	61	
	÷	81	
	h ABS	35 64	
	f LN	31 52	
	h ABS	35 64	
	9	09	
	9	09	
	7	07	
020	+	61	
	RCL C	34 13	= current seed
	x	71	
	g FRAC	32 83	= next seed
	STO C	33 13	
	RCL 2	34 02	= 13
	x	71	
	f INT	31 83	
	1	01	
	+	61	
030	f DSZ	31 33	
	GTO 1	22 01	- loop
	h RTN	35 22	
*	f LBL 2	31 25 02	J, Q, K ⇒ 10
	RCL 0	34 00	= 10
	h x≥y	35 52	- if 10 ≥ current card, return 10.
	g x≠y	32 71	
	h RTN	35 22	
	h x≥y	35 52	-else, return current card
	h RTN	35 22	
040 *	f LBL 3	31 25 03	ACE dealt?
	1	01	
	g x=y	32 51	-if so, clear ACE flag 1
	h CF 1	35 61 01	
	h R↓	35 53	
	h RTN	35 22	
*	g LBL d	32 25 14	GET NEW CARD
	1	01	
	h ST I	35 33	
	f GSB 1	31 22 01	→ card-generator
050	h RTN	35 22	
	g MERGE	32 41	
	h PAUSE	35 72	
*	g LBL e	32 25 15	MERGER prompt for CARD 2
	6	06	
	CHS	42	
	h ST I	35 33	
	GTO (i)	22 24	
*	f LBL A	31 25 11	INITIALIZATIONS
	f CL REG	31 43	
060	5	05	
	5	05	
	1	01	"Oh·BLISS" in R$_{50}$ & R$_{58}$
	7	07	
	8	08	
	.	83	
	4	04	
	STO 0	33 00	
	STO 8	33 08	
	3	03	
070	5	05	
	0	00	"I·LOSE" in R$_{52}$ & R$_{59}$
	7	07	
	.	83	
	1	01	
	STO 2	33 02	
	STO 9	33 09	
	f P≥S	31 42	
	f CL REG	31 43	
	1	01	for indexing R$_{50}$ & R$_{52}$
080	0	00	
	STO 0	33 00	
	1	01	
	2	02	
	STO 1	33 01	
	1	01	
	3	03	
	STO 2	33 02	
	2	02	
	1	01	
090	STO A	33 11	
	.	83	
	5	05	
	2	02	
	8	08	- default SEED stored in C.
	4	04	
	1	01	
	6	06	
	3	03	
	STO C	33 13	
100	f RND	31 24	- rounded off & stored as default bet in B.
	STO B	33 12	
	h CF 1	35 61 01	-clear "deal" flags
	h CF 2	35 61 02	
	h RTN	35 22	
*	f LBL C	31 25 13	SHUFFLE (SEED→)
	h F? 1	35 71 01	-if deal is already in progress, then display "ERROR"
	GTO 0	22 00	
	2	02	
	5	05	- loop index
110	h ST I	35 33	
	h F? 3	35 71 03	
	h F? 3	35 71 03	

REGISTERS

0	1	2	3	4	5	6	7	8	9
10	12	13	user's account	HP card 1 (± 10)	HP card 2 (± 10)	HP init: hand: xx.yy	HP count	USER init: hand: xx.yy	USER count
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
"Oh·BLISS"		"I·LOSE"						"Oh·BLISS"	"I·LOSE"

A	B	C	D	E	I
21	BET	SEED	user's card 1 (± 10)	user's card 2 (± 10)	index

Program Listing II (card 1)

