

BASSER COMPUTINGDEPARTMENTR.A.R. TEST TO 300 - ENG. 2.14Purpose

To test the ability of the C.R.T. store to retain information, when each location on every Tube is subjected to a known Read-Around Ratio. The R.A.R. used in the test may be any multiple of fifty, up to 300.

Method

The method of the test, and the nature of the error printout, are identical with those of R.A.R. Test Eng. 2.4.

Input

During the program, the SILLIAC output is switched to printer.

The bootstrap input comes to a 24 stop.

(1) A Black Switch start will begin the test, using a R.A.R. of 300.

OR

(2) A White Switch start enables the input of a parameter. This is a single digit, whose value is $n/50$, where n is the selected R.A.R. For convenience, the six possible parameters are punched at the end of the program tape.

The R.A.R. currently being used is printed at the beginning of each test cycle.

When the program is run with the Black Switch down, the test cycle is repeated indefinitely, using the same R.A.R. If the Black Switch is centred the program comes to a 24 stop at the end of the current test cycle, when a new parameter may be input, with a White Switch start.

R.A.R. TEST TO 300 - ENG. 2.14

000 80 028 40(001) by 001
 001 80 028 40 002
 002 26 000 00 000
 001 81 00N 42 000

Bootstrap

From here on, each word of the program is preceded on the input tape by its location in the store.

046 50 1J3 L5 15J from 001/
 047 26 10F 097

Prepare to copy the program into the other half of the store.

048 40 1J3 L1 1J3 from 115

Set (1J3) to plus or minus 0020000200, depending on the direction of the copying.

32 051

Is a test cycle about to begin?

049 24 04S

Yes. If the Black Switch is centred, stop.

04K 40 1N1 81 004
 42 04N

White Switch start, to input a parameter.

04S 92 285 92 0N5 from 049

2 CR/LFs, 2 FIGS.

04N 0S 001 14 006
 04J 40 1N2

Set the bombardment counter.

04F 00 023 L5 1N1
 04L 36 051 82 004
 050 82 008 L5 046
 051 83 008 22 051

Print, in decimal, the selected R.A.R. (= 300 with Black Switch start.

051		L5 25S	Correct the addresses of the 92 orders in the error printout subroutine.
052	40 05S	L0 1J3	
053	46 05S	L5 25J	
054	40 05J	L0 1J3	
055	42 05J	L5 2J6	
056	40 0J6	L0 1J3	
057	42 0J6		
058	26 11S	L5 157 00 000	Prepare to clear the half of the store to be tested.
059	S5 000	40 041 from 095/ONN	Test for failures.
05K	32 05S	F3 041	
05S	36 080		
05N	L5 1J7	92 081 from 05K	First part of error print shows type of failure, and location being tested.
05J	92 201	82 004	
05F	J0 1J9	50 180	
05L	82 00N	00 02L	
080	F1 1J7	27 0J4	
080	F1 1J7	40 1J7 from 05S	Switch (1J7) to all-1s or all-0s,
081	40(400)	by 14L	and store the result in the eight locations adjacent to the test location.
082	40(400)	40(400)by 150	
083	40(400)	by 146	
084	40(400)	40(400)by 147	
085	40(400)	by 149	
086	40(400)	40(400)by 14K	
087	40(400)	by 14N	
088	40(400)	40(400)by 14J	
085	F5 045	40 045	Is the test complete for this location?
086	36 140		
		L5 1N2 from 152	No. Set the bombardment counter,
087	26 180	00 000	and transfer to the bombardment loop.

089	(40 180	40 181)	from 09L/143/ 098	Store bombardment orders
08K	L5 089	L0 09K	by 08N/08L	
08S	36 08L	L5 089		
08N	L4 1NL	40 089		
08J	L5 ONF	26 089		
08L	L5 153	40 089	from 08S	Reset (089) and (199)
090	L5 093	40 199		and prepare to compute
091	L5 180	26 145		the locations adjacent to the test location.
093	00 001	36 180		Constant.
094	L5 1J7	36 ONO	from 19L	If the test is for
095	26 059	00 000		1-to-0 failures, skip the 0-to-1 failure collection.
096	40 045	L1 045	from 141	Is the test complete
097	36 046			for this half of the store?
098	L4 15L	L5 045 26 089		No. Form the bom- bardment order pair for the next test location.
09K	40 198	40 199		Constant.
09F	L5 15L	40 ONF	from 11L	Form bombardment
09L	26 089	00 000		order pair for first location in this half of the store.
ON0	F1(400)	40 041	by 146/from 094	
ON1	F1(400)	50 041	by 149	
ON2	40 041	J0 041		
ON3	F1(400)	40 041	by 14N	Collect 0-to-1
ON4	F1(400)	36 ON5	by 14L	failures.
ON5	J0 041	40 041		
ON6	J0 041	F1(400)	by 147	
ON7	40 041	F1(400)	by 14K	
ON8	J0 041	40 041		
ON9	J0 041	F1(400)	by 14J	
ONK	40 041	F1(400)	by 150	
ONS	J0 041	40 041		
ONN	J0 041	26 059		

