Probability of an Event

An experiment is a procedure that results in one out of a # of possible outcomes.

Sample space - the set of all possible outcomes
Event - a subset of the sample space

The probability of an event, $(p(E))$ w/ uniform distribution

$$p(E) = \frac{|E|}{|S|}$$

$|E|$ ← # of elements in event subset
$|S|$ ← # of elements in sample space

Probability distribution over the outcomes of an experiment with a countable sample space S is a function p from S to the set of real numbers in the interval 0 to 1

each $p(s)$ wher $s \in S$ is $0 \leq p(s) \leq 1$
(s is an element in the Sample Space)

so that

$$\sum_{s \in S} p(s) = 1$$

(i.e. the sum of the probabilities of all elements in the Sample Space is equal to 1)

The probability of outcome s is $p(s)$. If $E \subseteq S$ is an event, then the probability of event E is

$$p(E) = \sum_{s \in E} p(s)$$

(i.e the probability of E is a sum of the probabilities of all elements in E)