STEP	KEY ENTRY	KEY CODE	COMMENTS
	GTO 1	22 01	-if user didn't input new seed, go to card-generator
	h R↓	35 53	→else, check on new seed's bounds: 0<y<1
	1	01	
	GSB 4	31 22 04	0<y<X CHECK
	STO C	33 13	
	GTO 1	22 01	-if check fails, display "Error"
*	f LBL 4	31 25 04	
120	g x≤y	32 71	
	g GTO 0	22 00	
	h R↓	35 53	
	f x=0	31 57	
	GTO 0	22 00	
	f x<0	31 71	
	GTO 0	22 00	
	h RTN	35 22	
*	f LBL D	31 25 14	INITIAL DEAL
	h F? 1	35 71 01	-if deal is already in progress, then display "Error"
130	GTO 0	22 00	
	h CF 0	35 61 00	-set "deal" flags
	h SF 1	35 51 01	
	h SF 2	35 51 02	
	g GSB d	32 22 14	→generate HP's card 1
	g STO 6	33 06	- blink/print
	f -x-	31 84	→ J,Q,K ⇒ 10
	f GSB 2	31 22 02	
	STO 4	33 04	
	STO 7	33 07	
140	g GSB d	32 22 14	→generate HP's card 2
	STO 5	33 05	
	EEX	43	-format & store HP's initial hand in 6: xx.yy
	2	02	
	÷	81	
	STO + 6	33 61 06	= HP's card 2
	RCL 5	34 05	→ J,Q,K ⇒ 10
	f GSB 2	31 22 02	
	STO 5	33 05	
	STO + 7	33 61 07	
150	g GSB d	32 22 14	→generate user's card 1
	g STO 8	33 08	
	DSP 0	23 00	-stop for bet
	R/S	84	
*	f LBL B	31 25 12	BET→
	DSP 2	23 02	
	h F? 2	35 71 02	-if deal is not yet in progress, then display "Error"
	h F? 2	35 71 02	
	GTO 0	22 00	
	h SF 2	35 51 02	-reset "deal" flag 2
160	h F? 0	35 71 00	-if bet already in progress, then go to "redouble?"
	GTO f C	22 31 13	
	h F? 3	35 71 03	
	h F? 3	35 71 03	-if no new bet input, then retain old one.
	GTO f b	22 31 12	
	EEX	43	-else, check bounds of new bet: 0<y<10^4
	4	04	
	f GSB 4	31 22 04	
	f END	31 24	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	STO B	33 12	
170 *	g LBL b	32 25 12	HP DOUBLES?
	h SF 0	35 51 00	-set "bet" flag 0
	RCL 4	34 04	= HP's card 1
	1	01	
	g x=y	32 51	-if ACE or 10 point value, then HP doubles
	g GTO 5	22 05	
	h R↓	35 53	
	RCL 0	34 00	= 10
	g x≠y	32 61	
	g GTO 6	22 06	
180 *	f LBL 5	31 25 05	(RE) DOUBLE BET
	RCL B	34 12	
	2	02	
	x	71	
	STO B	33 12	
	h RTN	35 22	
*	g LBL c	32 25 13	USER REDOUBLES?
	h F? 3	35 71 03	
	h F? 3	35 71 03	
	GTO 6	22 06	
190	f GSB 5	31 22 05	
*	f LBL 6	31 25 06	FINAL BET DISPLAY
	RCL B	34 12	-blink/print final bet
	f -x-	31 84	
	h CF 0	35 61 00	= user's card 1
	RCL 8	34 08	→ J,Q,K ⇒ 10
	f GSB 2	31 22 02	
	STO 9	33 09	
	STO D	33 14	
	f GSB 3	31 22 03	→ ACE?
200	g GSB d	32 22 14	→ generate user's card 2
	g STO E	33 15	
	EEX	43	-format & store user's initial hand in 8: xx.yy
	2	02	
	÷	81	
	STO + 8	33 61 08	
	RCL 8	34 08	-blink/print
	DSP 2	23 02	= user's card 2
	f -x-	31 84	→ J,Q,K ⇒ 10
	RCL E	34 15	
210	f GSB 2	31 22 02	
	STO E	33 15	
	STO + 9	33 61 09	
	f GSB 3	31 22 03	→ ACE?
	DSP 0	23 00	
	GTO f e	22 31 15	→ MERGE card 2
	h RTN	35 22	
*	f LBL E	31 25 15	REDISPLAY 1ST. CARDS
	RCL 6	34 04	= HP's card 1
	f INT	31 83	
220	DSP 2	23 02	
	f -x-	31 84	
	RCL 8	34 08	= user's card 1
	DSP 0	23 00	
	h RTN	35 22	

LABELS

A INITIALIZE	B BET→	C SHUFFLE (SEED→)	D DEAL	E REDISPLAY 1ST CARDS
a	b HP doubles	c user redoubles	d deal subr.	e MERGE
0 "Error"	1 card-generator	2 J,Q,K ⇒ 10	3 ACE dealt?	4 0<y<x?
5 redouble	6 bet, hand	7	8	9

FLAGS

0	bet placed
1	deal in progress
2	deal in progress
3	numeric

SET STATUS

FLAGS	ON	OFF
0	☐	☒
1	☐	☒
2	☐	☒

TRIG	
DEG	☒
GRAD	☐
RAD	☐

DISP	
FIX	☒
SCI	☐
ENG	☐
n	2

Program Listing I (card 2)