OJ1	L5 041	36 OJ6	from OJ5
OJ2	00 001	40 041	from OJK
OJ3	L5 1N8	L4 043	
OJ4	40 043	00 001	from 05L
OJ5	36 OJ1	26 080	
OJ6	92 201	50 043	from OJ1
OJ7	L5 043	82 004	
OJ8	14 029	75 1N6	
OJ9	00 001	82 004	
OJK	L5 041	26 OJ2	

Determine the digital positions of the failures,

and compute and print them, in decimal.

100	00 000	S5 000	from 115
	(	)	by 10F
102	32 102	S5 000	
	(	)	by 10L
104	32 104	S5 000	
	(	)	by 110
106	32 106	S5 000	
	(	)	by 111
108	32 108	S5 000	
	(	)	by 112
10K	32 10K	S5 000	
	{	}	by 113
			by 114

Copy the program into the other half of the store, modifying the addresses of all words except the final group of constants.

10J	L5 1N0	L4 101
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Advance the addresses of the copying orders.

10F	40 101	L4 1JS
10L	40 103	L4 1JS
110	40 105	L4 1JS
111	40 107	L4 1JS
112	40 109	L4 1JS
113	40 10S	L4 1JS
114	40 10N	

Set the copying orders.

115	32 247	L0 15S
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Is the copying complete?

22 100

No. Continue copying.

(Locations 116 to 119 contain order pairs, set by 11S to 11F, to clear the half of the store which is to be tested)

11K	L5 116	L4 1NO	Advance the addresses of the clearing orders.
11S	40 116	L4 1JS	Store the clearing orders.
11N	40 117	L4 1JS	
11J	40 118	L4 1JS	
11F	40 119	L4 1JS	
11L	36 09F	L0 155 26 116	Is the clearing complete? If not, continue clearing.
140	L5 180	L4 1NK	Advance the test loc- ation by nineteen.
141	L0 159	36 096	Is the next test loc- ation in the correct half of the store?
142	L4 159	40 ONF	Yes. Re-form the bombardment order pair, and set ONF.
143	26 089	00 000	
145	L4 1NJ	40 19K	Compute the locations adjacent to the test location, and set the addresses of orders which operate on these locations.
146	46 082	46 ONO	
147	42 082	42 ON6	
148	L4 1NN	40 19S	
149	46 083	46 ON1	
14K	42 083	42 ON7	
14S	L0 1JS	40 19N	
14N	46 084	46 ON3	
14J	42 084	42 ON9	
14F	L4 1J1	40 19J	
14L	46 081	46 ON4	
150	42 081	42 ONK	
151	L5 1JJ	40 045	Set the counter used by 085.
152	22 086	00 000	Constant.
153	40 180	40 181	

155	41	300	41	400
157	41	200	41	300
159	50	400	50	400
15S	L5	1F0	40	3F0
15J	L4	040	40	240
15L	50	200	50	200

Constants, whose addresses are modified when the program is copied from one to the other half of the store.

Locations 180 to 198 contain order pairs, set by 089 to 08J, to bombard the test location with 50--- orders.

Location 199 contains an order pair, set by 090, to count the number of bombardments.

Locations 19K to 19J contain 50--- and JO--- orders, set by 145, 148, 14S, and 14F, to regenerate the adjacent locations and to collect the 1-to-0 failures.

19F	L1	0N0	40	0N0
19L	32	086	26	094

Has the bombard and regenerate cycle been repeated?

1N0	00	001	00	001
1N1	00	000	00	006
1N2	02	000	00	000
1N4	00	000	00	001
1N6	50	000	00	000
1N8	01	999	99	99L
1NK	00	013	00	013
1NN	80	020	00	020
1NJ	00	001	7L	LLL
1NL	00	002	00	002

Constants

1J1	00	03L	00	001
1J3	00	200	00	200
1J5	01	040	00	040
1J7	00	000	00	000
1J9	00	3LL	00	000
1JS	00	040	00	040
1JJ	LL	LLL	LL	LLF

Constants.

001	26	046	00	000
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Exit from bootstrap.

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Parameters, punched
for convenience, at
the end of the program
tape.

Revised version of Eng 2.4;
prepared by G. Oliphant,
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