```
R version 4.3.1 (2023-06-16 ucrt) -- "Beagle Scouts"
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Platform: x86_64-w64-mingw32/x64 (64-bit)

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'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[Previously saved workspace restored]

> rm(list = ls())
> x0 <- c(0.32,0.3,0.05,0.06,1,0.24,0.07,0.01,0.23,0.01,1,1,0,0,0.19,0.53,0.01,0.57,0.43,0,0.04,0
.01,0,0,0,0.01,0,0,0.1,0.04,0.05,0.01,0.11,1,0.7,0.03,0.01,1,0.91,0.07,0,0,0,0,0.01,0.01,0.01,0.0
2,0.21,0,0.02,0.06,0.09,0,0.39,0.13,0.03,0,0,0.61,0,0.62,0,0,0.6,0,0,0.53,0.46,0,0,0.28,0.1,0.1,0
.01,0,0,0.08,0,0,0.62,0.7,0.15,0.2,0,0.01,0.38,0,0,0.05,1,0.02,0,0,0,0,0,0,0,0,0.02,0.24,0.04,0,0
,0.39,0.18,0.12,0.01,0.47,0,0.65,0,0.05,0.07,0.59,0.06,0,0.1,0.62,0,0.04,0.28,0.41,1,0,0.32,0.03,
0,0.18,0,0.12,0.12,0,0.07,0,0,0,0,0,0,0,0,0.07,0.46,0,0,0.02,0.64,0.01,0.18,0.35,0.02,0.36,0,0,
0,0,0,0,0.19,0,0,0,0,0,0,0.03,0.23,0.04,0.04,0.03,0.51,0.06,0,0.62,0.65,0.42,0.5,0,0,0,0,0.24,0
.04,0,0.01,0,0.06,0.32,0.01,0,0.02,0,0,0.01,0.01,0.02,0,0.09,0.02,0,0.41,0.4,0.23,0.4,0,0,0,0,0,0
,0,0,0.12,0.04,0.01,0.25,0.16,0.8,0.13,1,0.05,1,0,0.23,0.58,0.37,0.02,0,0.02,0.02,0,0,0,0,0.25,0.
19,0.09,0.22,0.05,0.36,0.02,0,0.27,0.13,0.38,0.04,0.14,0,0.85,0.71,0.04,0,0,0.14,0,0.05,0.75,0,0,
0.75,0,0.77,0.21,0,0,0,0.78,0.13,0.36,0,0.25,0.37,1,0.03,0.66,0,0,0,0.02,0.4,0.05,1,0.4,0.04,0.03
,0,0,0,0,0,0,0,0,0,0,0)
> x1 <- c(0.09,0.05,0,0,0.08,0.06,0.22,0.24,0,0.38,0,0.04,0.02,0,0,0.38,0.87,0.27,0.32,0.01,0,0,0.0
1,0.59,0.15,0,0.29,0.01,0.53,0.87,0.01,0,0.01,0,0,0.02,0.36,0,0.02,0,0.03,0,0.02,0.02,0.01,0.23,0
,0.43,0.24,1,0,0,0,0.04,0,0.01,0.24,0.02,0.01,0,0.54,0,0,0.02,0.1,0.04,0.01,0,0,0,0.15,0,0.02,0.0
1,0.01,0.09,0,0.54,0,0.09,0,0,0.11,0,0.01,0,1,0.11,0.45,0.06,0,0.05,0,0,0,0,0.31,0,0.01,0,0.18,0.
55,0,0,0.02,0,0.15,0,0.25,0.12,0.26,0.71,0,0.08,0.03,0.01,0.01,0.11,0,0,0,0.24,0,0,0,0,0.17,0,0,0
,0.85,0.68,0,0,0,0,0.45,0,0.01,0,0,0.39,0,0.03,0.03,0.01,0.38,0.33,0.7,0.7,0.01,0.01,0.03,0.08,0.