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	RCL D	34 14	= user's card 1
	RCL E	34 15	" card 2
	x	71	
	RCL 9	34 09	= user's count
	+	61	
	RCL A	34 11	= 21
	g x=y	32 15	- user BJ
	GTO 5	22 05	
	RCL 9	34 09	- else, display user's count
010	h RTN	35 22	
*	f LBL A	31 25 11	RESCORE ACE
	h F? 1	35 71 01	- if no ACE held, display "ERROR"
	GTO 0	22 00	
	DSP 0	23 00	
	9	09	- index who owns ACE in I
	h F? 0	35 71 00	
	7	07	
	h STI	35 33	
	h F? 2	35 71 02	- if current score = 1, then change to 11.
020	GTO f a	22 31 11	
	h SF 2	35 51 02	- else reset flag 2 & rescore ACE as 1.
	RCL 0	34 00	
	STO - (i)	33 51 24	- update count
	RCL (i)	34 24	
	h RTN	35 22	
*	g LBL a	32 25 11	RESCORE ACE as 11
	RCL 0	34 00	= 10
	STO + (i)	33 61 24	- update count
	RCL A	34 11	= 21
030	RCL (i)	34 24	
	g X>Y	32 81	- if over 21, rescore as 1
	GTO A	22 11	
	h RTN	35 22	
*	f LBL C	31 25 13	HP (card 1). USER COUNT
	DSP 2	23 02	
	RCL 9	34 09	= user count
	EEX	43	
	2	02	
	÷	81	
040	RCL 4	34 04	= HP's card 1
	+	61	
	h RTN	35 22	
*	f LBL D	31 25 14	HIT
	g GSB C	32 22 13	
	STO + 9	33 61 09	
	RCL A	34 11	= 21
	RCL 9	34 09	= user's count
	g X≤Y	32 71	- if NOT over 21, then display
	h RTN	35 22	
050 *	f LBL 4	31 25 04	GAME OVER?
	h F? 2	35 71 02	- if no ACE scored as 11, then yes.
	GTO 6	22 06	
	f GSB A	31 22 11	→ else, rescore ACE as 1
	h F? 0	35 71 00	- if owned by HP,
	GTO f b	22 31 12	return to its "HIT" loop
	h RTN	35 22	

STEP	KEY ENTRY	KEY CODE	COMMENTS
*	f LBL 6	31 25 06	GAME OVER!
	RCL B	34 12	= bet
	h F? 0	35 71 00	
060	GTO 9	22 09	
*	f LBL 8	31 25 08	HP WON
	STO - 3	33 51 03	- decrement user's account
	RCL 0	34 00	= 10
	h STI	35 33	⇒ "OH BLISS"
	DSP 2	23 02	
	GTO 7	22 07	
*	f LBL 9	31 25 09	HP LOST
	STO + 3	33 61 03	- increment user's account
	RCL 1	34 01	= 12
070	h STI	35 33	⇒ "I LOSE"
	DSP 1	23 01	
	GTO 7	22 07	
*	f LBL 5	31 25 05	HP BJ or ACE?
	RCL 4	34 04	= HP's card 1
	f GSB 3	31 22 03	→ ACE?
	RCL 5	34 05	= HP's card 2
	f GSB 3	31 22 03	→ ACE?
	x	71	
	RCL 7	34 07	= HP's count
080	+	61	
	RCL A	34 11	= 21
	g X=Y	32 51	- if BJ, then check if user also has BJ
	GTO 8	22 08	- if user stood, return to HP-loop
	h F? 0	35 71 00	
	h RTN	35 22	
*	f LBL 6	31 25 06	USER BJ!
	RCL A	34 11	= 21
	STO 9	33 09	
	RCL B	34 12	= bet
090	2	02	- double
	x	71	
	STO +3	33 61 03	- increment user's account
	RCL 1	34 01	= 12
	h STI	35 33	⇒ "I LOSE"
	DSP 1	23 01	
*	f LBL 7	31 25 07	END-GAME DISPLAY
	RCL (i)	34 24	- WHO WON blink/print
	f -x-	31 84	
	RCL 9	34 09	= user's count
100	EEX	43	
	2	02	
	÷	81	
	RCL 7	34 07	= HP's count
	+	61	
	DSP 2	23 02	- blink/print: HP's count. user's count
	f -x-	31 84	
	RCL 3	34 03	= user's account
	R/S	84	
*	f LBL 8	31 25 08	HP BJ!
110	STO 7	33 07	= 21
	RCL B	34 12	= bet
	h F? 0	35 71 00	- if user stood, then HP wins
	GTO 8	22 08	

