## Statistics

## 1 Conditional probability

$$
\begin{aligned}
\operatorname{Pr}(A \mid B)=\frac{\operatorname{Pr}(A \cap B)}{\operatorname{Pr}(B)} \quad \text { where } \operatorname{Pr}(B) \neq 0 \\
\operatorname{Pr}(A)=\operatorname{Pr}(A \mid B) \cdot \operatorname{Pr}(B)+\operatorname{Pr}\left(A \mid B^{\prime}\right) \cdot \operatorname{Pr}\left(B^{\prime}\right) \quad \text { (law of total probability) }
\end{aligned}
$$

For independent events:

- $\operatorname{Pr}(A \cap B)=\operatorname{Pr}(A) \cdot \operatorname{Pr}(B)$
- $\operatorname{Pr}(A \mid B)=\operatorname{Pr}(A)$
- $\operatorname{Pr}(B \mid A)=\operatorname{Pr}(B)$

