Terms

Randomness

A set of data that contains no recognizable patterns or regularities
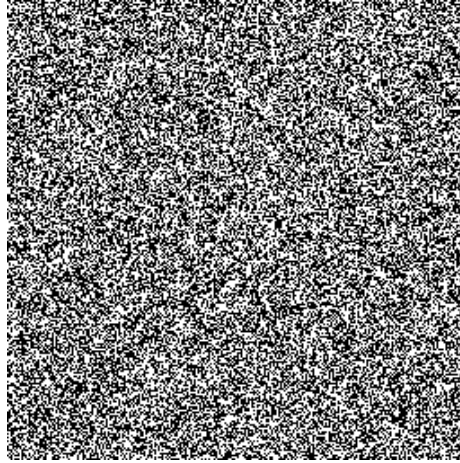

Figure 1: random image

Sample Space

An ordered list of unique possible outcomes of a given event with an associated level of probability.
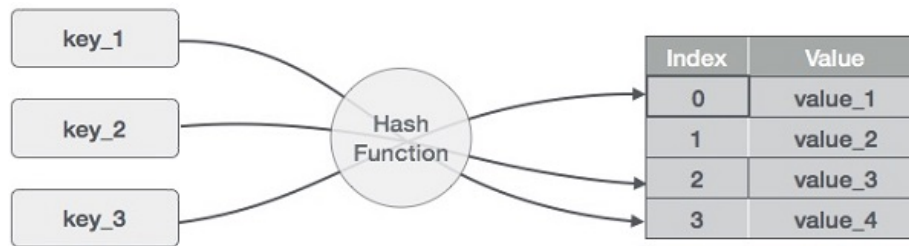
This can be seen as a hash table.

Figure 2: sample space diagram

Disjoint

Two events have no common outcomes however knowing the occurrence of event "A" sets the probability of event "B" to 0. Vice versa.
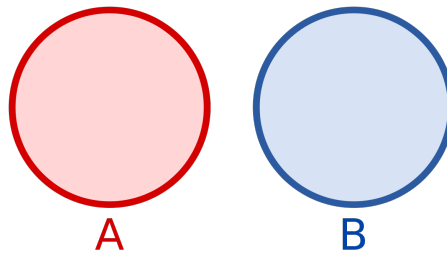
Figure 3: disjoint diagram

Independent

Two events that can occur at the same time but knowing the occurrence of event "A" does not change event "B". Vice versa.
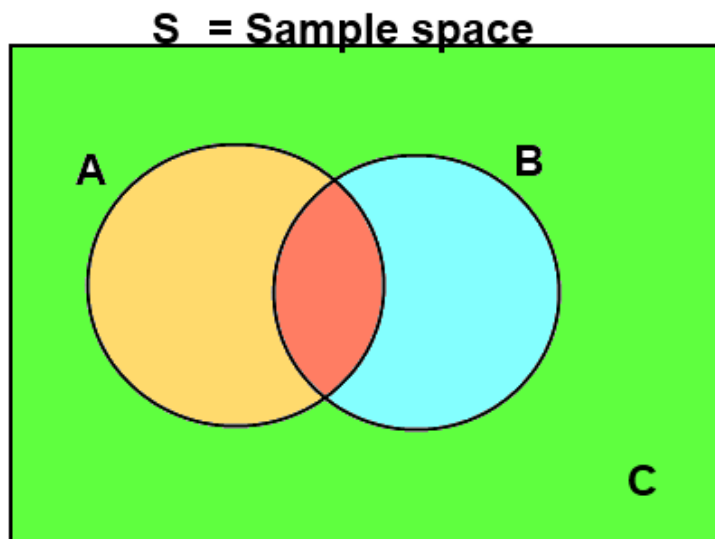
Figure 4: independent events

Sampling without Replacement

Remove an element from the dataset and remove a N amount of elements after without reintroducing previously removed elements.

These events are:

- **not** disjoint
- **independent**

Sampling with Replacement

Remove an element from the dataset and immediately reintroduce the previously removed element.

These events are:

- **not** disjoint
- **not** independent

Simulation

The act of emulating real life events in hopes to find the likelihood of said event.

Figure 5: simulation

Random Variables

Random variable is a variable whose numerical values describe outcomes of a random event

Discrete

Probability mass function (PMF) places positive probability at specific numbers on the number line

Continuous

Probability density function (PDF) places positive probability along a possibly infinite interval of the number line

Central Limit Theorem

In probability theory, the central limit theorem establishes that, in some situations, when independent random variables are added, their properly normalized sum tends toward a normal distribution even if the original variables themselves are not normally distributed
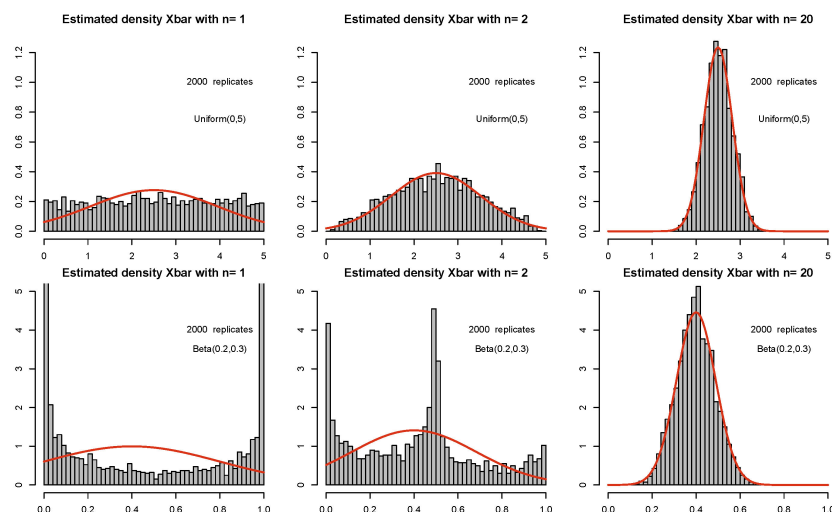
Figure 6: central limit theorem diagram