REGISTERS

0: 10	1: 12	2: 13	3: user's account	4: HP card 1 (≤ 10)	5: HP card 2 (≤ 10)	6: HP initial hand: xx.yy	7: HP count	8: user init. hand: xx.yy	9: user count
S0: "OH BLISS"	S1	S2: "I LOSE"	S3	S4	S5	S6	S7	S8: "OH BLISS"	S9: "I LOSE"
A: 21	B: BET	C: SEED	D: user's card 1 (≤ 10)	E: user's card 2 (≤ 10)	I: index				

Program Listing II (card 2)

STEP	KEY ENTRY	KEY CODE	COMMENTS
	RCL A	34 11	- else = tie ("posh")
	STO 9	33 09	
	RCL 2	34 02	= 13
	h STI	35 33	⇒ "0.000000000"
	DSP 9	23 09	
	GTO 7	22 07	
120 *	f LBL E	31 25 15	STAND
	h SF 1	35 51 01	- reset ACE flags 1&2
	h SF 2	35 51 02	
	RCL 6	34 06	= HP's initial hand
	DSP 2	23 02	
	f -x-	31 84	- blink/print
	h SF 0	35 51 00	- set "stand" flag 0
	f GSB 5	31 22 05	⇒ HP BJ or ACE?
*	g LBL e	32 25 15	RESCORE HP ACE?
	h F? 1	35 71 01	- holds an ACE?
130	GTO f b	22 31 12	- no: skip to b
	h F? 2	35 71 02	- ACE scored as 11?
	h F? 2	35 71 02	
	GTO f b	22 31 12	- no: skip to b
	h SF 2	35 51 02	- else reset "11" flag
	RCL 7	34 07	= HP's count
	RCL 1	34 01	= 12
	g x≤y	32 71	- if 7 ≤ HP count ≤ 11,
	GTO f b	22 31 12	then rescore ACE
	h R↓	35 53	as 11.
140	7	07	
	g x≤y	32 71	
	f GSB A	31 22 11	
*	g LBL b	32 25 12	HP HIT?
	RCL 7	34 07	= HP's count
	1	01	
	7	07	
	g x≤y	32 71	- if over 16,
	GTO 9	22 09	then stand
	g GSB c	31 22 13	- else hit
150	STO + 7	33 61 07	- increment HP's count
	RCL A	34 11	= 21
	RCL 7	34 07	= HP's count
	g x>y	32 81	- if over 21, check
	GTO 4	22 04	if GAME is over
	GTO f e	22 31 15	- else loop
*	f LBL 9	31 25 09	COMPARE COUNTS
	RCL 2	34 02	= 13
	h ST I	35 33	⇒ "0.00" (for POSH)
	RCL 9	34 09	= user's count
160	RCL 7	34 07	= HP's count
	g x=y	32 51	- PUSH?
	GTO 7	22 07	→ END-GAME disp.
	g x>y	32 81	- HP wins?
	h CF 0	35 61 00	- yes
	GTO 6	22 06	→ GAME OVER
*	g LBL c	32 25 13	GET NEW CARD
	g GSB d	32 22 14	→ generate card
	DSP 0	23 00	
	f -x-	31 84	- blink/print

STEP	KEY ENTRY	KEY CODE	COMMENTS
170	f GSB 2	31 22 02	→ J, Q, K ⇒ 10
	f GSB 3	31 22 03	→ ACE?
	h RTN	35 22	
	R/S		
180			
190			
200			
210			
220			

LABELS

A ACE→1 or 11	B	C HP (card 1), user count	D HIT	E STAND
a ACE→11	b HP HIT?	c get new card	d deal subr.	e rescore HP ACE?
0 "Error"	1 card-generator	2 J,Q,K ⇒ 10	3 ACE dealt?	4 game over?
5 HP BJ or ACE?	6 game over! / user BJ!	7 end-game disp.	8 HP won (or BJ!)	9 HP lost / compare counts

FLAGS

0	Stand
1	ACE dealt
2	ACE = 11
3	

SET STATUS

FLAGS	ON	OFF
0	☐	☒
1	☐	☑
2	☒	☐
3	☐	☒

TRIG		DISP	
DEG	☒	FIX	☒
GRAD	☐	SCI	☐
RAD	☐	ENG	☐
		n	0