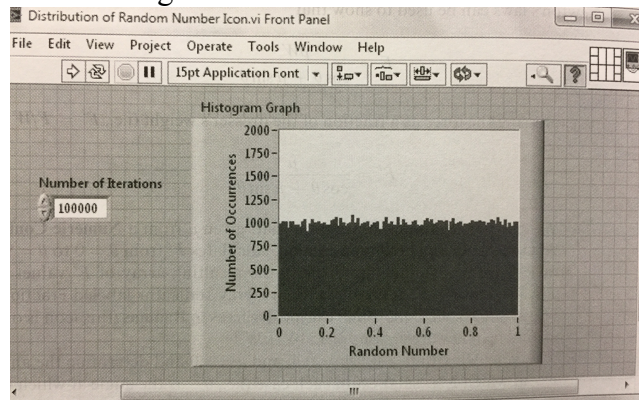


LabVIEW HW #3

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 The For Loop and Waveform Graph.
2. **Distribution of Random Number Icon.vi** In the first homework set, you made use of a VI called **Random Number (0-1)**, which, each time it is called, generates a double-precision floating-point number in the range from zero to (but not including) one, where the number is equally likely to be anywhere within this range (*i.e.*, the probability distribution is not at all a bell-shaped curve, but is instead uniform).
 - a. *Demonstrate* that the distribution of values is indeed uniform, as follows: write a VI that employs the **Random Number (0-1)** icon to generate an array of N numbers, and then use **Histogram.vi** to plot the distribution of these values. The front panel of the VI is shown below, where it has been run with $N = 100,000$ and the random-number range from zero to one has been divided into 100 bins for the histogram plot. The **Histogram Graph**, which has a calibrated x -axis, can be produced on the block diagram by popping up on Histogram.vi’s **Histogram Graph** terminal and selecting **Create>>Indicator**.



- b. During a run in which **Random Number (0-1)** produces N numbers in the range $0 \leq x < 1$, the number of occurrences of a random number in the range from x to $(x + dx)$ is expected to be $dN = \rho dx$, where ρ is a constant. By integrating each side of that equation, you should show that $\rho = N$. Then, from the definition of the distribution’s mean and standard deviation, show that the mean value of x is 0.5 and that (for large values of N) the standard deviation is approximately equal to the inverse of the square root of 12. Add the **Std Deviation and Variance.vi** icon to your block diagram so that the distribution’s mean and standard deviation are calculated and displayed on the front panel. Run your VI, and show that the mean and standard deviation have the expected values.