

Master Probability Concepts: Exhaustive, Favourable, Mutually Exclusive, and Equally Likely Cases

Data Science and A.I. Lecture Series

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What Will We Learn?

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- Exhaustive Cases: Understanding the total number of outcomes in a random experiment.

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- Mutually Exclusive Cases: Exploring cases that cannot occur simultaneously.

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- Exhaustive Cases: Understanding the total number of outcomes in a random experiment.
- Favourable Cases: Identifying outcomes that lead to the occurrence of an event.
- Mutually Exclusive Cases: Exploring cases that cannot occur simultaneously.
- Equally Likely Cases: Learning about cases with no preference for one outcome over another.

Definition: The total number of possible outcomes in a random experiment is called **exhaustive cases**.

Examples:

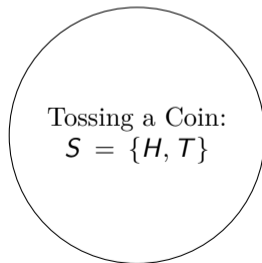
- Tossing a coin: Sample Space $S = \{H, T\}$
Number of Exhaustive Cases = **2**.

Exhaustive Cases

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Examples:

- Tossing a coin: Sample Space $S = \{H, T\}$
Number of Exhaustive Cases = **2**.
- Throwing a die: Sample Space $S = \{1, 2, 3, 4, 5, 6\}$
Number of Exhaustive Cases = **6**.

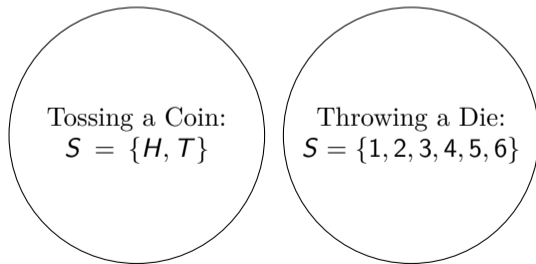


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Examples:

- Drawing a spade card from a deck:
Favourable Cases = 13 (spades).

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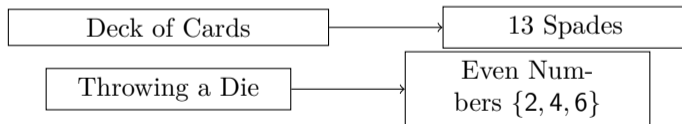


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- Getting an even number by throwing a die:
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Mutually Exclusive Cases

Definition: Cases are **mutually exclusive** if the occurrence of any one prevents the occurrence of all others in a single experiment.

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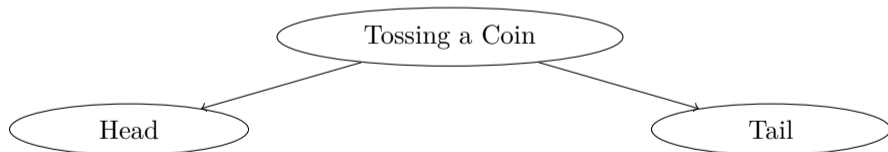
- Tossing a coin: Head and Tail are mutually exclusive.

Mutually Exclusive Cases

Definition: Cases are **mutually exclusive** if the occurrence of any one prevents the occurrence of all others in a single experiment.

Examples:

- Tossing a coin: Head and Tail are mutually exclusive.
- Drawing a card: Drawing a spade and a club are mutually exclusive.



Equally Likely Cases

Definition: Cases are **equally likely** if there is no reason to expect one outcome over the others.

Examples:

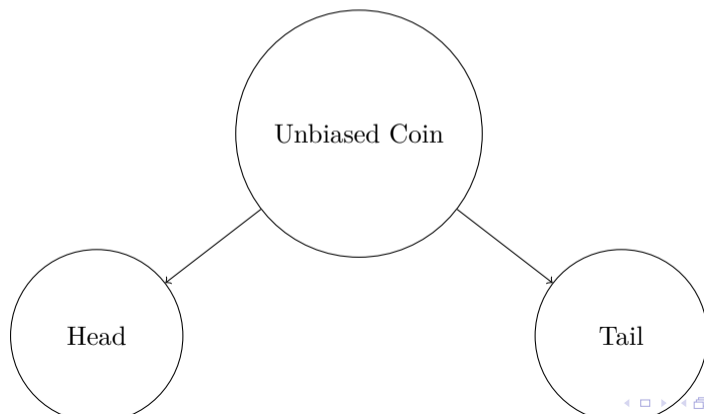
- Tossing an unbiased coin: Head and Tail are equally likely.

Equally Likely Cases

Definition: Cases are **equally likely** if there is no reason to expect one outcome over the others.

Examples:

- Tossing an unbiased coin: Head and Tail are equally likely.
- Throwing an unbiased die: All six faces are equally likely.



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