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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: 22:30:55
 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 ? 100
 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) ? T
 27

28 ITERATIVE DETERMINATION OF NEEDED TEST PROGRAM
 29 ITERATE ON NUMBER OF TRIALS
 30

31 TRIALS	32 FAILURES	33 DEMONSTRATED RELIABILITY	34 CONFIDENCE LEVEL (%)	35 CONSUMER'S RISK (%)
36 100	37 1	38 0.95	39 96.29187907	40 3.708120933
41 99	42 1	43 0.95	44 96.12951552	45 3.870484476
46 98	47 1	48 0.95	49 95.96033288	50 4.039667116
51 97	52 1	53 0.95	54 95.78406311	55 4.215936892
56 96	57 1	58 0.95	59 95.60042883	60 4.399571166
61 95	62 1	63 0.95	64 95.40914313	65 4.590856869
66 94	67 1	68 0.95	69 95.20990927	70 4.790090732
71 93	72 1	73 0.95	74 95.00242048	75 4.997579524
76 92	77 1	78 0.95	79 94.78635971	80 5.213640293
81 91	82 1	83 0.95	84 94.56139941	85 5.43860059
86 90	87 1	88 0.95	89 94.3272013	90 5.672798702
91 89	92 1	93 0.95	94 94.08341613	95 5.916583871
96 88	97 1	98 0.95	99 93.82968349	100 6.170316512
101 87	102 1	103 0.95	104 93.56563158	105 6.434368424
106 86	107 1	108 0.95	109 93.29087702	110 6.709122984
111 85	112 1	113 0.95	114 93.00502466	115 6.994975342
116 84	117 1	118 0.95	119 92.70766741	120 7.292332593
121 83	122 1	123 0.95	124 92.39838605	125 7.601613945
126 82	127 1	128 0.95	129 92.07674914	130 7.923250861
131 81	132 1	133 0.95	134 91.74231281	135 8.257687193
136 80	137 1	138 0.95	139 91.39462072	140 8.605379285
141 79	142 1	143 0.95	144 91.03320394	145 8.966796065
146 78	147 1	148 0.95	149 90.6575809	150 9.342419101
151 77	152 1	153 0.95	154 90.26725737	155 9.732742634
156 76	157 1	158 0.95	159 89.86172642	160 10.13827358
161 77	162 1	163 0.95	164 90.26725737	165 9.732742634

61 PRODUCER'S RISK (%)	62 TRUE RELIABILITY
63 90.26725737	64 0.95
65 89.6240188	66 0.951
67 88.94206083	68 0.952

67	88.21942007	0.953
68	87.45407231	0.954
69	86.64393544	0.955
70	85.78687323	0.956
71	84.88070009	0.957
72	83.92318686	0.958
73	82.91206784	0.959
74	81.84504921	0.96
75	80.71981891	0.961
76	79.53405837	0.962
77	78.28545601	0.963
78	76.97172303	0.964
79	75.59061151	0.965
80	74.13993521	0.966
81	72.6175934	0.967
82	71.02159788	0.968
83	69.3501038	0.969
84	67.60144447	0.97
85	65.77417067	0.971
86	63.86709504	0.972
87	61.87934189	0.973
88	59.81040316	0.974
89	57.66020109	0.975
90	55.42915836	0.976
91	53.1182763	0.977
92	50.72922226	0.978
93	48.2644268	0.979
94	45.72719182	0.98
95	43.12181068	0.981
96	40.45370154	0.982
97	37.72955511	0.983
98	34.95749832	0.984
99	32.14727542	0.985
100	29.31044813	0.986
101	26.4606168	0.987
102	23.6136644	0.988
103	20.78802563	0.989
104	18.00498357	0.99
105	15.2889962	0.991
106	12.6680559	0.992
107	10.17408476	0.993
108	7.843369117	0.994
109	8.067962289	0.9939
110	8.294551467	0.9938
111	8.523093773	0.9937
112	8.753546857	0.9936
113	8.985868885	0.9935
114	9.22001854	0.9934
115	9.455955011	0.9933
116	9.693637994	0.9932
117	9.933027681	0.9931
118	10.17408476	0.993
119	9.933027681	0.9931
120	9.957059001	0.99309
121	9.981106955	0.99308
122	10.0051715	0.99307
123	9.981106955	0.99308

124
125 REQUIRED TEST PROGRAM SUMMARY

126		
127	TRIALS	77
128	FAILURES	1
129	REQUIRED RELIABILITY	0.95
130	CONFIDENCE LEVEL (%)	90.26725737
131	CONSUMER'S RISK (%)	9.732742634
132	PRODUCER'S RISK (%)	9.981106955

133 TRUE RELIABILITY 0.99308
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