Name(s)	Project Number
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Project Title

Can Wind Chimes Generate Truly Random Numbers?

Abstract

Objectives/Goals
The sound of wind chimes can be used as a seed to generate truly random numbers.

Methods/Materials
A wind chime for recording sound, a fan to control wind speed, a recording device (iPhone), a program that can convert audio to numbers (Audacity), and the Java programming language. I put my iPhone next to the wind chimes to record the sound, and used a fan to control wind speeds. I recorded 60 samples of data, all around 20 seconds long with 4 different tests. First I rang the chimes manually, then I used the fan#s 3 wind speeds. Next I ran the files through Audacity to take the Spectrum (or Fast Fourier Transform) of the sound file. These files each consisted of roughly 256 numbers. Then I ran the numbers through a program I created to seed a random number generator. Finally I analyzed the numbers through a program that I created to determine if the sequence were random by using the Chi Square Test.

Results
After going through all 60 files, the Chi Square Test returned that each of the sequences were random, and I compared these results to a control group that consisted of a sequence of truly random numbers and a non-random sequence (Fibonacci).

Conclusions/Discussion
I concluded that the random numbers created by the wind chimes were truly random.

Summary Statement

Wind chimes can be used as a seed for a Truly Random Number generator.

Help Received