

Program Description I

Program Title BLACKJACK GAME

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Program Description, Equations, Variables This program operates as a Blackjack dealer. (System players will find that their systems don't work since cards are dealt from an infinite deck.) The subroutine which deals cards produces integers randomly from 1 to 13 inclusive in an even distribution. The integers 11, 12, and 13 are then converted to 10. Any Ace (1) dealt is set to 11 points if possible (total < 21) and a flag set to indicate that the player (or dealer) is "SOFT." Four cards are dealt initially with the player's total and the dealer's second card ("up" card) shown in the following format:

PP. DD where PP is the player's total and DD is the dealer's second card (dealer's total after "STICK" or Blackjack). If the player is "SOFT" then the exponent position of the display will show 00. The current Bankroll figures into the random number generator to give plenty of variety (difficult to memorize sequences). The player wins 1.5 x his bet if he has a Blackjack (and the dealer does not have a Blackjack).

Operating Limits and Warnings Attempts to gamble on credit (bet more than the current Bankroll) will cause the program to halt with "Error" displayed. This will also occur doubling down causes a valid bet to become invalid. The program must be restarted following this (new Bankroll, [A]).

Compute Times: Initial deal (4 cards) is approximately 14 seconds.
To deal one card (HIT) is approximately 4 seconds.

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) Start with Registers cleared (f, CL REG).

Enter \$5000 and push "START" (A).

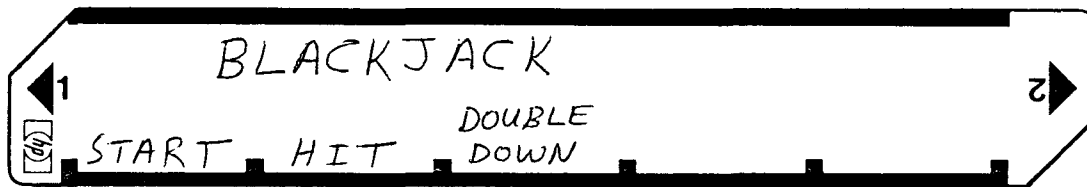
1. Bet \$50 and push [R/S]. The program pauses to display 7.21 (dealer has Blackjack, player has a 2-card total of 7, dealer automatically wins). Display blinks off 3 times then the program subtracts your bet from your Bankroll then halts showing new Bankroll of \$4950.

2. Bet another \$50 and push [R/S]. The program halts (after ~14 sec.) to display 16.03 (tough decision!) Go ahead and "HIT" it. [B]. See displayed 20.03 (Lucky! better "STICK"). To stick, push [R/S]. The following sequence of displays occurs: 20.14 (dealer had Ace in the hole), 20.12 (got to 22 so took Ace to 1), 20.16, 20.22 (Win!!), \$5000.

3. Bet another \$50 and push [R/S]. The program halts to display 17.08 00 (you have an Ace and a 6). So take a hit, [B]. Displays 17.08 (got a 10, reduced Ace to 1). Better stick, [R/S]. Display sequence is: 17.15 (dealer had a 7 in the hole), 17.23 (dealer got an 8 and busted), You Win!! , \$5050.

Reference(s) HP-65 library program # 1296A by Gary D. Campbell.

I must give Gary (who I know personally) credit for the random generator and the display format (except for using the exponent to indicate a soft hand).



