Class Notes for STT861

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1 Lecture One

Ex 1. Toss a fair coin; what is the probability of obtaining heads? $P(H) = \frac{1}{2}$

Ex 2. Throw a fair die; what is the probability of obtaining 6? What about obtaining an even number?
$P(6) = \frac{1}{6}$
$P(n = 2, 4, 6) = \frac{1}{2}$

The probability is not the realized result, but the convergence of results as the number of iterations approaches infinity. Review the Weak Law of Large Numbers.

Def. A **random experiment** is an action which will result in one of the many possible outcomes.

Def. A **sample space** is the collection of all possible outcomes of a random experiment. We shall denote by **S**.

Def. A **set** is a collection of some <u>well defined</u> objects.

Def. Outcomes are also called **sample points**.

Def. An **Event** is a subset of sample space **S** for which we can define probability.

Def. Suppose A and B are two sets. $A \subset B$ (A is a **subset** of B) if $x \in A$ implies $x \in B$. If $A \subset B$ and $B \subset A$ then $A = B$.

Def. A set is called an empty set (or **null set**) if it contains no elements.
Notation: $\{\emptyset\}$
Convention: $\emptyset \subset A$, for any set A
Corrolary: $\forall A, \emptyset \subset A \subset \mathbf{S}$

Def. Complement A^c is the set such that $x \in A^c \Rightarrow x \notin A$.
In other words, $A^c = \{x : x \notin A\}$
Notation: A^c *or* A' *or* $\overline{A}$