In all these exercises, you will be tasked to perform some statistical tests on sequences of random numbers. For each test:

   i. Write a program in MATLAB or Octave which computes the value used for the test, i.e. the value, for the sequence given as an input, of the relevant statistic for the given test.

   ii. For each given sequence, run the program on that sequence (for a suitable number n of samples) to obtain its test value.

   iii. Look up the test value(s) in the relevant table for the given test (or use equivalent software) to determine how likely or unlikely it is that each of the given sequences is truly random.

67. Perform the **continuous frequency test** (i.e. the version of the frequency test based on the Kolmogorov-Smirnov test) for a sequence produced by the builtin `rand` function of MATLAB or Octave (which is claimed to be uniformly distributed).

For the next 5 exercises, consider the following sequences over $\{0, 1, 2, 3, 4, 5\}$ (i.e. $d = 6$):

   a. $U_1 = 1, 1, 1, 1, \ldots$

   b. $U_2 = 0, 1, 2, 3, 4, 5, 0, 1, 2, 3, 4, 5, \ldots$

   c. $U_3 = $ `randi`$([0, 5])$ (using the builtin `randi` function of MATLAB or Octave)

and verify the claim that they are uniformly-distributed random sequences using the respective statistical test.

68. Perform the **discrete frequency test** (i.e. the version of the frequency test based on the χ^2 test) for the sequences U_1, U_2 and U_3.

69. Perform the (discrete) **series test** for the sequences U_1, U_2 and U_3.

70. Perform the **gap test** for the sequences U_1, U_2 and U_3.

71. Perform the (simplified) **poker test** (i.e. the version where only the number of distinct values in an m-tuple is counted, i.e. which does not distinguish between e.g. a poker or a full house) for the sequences U_1, U_2 and U_3 and $m = 5$.

72. Perform the **coupon collector test** for the sequences U_1, U_2 and U_3.

73. Perform the **permutation test** for a sequence produced by the builtin `rand` function of MATLAB or Octave (which is claimed to be uniformly distributed) and the length $t = 3$.

74. Perform the **series correlation test** for a sequence produced by the builtin `rand` function of MATLAB or Octave (which is claimed to be uniformly distributed).

75. Perform the **maximum of t test** for a sequence produced by the builtin `rand` function of MATLAB or Octave (which is claimed to be uniformly distributed) and the length $t = 3$.

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