01,0.12,0.23,0,0.01,0.61,0.02,0.23,0.01,0,0,0.01,0.02,0,0,0,0,0,0,0.01,0,0,0.09,0.01,0.08,0.03,0,
0.79,0.01,0,0.02,0,0,0,0.37,0,0.1,0.47,0,0,0,0.37,0,0,0.91,0.17,0.01,0,0,0,0.01,0.02,0,0,0.07,0.1
1,0.01,0,0.26,0.67,0,0,0,0,0,0,0,0.04,0,0,0,0,0.12,0.1,0.6,0.03,0,0,0,0.04,0,0.25,0,0,0.05,0,0,0,
0,0,0,0.07,0,0,0,0,0,0,0.46,0.13,0.01,0.25,0.13,0.01,0.21,0,0,0,0.01,0.12,0,0.01,0.12,0,0,0,0,0,0
,0.01,0.63,0,0.09,0.01,0,0.06,0,0,0,0.01,0,0,0,0,0.01,0,0.08,0.01,0,0,0.01,0.01,0,0,0,0,0)
> x2 <- c(0,0,0,0,0,0.39,0,0,0,0.01,0.05,0.61,0,0,0.45,0.4,0.37,0,0,0,0,0,0,0,0.06,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0.04,0,0.01,0,0,0,0,0,0,0.05,0,0,0,0,0,0,0.01,0.01,0,0,
0,0,0,0,0,0,0.01,0,0.01,0.01,0,0,0,0,0,0,0,0,0,0,0.01,0.01,0.75,0,0,0,0,0,0,0.01,0,0.06,0.01,0.01
,0.01,0.11,0.02,0.02,0,0.01,0,0,0.01,0.68,0,0.52,0,0,0,0.01,0,0,0,0,0.04,0.01,0.05,0,0,0,0,0.26,0
,0.01,0,0,0,0.06,0,0,0,0.01,0.01,0.01,0.01,0,0.17,0.19,0.1,0,0,0.01,0,0.83,0,0,0,0,0.51,0,0,0,0,0
.07,0.39,0,0,0,0,0,0,0,0.02,0.27,0,0,0.01,0.42,0,0,0,0,0,0.11,0.59,0,0,0,0,0,0,0,0,0.03,0.03,0,0,
0,0,0,0,0,0,0.07,0.01,0,0,0.02,0,0.01,0,0.04,0.09,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0.19,
0.02,0,0,0,0.04,0,0,0.05,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0.19,0,0,0,0,0,0.01,0.06,0
,0.08,0,0,0,0,0.1,0.29,0,0,0,0,0,0,0,0,0,0,0,0,0,0)
> x3 <- c(0,0.01,0.12,0,0,0.18,0.02,0.02,0,0,0,0,0,0,0,0,0,0,0.02,0,0,0,0,0)
> x <- c(x0,x1,x2,x3)
> y0 <- c(0.0875,0.0704,0.3871,0.0715,0.1469,0.1301,0.1004,0.2399,0.3157,0.3346,0.0847,0.0847,0.8
814,0.8814,0.1681,0.1328,0.7335,0.0643,0.2664,0.6552,0.0753,0.6001,0.5573,0.4044,0.7465,0.4289,0.
1064,0.4542,0.0847,0.1402,0.1569,0.6046,0.1506,0.6762,0.7613,0.8819,0.9112,0.2728,0.7036,0.5815,0
.4774,0.9592,0.4774,0.9592,0.9668,0.9668,0.9668,0.3383,0.1049,0.2685,0.5454,0.2061,0.0771,0.7721,
0.0686,0.1792,0.606,0.5154,0.4071,0.0689,0.9069,0.1025,0.8759,0.8952,0.0877,0.5874,0.5509,0.0712,
0.0831,0.9462,0.9462,0.2593,0.4151,0.4151,0.7638,0.7226,0.7226,0.1502,0.8679,0.8679,0.0743,0.0702
,0.0747,0.0898,0.5146,0.9853,0.1969,0.9744,0.9852,0.9327,0.3732,0.356,0.9929,0.4289,0.6004,0.6816
,0.175,0.7929,0.5143,0.7946,0.205,0.0706,0.2861,0.445,0.8598,0.1387,0.4225,0.3413,0.7539,0.1091,0
.0907,0.0881,0.1384,0.1776,0.2861,0.0795,0.1576,0.1245,0.1629,0.0601,0.1335,0.087,0.0796,0.0648,0
.0705,0.1256,0.1574,0.1903,0.5828,0.1611,0.4124,0.1809,0.1809,0.7403,0.682,0.6693,0.4343,0.1392,0
.458,0.3618,0.8299,0.9593,0.7287,0.0992,0.5504,0.073,0.8721,0.2207,0.1299,0.063,0.2674,0.1903,0.0
717,0.178,0.0875,0.8105,0.43,0.7746,0.9803,0.9577,0.9803,0.1253,0.7684,0.95,0.882,0.915,0.9077,0.
