LabVIEW HW #4

Each problem begins with a suggested descriptive name (including the *.vi* extension) for the solution VI that you will write. Suggested icons for use in the VI are given at the end of some problem statements. The palette locations of the cited icons are not give explicitly: these icons can be found with the aid of **Quick Drop**.

1. Complete the Do-It-Yourself/"USE IT!" section ending the chapter on MathScript Node and XY Graph.

2. **Noisy Sine [MathScript Node].vi** Write a MathScript-based VI that generates *three cycles* of a 100-Hz sine wave with added random noise that has a "Gaussian" distribution (rather than a uniform distribution). The histogram of a collection of Gaussian-distributed random numbers is a bell-shaped curve, which accurately models the noise seen in many experimental situations (and so this distribution is also called the "Normal" distribution). In this case, the mean should be zero and the standard deviation should, initially, be set to one. In your VI, use the MathScript command *randnormal*(1,*N*), which produces a single row vector of N Gaussian-distributed random numbers, with standard deviation set to one. You should also calculate *N* samples of the sine wave at equally spaced times, from $t = 0$ to $t = 0.3$ s, then <u>add</u> things together in such a way that a unique "Gaussian" random number is added to each of these sine-wave samples, to create a noisy waveform, which you should plot on an XY Graph. So that we might discuss the concept of a "Signal-to-Noise Ratio" (SNR), you should refine your program so that both the amplitude of the sine wave signal and the standard deviation associate with the added noise are adjustable from the front panel. [You will make use of this VI in lab.]