random variable (X, Y)
A function that maps an *outcome* to a numerical value. Because some outcomes in the physical world cannot be measured directly, a random variable is used to make them measurable. Most commonly a table is used to map phenomena (outcomes) to values. E.g.:

Outcome	Rain	No rain
Value (X)	1	0
Probability (p)	0.3	0.7

The *probabilities* of the individual values of a random variable always sum up to 1. The probabilities can be omitted, if their distribution is uniform (→ *uniform distribution*). Sometimes a frequency can be used to compute the value of a random variable, like the number of heads when tossing three coins:

Number of heads facing up in 3 coins, H=heads, T=tails								
Outcome	TTT	TTH	THT	THH	HTT	HTH	HHT	HHH
Value (X)	0	1	1	2	1	2	2	3

In many cases outcomes already are measurable. In these cases, the random variable is an identity mapping.

The *probability* of a *discrete* random variable taking a specific value is expressed using the notation $P(X = x)$ where X is the random variable and x the corresponding value. For instance, given the above table, the probability of getting two heads is $P(X = 2) = \frac{3}{8}$ (3 out of 8 cases map to 2).

When a random variable is *continuous*, each point in its distribution has infinitesimally small probability, so values of continuous variables are expressed as a intervals. For instance, the notation $P(1.5 \le X \le 1.7)$ indicates the probability of the random variable X to lie in the interval $[1.5, 1.7]$.