Pattern Recognition   **Kiel University**
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Exercises

Theory Sheet 2

Exercise T-2.1: Conditional Probability

Consider a sample space X comprising three possible outcomes $X = \{v_1, v_2, v_3\}$.

We define the events

$$
\begin{aligned}
E &= \{v_1, v_2\} \\
F &= \{v_1, v_3\}
\end{aligned}
$$

and denote by E^c the complement of E.

Compute $P(F|E^c)$, the conditional probability of F given E^c, using the conditional probability formula for the events A and B:

$$
P(A|B) = \frac{P(A,B)}{P(B)}
$$

Exercise T-2.2: Conditional Probability

The Census Bureau has estimated the following survival probabilities for men:

1. probability that a man lives at least 70 years: 80%

2. probability that a man lives at least 80 years: 50%

What is the conditional probability that a man lives at least 80 years given that he has just celebrated his 70th birthday?

Exercise T-2.3: Conditional Probability

For a pre-shipment inspection of tools a company uses the following procedure:
From each box of tools, containing 50 pieces, 5 pieces are randomly taken (without returning them). Only if all 5 pieces are flawless, the box is accepted - otherwise it is rejected. What is the probability that a box is accepted although it contains 20% defective products?

Generalize to N pieces per box, M of these being defective and n pieces taken randomly.