9077,0.9209,0.6918,0.1197,0.1229,0.7733,0.7994,0.09,0.1524,0.4232,0.0515,0.0936,0.0452,0.0773,0.8
838,0.9047,0.964,0.8035,0.2136,0.3951,0.6989,0.6201,0.3347,0.1018,0.104,0.6283,0.6028,0.3046,0.65
```

```
91,0.8274,0.5066,0.4361,0.1503,0.2503,0.4571,0.1488,0.7794,0.4268,0.0559,0.1087,0.0668,0.7441,0.7
648,0.863,0.8151,0.8389,0.6508,0.8117,0.8517,0.2186,0.1379,0.4101,0.0488,0.0678,0.0727,0.266,0.05
36,0.0685,0.0897,0.4139,0.1394,0.1547,0.0903,0.1774,0.3955,0.193,0.4633,0.6847,0.7442,0.5487,0.77
24,0.2417,0.1767,0.0994,0.145,0.1182,0.1016,0.6425,0.7328,0.065,0.0816,0.0782,0.3334,0.1191,0.357
,0.0728,0.0698,0.2233,0.7565,0.4982,0.26,0.3393,0.2273,0.1435,0.5971,0.7391,0.0683,0.0985,0.0744,
0.0749,0.7641,0.6607,0.1078,0.0698,0.0973,0.098,0.7277,0.0694,0.0866,0.1188,0.0703,0.0864,0.3017,
0.2698,0.1014,0.4373,0.1549,0.2356,0.0688,0.266,0.3563,0.3391,0.7231,0.9948,0.6107,0.7709,0.8988,
0.6275,0.7531,0.8192,0.5821,0.8099,0.9041)
> y1 <- c(0.7959,0.9433,0.8308,0.4849,0.6018,0.166,0.0905,0.1541,0.7114,0.1001,0.3914,0.4022,0.33
45,0.7707,0.8916,0.1337,0.0517,0.079,0.1289,0.6578,0.3637,0.5736,0.0909,0.184,0.6638,0.2145,0.266
,0.102,0.1915,0.1903,0.8999,0.1397,0.5328,0.7181,0.543,0.0773,0.4774,0.0675,0.9217,0.134,0.7027,0
.4233,0.4233,0.5384,0.1148,0.5836,0.1096,0.3546,0.0598,0.6505,0.8192,0.622,0.7843,0.81,0.5453,0.1
323,0.9398,0.0922,0.6408,0.1042,0.7682,0.4531,0.7019,0.9439,0.9276,0.373,0.8918,0.2318,0.966,0.09
04,0.8088,0.5337,0.1325,0.6355,0.7218,0.8627,0.1813,0.9895,0.1889,0.2971,0.1547,0.1121,0.6412,0.1
908,0.8134,0.0731,0.0742,0.0876,0.0722,0.5858,0.102,0.7919,0.926,0.6468,0.1362,0.1348,0.7452,0.47
66,0.5673,0.6823,0.0672,0.7492,0.8926,0.7773,0.919,0.1464,0.8577,0.1701,0.2428,0.0738,0.0867,0.94
97,0.0922,0.36,0.1245,0.6974,0.0714,0.6436,0.7827,0.7931,0.0651,0.9026,0.5922,0.4502,0.703,0.0624
,0.9831,0.8772,0.9814,0.3061,0.1123,0.8785,0.8624,0.802,0.9885,0.0716,0.9718,0.6705,0.9838,0.9536
,0.2481,0.9356,0.7678,0.7678,0.2598,0.3636,0.2056,0.1509,0.1509,0.7996,0.7424,0.183,0.1332,0.7091
,0.2884,0.192,0.7418,0.2767,0.1438,0.7921,0.6835,0.4273,0.7971,0.1445,0.2815,0.1015,0.7577,0.72,0
.4892,0.9117,0.797,0.785,0.2909,0.1512,0.3919,0.1153,0.1415,0.3973,0.5167,0.6297,0.1451,0.4927,0.
8236,0.4312,0.9586,0.9211,0.9457,0.2204,0.9751,0.6862,0.5014,0.87,0.9895,0.9559,0.1423,0.9893,0.9
59,0.2972,0.1844,0.5764,0.6664,0.9914,0.9788,0.3332,0.6886,0.9555,0.9818,0.3176,0.929,0.0674,0.35
96,0.1,0.0707,0.6841,0.6841,0.1786,0.6712,0.6712,0.3525,0.7705,0.2741,0.2396,0.8699,0.495,0.9816,
0.313,0.0759,0.0851,0.133,0.2681,0.5519,0.4956,0.1128,0.9547,0.3438,0.9907,0.9907,0.9859,0.992,0.
992,0.9775,0.9775,0.9806,0.9806,0.3505,0.4323,0.4985,0.975,0.9645,0.9629,0.476,0.0945,0.2732,0.63
7,0.4983,0.1838,0.5601,0.1582,0.4217,0.7842,0.9711,0.9851,0.4161,0.894,0.806,0.7086,0.9333,0.7582
,0.6404,0.865,0.8337,0.8366,0.4859,0.1153,0.6432,0.1239,0.6658,0.5289,0.2579,0.309,0.9302,0.902,0
.5938,0.7066,0.8311,0.8698,0.7971,0.8354,0.9692,0.3073,0.3963,0.9698,0.9851,0.7848,0.7848,0.9234,
0.9538,0.9041,0.9822,0.9399)
> y2 <- c(0.9211,0.8144,0.9955,0.9955,0.5401,0.0972,0.6782,0.6639,0.8456,0.2068,0.2278,0.1234,0.9
601,0.9601,0.1514,0.4763,0.1819,0.9955,0.9955,0.9851,0.9851,0.9851,0.9958,0.9958,0.1749,0.9948,0.
