

Estimating Probabilities: Takeaways

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Syntax

- Simulating a coin toss using R:

```
set.seed(1)
```

```
coin_toss <- function() {
```

```
  toss <- runif(1)
```

```
  if (toss <= 0.5) {
```

```
    return("HEADS")
```

```
  } else {
```

```
    return("TAILS")
```

```
  }
```

```
}
```

Concepts

- A **random experiment** is any process for which we can't predict outcomes with certainty. Examples of random experiments include: the toss of a coin and the rolling of a die.
- When we calculate the probability of an event under the assumption that the outcomes have equal chance of occurring, we're calculating the **theoretical probability** of an event.
- The theoretical probability formula only works under the assumption that all outcomes in the sample space have an equal chances of occurring.
- When we calculate the probability of an event by performing an experiment, we calculate the **empirical probability** of the event.
- Generally, for any event , we can calculate its empirical probability by using the following formula:

$$\text{est. } P(\text{event}) = \frac{\text{number of times event observed}}{\text{number of times experiment was repeated}}$$

- The Law of Large Numbers states that the empirical probability of an event will approach the theoretical probability value as the number of random experiments used increases

Resources

- [An easy intro to some basic probability concepts](#)
- [Tutorial: Basic Statistics in Python — Probability](#)