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1.	Load Program Card (Both sides)		<input type="checkbox"/> <input type="checkbox"/>	
2.	Enter "Bankroll" (Total amount of money to be risked)	\$	<input type="checkbox"/> A	Bankroll
3.	Place a bet (no credit allowed) and deal a hand (2 cards to player and 2 to dealer) Note: see program description for meaning of PP. DD	\$	<input type="checkbox"/> R/S	PP. DD
4.	Player may wish to get "HIT" (take another card) If player's total exceeds 21 then		<input type="checkbox"/> B	PP. DD ↓ new Bankroll
5.	Repeat step 4 as desired.		<input type="checkbox"/> <input type="checkbox"/>	
6.	Player may "DOUBLE DOWN" if his 2-card total is 10 or 11 (doubles bet and takes 1 card) Play automatically continues until win or lose		<input type="checkbox"/> C	PP. DD ↓ new Bankroll
7.	Player may "STICK" when satisfied with his total. The dealer then takes cards until he breaks (over 21) or exceeds 16 (17 if he is soft). The program pauses to show totals after each card dealt. Dealer wins if his total is higher than the player's total and he did not exceed 21. All ties cancel the bet (neither win nor lose). Player wins if his total is higher than the dealer's total and he did not exceed 21.		<input type="checkbox"/> R/S	PP. DD ↓ PP. DD ↓ ↓ ↓ new Bankroll
8.	Return to step 3 for a new hand. Note: Blackjack (21 with 2 cards) causes display to flash. If it is for the player, he wins 1.5 x his Bet.		<input type="checkbox"/> <input type="checkbox"/>	

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL A	31 25 11	Initialize for new hand	57	*LBL 5	31 25 05	Deal next card for the dealer
2	2	02		58	GSB 8	31 22 08	
3	1	01		59	STO 3	33 03	
4	STO 0	33 00		060	*LBL 0	31 25 00	Here to set dealer's 1st card
5	x≠y	35 52		61	RCL 3	34 03	
6	STO 5	33 05	Save Bankroll	62	STO+1	33 61 01	Set dealer total
7	FIX	31 23		63	RCL 0	34 00	
8	DSP 0	23 00		64	RCL 1	34 01	dealer "soft"? (Ace=11)
9	SF 0	35 51 00	initially there are no Aces.	65	FI?	35 71 01	
010	CF 1	35 61 01		66	x≤y?	32 71	Yes - dealer > 21?
11	R/S	84	Stop to enter Bet.	67	GTO 3	22 03	Neither - go on
12	STO 4	33 04	Save Bet	68	RCL 8	34 08	
13	GSB 6	32 22 12	Check for attempt to get credit	69	STO-1	33 51 01	dealer was soft and >21 so reduce the Ace to 1.