994,0.994,0.9935,0.9935,0.9958,0.9958,0.9934,0.9934,0.9938,0.979,0.979,0.9929,0.9929,0.9885,0.990
3,0.988,0.9716,0.9919,0.9917,0.9894,0.9894,0.9943,0.9968,0.9968,0.9965,0.9944,0.9944,0.2301,0.326
7,0.6555,0.9315,0.9303,0.4976,0.9528,0.9593,0.196,0.6242,0.9036,0.7702,0.9151,0.8814,0.8952,0.717
,0.5542,0.9722,0.944,0.9489,0.28,0.9407,0.695,0.695,0.266,0.7829,0.2204,0.891,0.6533,0.6533,0.943
,0.8819,0.8819,0.5366,0.8923,0.9796,0.9336,0.7102,0.9808,0.9808,0.7916,0.7916,0.7131,0.8974,0.961
1,0.9611,0.9853,0.9389,0.6316,0.5084,0.6905,0.6279,0.2032,0.5646,0.5646,0.1886,0.1612,0.2496,0.84
58,0.9212,0.9758,0.9852,0.6753,0.3391,0.4578,0.1005,0.9572,0.1978,0.8108,0.6727,0.967,0.9752,0.31
47,0.1682,0.1092,0.1713,0.5645,0.5544,0.705,0.7301,0.7776,0.0938,0.6756,0.4473,0.4398,0.5957,0.92
73,0.1298,0.6878,0.9607,0.9212,0.9265,0.52,0.2692,0.3025,0.1716,0.148,0.1339,0.0663,0.8066,0.9302
,0.1792,0.5531,0.8529,0.4078,0.7719,0.393,0.8323,0.1302,0.9919,0.9639,0.9887,0.5838,0.3865,0.1035
,0.9381,0.9103,0.5031,0.9701,0.9735,0.8559,0.3413,0.5414,0.4467,0.8844,0.3904,0.6079,0.2418,0.384
5,0.9377,0.5111,0.9772,0.9123,0.6226,0.0623,0.9567,0.9432,0.9353,0.968,0.9778,0.9834,0.9824,0.951
8,0.4146,0.4146,0.6376,0.7664,0.9742,0.9809,0.6859,0.2846,0.7809,0.983,0.2736,0.448,0.9639,0.8418
,0.4817,0.8365,0.9667,0.8368,0.6515,0.2472,0.9881,0.9884,0.9811,0.9891,0.99,0.9841,0.9859,0.9654,
0.9838,0.9684,0.9847,0.9834,0.9731,0.9561,0.9873,0.992,0.9862,0.993,0.9951,0.9922,0.9893,0.0809,0
.46,0.891,0.9921,0.8153,0.8715,0.9454,0.8307,0.1355,0.9761,0.9749,0.9767,0.984,0.9895,0.9777,0.97
19,0.9911,0.9691,0.9758,0.9803,0.9726,0.9842,0.9818,0.9608,0.9915,0.9923,0.986,0.9891,0.9945,0.99
89,0.9803,0.9803,0.0749,0.8173,0.7966,0.817,0.7941,0.7941,0.4972,0.3057,0.4134,0.1588,0.8532,0.91
82,0.7077,0.9744,0.3487,0.0563,0.9691,0.9725,0.9814,0.9761,0.9576,0.9585,0.9773,0.9558,0.9693,0.9
629,0.9629,0.9469,0.9842,0.977,0.9901)
> y3 <- c(0.9888,0.6097,0.809,0.9751,0.664,0.6442,0.4325,0.2947,0.9744,0.9883,0.9886,0.9812,0.957
4,0.9881,0.993,0.9894,0.9948,0.981,0.9887,0.9797,0.9959,0.9959,0.9892,0.9892,0.9906)
> y <- c(y0,y1,y2,y3)
> cor.test(x, y,alternative = "two.sided", method = "spearman", exact=FALSE )

        Spearman's rank correlation rho

data:  x and y
S = 227279998, p-value < 2.2e-16
alternative hypothesis: true rho is not equal to 0
sample estimates:
       rho
-0.7230099

> # ---- Confidence interval ----
> if(!"RVAideMemoire" %in% installed.packages()){install.packages("RVAideMemoire")}
> library(RVAideMemoire)
*** Package RVAideMemoire v 0.9-83-3 ***
```

```
> spearman.ci(x,y)

        Spearman's rank correlation

data:  x and y
1000 replicates

95 percent confidence interval:
 -0.7516166 -0.6886417
sample estimates:
       rho
-0.7230099

>
```