- **Formulas**
- Conditional Probability: $P(e \wedge h) = P(e \mid h) * P(h)$
- Bayes' Rule: $P(e \mid h) * P(h) = P(h \mid e) * P(e)$
- Chain Rule: $P(a_1 \wedge a_2 \wedge a_3) = P(a_1 \mid a_2 \wedge a_3) * P(a_2 \mid a_3) * P(a_3)$
- Filtering Formula: $P(s_i \mid o_{0...i} = \frac{P(o_i|s_i)*\sum_{s_{i-1}\in S_{i-1}} P(s_i|s_{i-1})*P(s_{i-1}|o_{0...1})*P(o_{0...i-1})}{P(o_{0...i})}$ where $P(o_{0...i})$ means $P(o_0 \wedge o_1 \wedge \cdots \wedge o_i)$
- **Axioms of probability**
- $P(a) \geq 0$
- $P(true) = 1$
- $P(a \wedge b) = P(a) + P(b)$ if $a$ and $b$ are mutually exclusive
- **Propositions**
- $P(\neg a) = 1 - P(a)$
- $P(a) = \sum_{x \in domain(X)} P(a \wedge X = x)$
- $P(a \vee b) = P(a) + P(b) - P(a \wedge b)$
- If $a \leftrightarrow b$ then $P(a) = P(b)$
- $P(a) = P(a \wedge b) + P(a \wedge \neg b) = \sum_{b \in B}(a \wedge b)$