14	CL x	44		070	CF 1	35 61 01	
15	STO 2	33 02	initialize player total and # of cards.	71	*LBL 3	31 25 03	
16	STO 6	33 06		72	GSB 6	31 22 06	Format display
17	GSB 9	31 22 09	Deal to player	73	PAUSE	35 72	Pause to show totals
18	GSB 8	31 22 08	Deal to dealer	74	RCL 0	34 00	
19	STO 3	33 03	Save dealer's 1st card	75	RCL 2	34 02	Player broke? (>21)
020	GSB 9	31 22 09	Deal to player	76	x>y?	32 81	
21	GSB 8	31 22 08	Deal to dealer	77	GTO 2	22 02	Yes - go lose
22	STO 1	33 01	Save dealer's "up" card	78	x≠y	35 52	No
23	RCL 3	34 03		79	RCL 1	34 01	Dealer broke? (>21)
24	+	61	Dealer total = 21? (Blackjack)	080	x>y?	32 81	
25	RCL 0	34 00		81	GTO 4	22 04	Yes - player wins
26	x≠y?	32 61	No	82	5	05	No
27	GTO 0	22 00	Yes - save dealer's total	83	+	61	Dealer ≤ 16?
28	STO 1	33 01	Go flush display	84	x≤y?	32 71	
29	GSB 4	32 22 14		85	GTO 5	22 05	Yes - get next card
030	RCL 0	34 00	Did player total also = 21?	86	1	01	No
31	RCL 2	34 02		87	-	51	Dealer soft and = 17?
32	x=y?	32 51	Yes - Tie	88	FI?	35 71 01	
33	GTO 0	22 31 13	No - go lose	89	x≠y?	32 61	
34	GTO 2	22 02	here for dealer ≠ 21	090	GTO 0	22 00	No - go on
35	*LBL 0	31 25 00	Player = 21?	91	GTO 5	22 05	Yes - get next card
36	RCL 2	34 02		92	*LBL 0	31 25 00	
37	x≠y?	32 61	No	93	RCL 1	34 01	Tie?
38	GTO 1	22 01	Yes - set dealer's total	94	RCL 2	34 02	
39	RCL 3	34 03	Go flash display	95	x=y?	32 51	Yes - No win or lose
040	STO+1	33 61 01		96	GTO 0	22 31 13	Player > Dealer?
41	GSB 4	32 22 14	increase bet by factor of 1.5	97	x>y?	32 81	Yes - Player wins
42	1	01		98	GTO 4	22 04	Here for lose
43	.	83		99	*LBL 2	31 25 02	
44	5	05		100	RCL 4	34 04	change bet to negative value
45	STO x 4	33 71 04	Go win	101	CHS	42	
46	GTO 4	22 04	Here for a HIT	102	STO 4	33 04	
47	*LBL B	31 25 12	Deal to player	103	*LBL 4	31 25 04	Win Label - here for win, lose, or draw.
48	GSB 9	31 22 09		104	RCL 4	34 04	
49	RCL 0	34 00	Break? (>21)	105	RCL 5	34 05	
050	RCL 2	34 02	Yes - go display & lose	106	+	61	Set new Bankroll
51	x>y?	32 81	No - also no Blackjacks	107	GTO A	22 11	Back to start
52	GTO 3	22 03	Format display	108	*LBL C	32 25 13	Tie,
53	*LBL 1	31 25 01	Stop for decision	109	0	00	clear Bet
54	GSB 6	31 22 06		110	STO 4	33 04	
55	R/S	84	"STICK"	111	GTO 4	22 04	
56	GTO 0	22 00		112	*LBL C	31 25 13	Here for "DOUBLE DOWN"

