Code	**MONTE_CARLO_SIMULATION.PY**
Author	Nathaniel Heatwole, PhD (heatwolen@gmail.com) (GitHub) (LinkedIn)
Summary	Uses Monte Carlo simulation to test the central limit theorem, by generating and averaging random draws from several constituent distributions
Methods/ Process	Monte Carlo simulation - Method for evaluating complex probability spaces, where the output depends on several constituent probability distributions - Constituent distributions can be of any type/family (discrete or continuous) - Especially useful in cases where closed-form analytic solutions do not exist - Number of observations chosen should adequately cover the sample space and generate stable output distribution Central limit theorem - Average value of sequence of random variables (independently sampled) is normally distributed - Asymptotically correct, as number of distributions (and observations sampled from each) increases - Holds regardless of types or parameters of constituent distributions Steps 1. Define constituent distributions 2. Generate one random sample from each distribution (sampling independently) 3. Compute average value of those random samples (rowwise) 4. Repeat for many sets of random draws (sampling with replacement) 5. Assess distribution of average value (columnwise, across all trials)
Training Data	Constituent distributions - 10 triangular (three-parameter: minimum, mode, maximum) - Fixed-width, non-overlapping, and abutting (no gaps) - Mode value alternating between minimum and maximum values - Each is highly non-normal (skewed, with linear density segments) - Resembles sawtooth wave when all are viewed together - 1 million random draws from each
Results	Average value distribution is smooth bell-shaped curve (as the central limit theorem predicts), even though all constituent distributions are highly non-normal