Computer programming for statistics I

MathsNET
A joined up approach to teaching and learning mathematics

0.1 Level 1

Use the blocks below to create 10 Bernoulli random variables, $\{X_i\}$. Store all these random variables in a list use this list to plot a graph with points at (i, X_i) where i runs from 1 to 10.

0.2 Level 2

Use the blocks below to modify the code that you have written so that it generates a single binomial random variable, X, with parameters $p = 0.5$ and $N = 5$. Plot the value of this binomial random variable at the point $(1, X)$. Click here if you want to watch the explanatory video.

0.3 Level 3

Now use the blocks below to write a code that generates a single geometric random variable, Y, with parameter $p = 0.6$. Plot the value fo this geometric random variable at the point $(1, Y)$ Click here if you want to watch the explanatory video.

0.4 Level 4

Use the blocks to generate a sample of 50 uniform random variables. Draw a graph showing how the value of the sample mean changes as you increase the number of random variables in your sample. Click here if you want to watch the explanatory video.

0.5 Level 5

Use the blocks to generate a sample of 51 uniform random variables. Calculate the median, ϕ, for your sample of random variables and plot a point on the graph at $(1, \phi)$. You should draw a y error bar around this point. To get the width of this error bar calculate the 10th and 90th percentiles and determine, which of these two quantities is further from the median. Use the distance between the further away percentile and the median as the width of the error bar. Click here if you want to watch the explanatory video.

0.6 Level 6

Use the blocks to generate a sample of 50 uniform random variables. Calculate the sample mean, μ, for your sample of random variables and the sample variance, σ^2. Draw a point on the graph at $(1, \mu)$. Draw a y error bar around this point that starts at $\mu - \sigma$ and that finishes at $\mu + \sigma$. Click here if you want to watch the explanatory video.

0.7 Level 7

Use the blocks below to create a function that generates and returns the value of a bernoulli random variable. Use this function to generate a sample of bernoulli random variables and then use what you have learnt in the exercises that involved generating uniform random variables to draw a graph showing how the sample mean changes as you increase the number of bernoulli random variables in your sample. Click here if you want to watch the explanatory video.