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2 RELIABILITY DEMONSTRATION FOR BERNOULLI TRIALS (BERNOULLI.BAS)
3 ORIGINAL DATE: Circa 1985
4 REVISION DATE: October 25, 2020
5 AUTHOR: Phil Rutherford
6 RUN DATE: 25-10-2020 (DD-MM-YYYY)
7 RUN TIME: 22:35:30
8 RUN WITH MMBASIC.EXE (www.mmbasic.com)
9
10 RELIABILITY DEMONSTRATION USING BERNOULLI TRIALS. CALCULATES
11 THE NUMBER OF TRIALS FOR A GIVEN NUMBER OF FAILURES, OR THE
12 NUMBER OF FAILURES FOR A GIVEN NUMBER OF TRIALS. INPUT DESIRED
13 RELIABILITY TO BE DEMONSTRATED AT A SPECIFIC CONFIDENCE LEVEL
14 AND PRODUCER'S RISK.
15 * CONSUMER'S RISK -- TRUE RELIABILITY < DESIRED RELIABILITY
16 * PRODUCER'S RISK -- TRUE RELIABILITY > DESIRED RELIABILITY
17
18 TEST PROGRAM REQUIREMENTS
19
20 ESTIMATED NO. OF TRIALS           ? 77
21 ESTIMATED NO. OF FAILURES         ? 1
22 DEMONSTRATED RELIABILITY          ? 0.95
23 CONFIDENCE LEVEL (%)              ? 90
24 CONSUMER'S RISK GOAL (%)          10
25 PRODUCER'S RISK GOAL (%)         ? 10
26 ITERATE ON TRIALS (T) OR FAILURES (F) ? F
27
28 ITERATIVE DETERMINATION OF NEEDED TEST PROGRAM
29 ITERATE ON NUMBER OF FAILURES
30
31 TRIALS   FAILURES  DEMONSTRATED  CONFIDENCE  CONSUMER'S
32          FAILURES  RELIABILITY   LEVEL (%)   RISK (%)
33
34 77       1         0.95         90.26725737  9.732742634
35 77       2         0.95         74.65431606  25.34568394
36 77       1         0.95         90.26725737  9.732742634
37
38 PRODUCER'S          TRUE
39 RISK (%)            RELIABILITY
40
41 90.26725737        0.95
42 89.6240188         0.951
43 88.94206083        0.952
44 88.21942007        0.953
45 87.45407231        0.954
46 86.64393544        0.955
47 85.78687323        0.956
48 84.88070009        0.957
49 83.92318686        0.958
50 82.91206784        0.959
51 81.84504921        0.96
52 80.71981891        0.961
53 79.53405837        0.962
54 78.28545601        0.963
55 76.97172303        0.964
56 75.59061151        0.965
57 74.13993521        0.966
58 72.6175934         0.967
59 71.02159788        0.968
60 69.3501038         0.969
61 67.60144447        0.97
62 65.77417067        0.971
63 63.86709504        0.972
64 61.87934189        0.973
65 59.81040316        0.974
66 57.66020109        0.975

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67	55.42915836	0.976
68	53.1182763	0.977
69	50.72922226	0.978
70	48.2644268	0.979
71	45.72719182	0.98
72	43.12181068	0.981
73	40.45370154	0.982
74	37.72955511	0.983
75	34.95749832	0.984
76	32.14727542	0.985
77	29.31044813	0.986
78	26.4606168	0.987
79	23.6136644	0.988
80	20.78802563	0.989
81	18.00498357	0.99
82	15.2889962	0.991
83	12.6680559	0.992
84	10.17408476	0.993
85	7.843369117	0.994
86	8.067962289	0.9939
87	8.294551467	0.9938
88	8.523093773	0.9937
89	8.753546857	0.9936
90	8.985868885	0.9935
91	9.22001854	0.9934
92	9.455955011	0.9933
93	9.693637994	0.9932
94	9.933027681	0.9931
95	10.17408476	0.993
96	9.933027681	0.9931
97	9.957059001	0.99309
98	9.981106955	0.99308
99	10.0051715	0.99307
100	9.981106955	0.99308

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REQUIRED TEST PROGRAM SUMMARY

TRIALS	77
FAILURES	1
REQUIRED RELIABILITY	0.95
CONFIDENCE LEVEL (%)	90.26725737
CONSUMER'S RISK (%)	9.732742634
PRODUCER'S RISK (%)	9.981106955
TRUE RELIABILITY	0.99308

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