REGISTERS

0	21	1 Dealer's Total	2 Player's Total	3 Dealer's first card	4 Bet	5 Bank-Roll	6 # of cards Dealt to Player	7 Random # Seed	8 10	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	
A	B	C	D	E	I					

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
113	RCL 2	34 02	} Player = 10?	169	1	01	} is it an Ace?
114	RCL 8	34 08		170	XZY	35 52	
115	X=Y?	32 51		171	X=Y?	32 51	
116	GTO 0	22 00	Yes - OK, so far	172	FI?	35 71 01	Yes - already SOFT?
117	1	01	No	173	RTN	35 22	SOFT, or no Ace, done
118	+	61	} Player = 11?	174	RCL 8	34 08	} is an Ace, not SOFT, so add 10 and set SOFT indication
119	X≠Y?	32 61		175	+	61	
120	GTO 1	22 01		176	SF 1	35 51 01	
121	*LBL 0	31 25 00	No-disallow doubling	177	RTN	35 22	Done
122	RCL 6	34 06	Yes - OK, so far	178	*LBL 7	31 25 07	Deal one card routine
123	2	02	} Does player have 2 cards?	179	1	01	} Establish 10 for many uses
124	X≠Y?	32 61		180	0	00	
125	GTO 1	22 01		No-disallow doubling	181	STO 8	33 08
126	STO X 4	33 71 04	OK, double bet	182	RCL 7	34 07	
127	GSB 6	32 22 12	Check for credit try	183	RCL 5	34 05	} Get current Bankroll
128	GSB 9	31 22 09	Deal 1 card to player	184	RCL 5	34 05	
129	GTO 3	22 03	Go display & pause (stick)	185	X	71	
130	*LBL 6	31 25 06	Format display routine	186	+	61	
131	RCL 1	34 01	} Dealer total → .DD	187	+	61	
132	EEX	43		188	LN	31 52	
133	2	02		189	RCL 7	34 07	
134	÷	81	} Add player total → PP. DD	190	+	61	} Set new seed
135	RCL 2	34 02		191	X ²	32 54	
136	+	61		192	FRAC	32 83	} Form card value 1 ≤ C ≤ 13
137	DSP 2	23 02	} Set FIX 2 display	193	STO 7	33 07	
138	FIX	31 23		194	1	01	
139	FO?	35 71 00		195	3	03	} is card 11, 12, or 13? Yes - make it a 10
140	RTN	35 22	Player SOFT?	196	X	71	
141	DSP 3	23 03	No-done	197	1	01	
142	ENG	35 23	Yes} set ENG 3 display	198	+	61	} Flash Delay routine
143	RTN	35 22	} for PP. DD .00	199	INT	31 83	
144	*LBL 9	31 25 09	Done	200	X>Y?	32 81	} Flash routine Format display
145	GSB 7	31 22 07	Deal to player routine	201	XZY	35 52	
146	1	01	Deal one card	202	RTN	35 22	
147	STO+6	33 61 06	} Increment player card counter	203	*LBL e	32 25 15	} Flash totals
148	XZY	35 52		204	RTN		
149	FO?	35 71 00		205	*LBL d	32 25 14	
150	X≠Y?	32 61	is player SOFT?	206	GSB 6	31 22 06	} Continue Check for credit try
151	GTO 0	22 00	No-is card an Ace?	207	PAUSE	35 72	
152	RCL 8	34 08	No-Ace, or already SOFT	208	GSB e	32 22 15	
153	+	61	} is an Ace, was not SOFT, so add 10 and indicate SOFT.	209	PAUSE	35 72	} would a loss cause Bankroll to go negative with this bet?
154	CF 0	35 61 00		210	GSB e	32 22 15	
155	*LBL 0	31 25 00		211	PAUSE	35 72	
156	STO+2	33 61 00	Set new player total	212	GSB e	32 22 15	} "Error" - Restart program By 0 if Yes, By 1 if No
157	FO?	35 71 00	SOFT?	213	PAUSE	35 72	
158	RTN	35 22	No-done	214	RTN	35 22	
159	RCL 0	34 00	Yes} Player > 21?	215	*LBL b	32 25 12	} OK, go on
160	RCL 2	34 02	216	RCL 4	34 04		
161	X≤Y?	32 71	No-done	217	CHS	42	
162	RTN	35 22	} remove 10 and clear SOFT indication.	218	RCL 5	34 05	
163	RCL 8	34 08		219	+	61	
164	STO-2	33 51 02		220	0	00	
165	SFO	35 51 00		221	X≤Y?	32 71	
166	RTN	35 22		222	1	01	
167	*LBL 8	31 25 08	Deal to Dealer routine	223	÷	81	
168	GSB 7	31 22 07	Deal one card	224	RTN	35 22	

LABELS

FLAGS

SET STATUS

A ENTER BANKROLL	B HIT	C DOUBLE DOWN	D	E	0 Clear for player "SOFT"	1 Set for Dealer "SOFT"	ON OFF	TRIG	DISP
a	b CREDIT CHECK	c TIE	d FLASH	e FLASH DELAY			0 <input checked="" type="checkbox"/> <input type="checkbox"/>	DEG <input checked="" type="checkbox"/>	FIX <input checked="" type="checkbox"/>
0 used 5 times	1 Display Halt	2 Lose	3 Display Pause	4 Win			1 <input type="checkbox"/> <input checked="" type="checkbox"/>	GRAD <input type="checkbox"/>	SCI <input type="checkbox"/>
5 Next Dealer Card	6 Format Display	7 Deal one Card	8 Deal to Dealer	9 Deal to Player			2 <input type="checkbox"/> <input type="checkbox"/>	RAD <input type="checkbox"/>	ENG <input type="checkbox"/>
							3 <input type="checkbox"/> <input type="checkbox"/>		n <u>0</u>