1. Summarize briefly why using logic exclusively to formalize a domain like medical diagnosis is hard.

2. State the principle of maximum expected utility briefly.

3. True or false: A prior (or unconditional) probability takes into account all relevant other information

4. Posterior (conditional) probabilities are conditional on what?
5. Prove that $P(a|b \land a) = 1$. Use the definition of conditional probability and some basic properties of conjunction.

6. Suppose we have the following random variables and domains (values) to describe the state of a car at a repair shop:

- **Problem**: \{brakes, clutch, electrical, steering, tires\}
- **Rattling**: \{true, false\}
- **Squeaky**: \{true, false\}
- **Type**: \{economy, midrange, luxury\}

Give an English translation of the following conditional probability statement using these variables and values and the notational conventions in the book:

$$P(\text{clutch}|\text{rattling} \land \neg \text{noisy} \land \text{luxury}) = 0.4$$
7. Assume a random variable \textit{Cuisine} with values \{\textit{american}, \textit{japanese}, \textit{chinese}, \textit{french}, \textit{polish}\} representing the type of meal served in a cafeteria for lunch. What does the following probability statement say?

\[
P(Cuisine) = (0.5, 0.2, 0.2, 0.1, 0)
\]

8. Using the random variables from the car repair shop example above, draw (or describe) tables showing the elements of the following joint probability distributions (of course you can’t fill in the values):

(a) \(P(\text{Problem}, \text{Type})\)

(b) \(P(\text{Problem}, \text{Type}, \text{Rattling})\)

(c) \(P(\text{Problem}, \text{Type}, \text{Rattling}, \text{Squeaky})\)