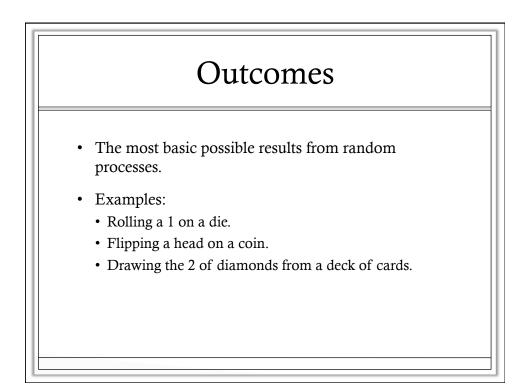


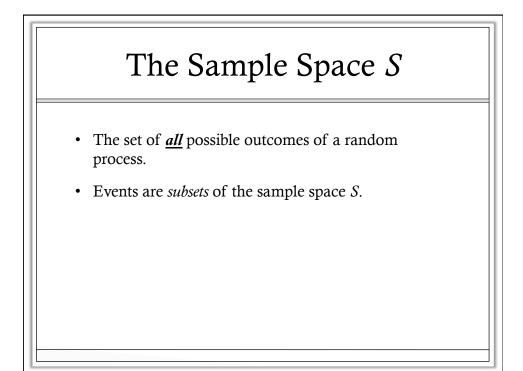
Experiments

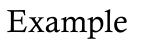
- Also called random processes.
- Exhibit chance behavior:
 - Individual outcomes are uncertain, but there is a regular distribution in a large number of repetitions.
 - **Unpredictable in the short-run**, but produce a predictable pattern in the long-run.



Events

- Outcomes or a collection of outcomes that share some property of interest.
 - Simple events: consist of one outcome
 - Compound events: consists of more than one outcome
- Examples:
 - Rolling an odd number.
 - Flipping exactly two heads on four coin tosses.
 - Drawing a heart from a deck of cards.

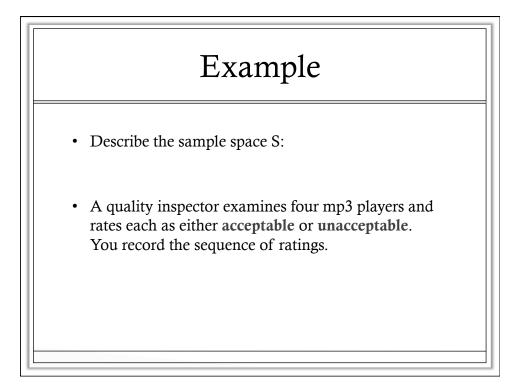


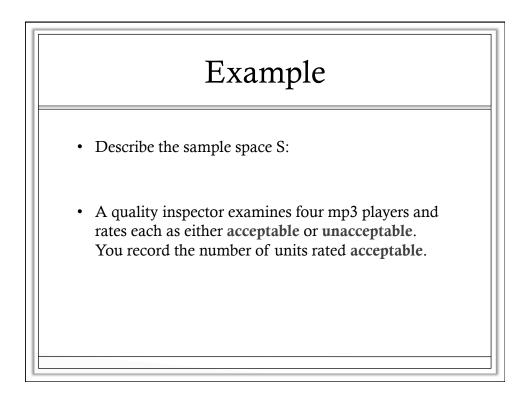


• Describe the sample space S:

• A new business is started. After two years, it is either still in business or it has closed.

Example Describe the sample space S: A rust prevention treatment is applied to a new car. The response variable is the length of time before rust begins to develop on the vehicle.

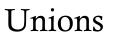




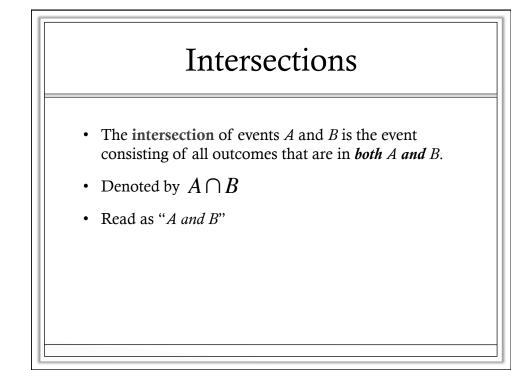
Important Relationships from Set Theory

- Complements
- Unions
- Intersections

Complements The complement of event *A* is the set of all outcomes in *S* that are not contained in *A*. The event that A does *not* occur Denoted by *A*'.



- The **union** of *A* and *B* is the event consisting of the outcomes that are *either in A or B or in both*.
- Denoted by $A \cup B$
- Read as "A or B"



The Null Set

- The event consisting of no outcomes.
- Also called the null event.
- Denoted by \emptyset
- If $A \cap B = \emptyset$, the events are said to be **disjoint** or **mutually exclusive**.