- Let Ω be a countable set (for us usually finite, but not always)
- Assume that we have a function $p \colon \Omega \to \mathbb{R}$ with the properties:
  - for all $\omega \in \Omega$, $0 \leq p(\omega) \leq 1$;
  - $$\sum_{\omega \in \Omega} p(\omega) = 1.$$

Notation

- Ω — **outcome space** or **sample space**
- each $\omega \in \Omega$ is an **outcome** or **sample**
- Ω with the function p is called a **discrete probability space**
  - "discrete" because Ω is *countable*
- Any subset $E \subseteq \Omega$ is called an **event**.
- We define the **probability of the event** E as

$$\mathbb{P}(E) := \sum_{\omega \in E} p(\omega).$$