**decision tree**

A tree diagram with *probabilities* and *conditional probabilities* on its edges. See figure DCT. The leaf nodes usually contain conclusions. In the figure, they list joint probabilities.

![Decision Tree Diagram](image)

**Figure DCT:** decision tree

The figure shows a decision tree with two variables and hence two levels. The first level, originating from the root node to the left, determines whether or not the *event* \( A \) occurs. When the event occurs, the \( P(A) \) branch is followed, else the \( P(\bar{A}) \) branch (\( \rightarrow \) complement) is taken. At the next level \( A \) versus \( \bar{A} \) is already known, so it lists the probabilities of \( P(B|A) \) ("B given A") and \( P(B|\bar{A}) \) in the upper branch and \( P(\bar{B}|A) \) and \( P(\bar{B}|\bar{A}) \) in the lower one.

At each vertex, the probability of all branches sums up to \( p = 1 \). For instance, \( P(A) + P(\bar{A}) = 1 \) and \( P(B|A) + P(\bar{B}|A) = 1 \). The joint probabilities (like \( P(A \cap B) \)) are computed by multiplying the probabilities that lead to their respective leaf vertexes (e.g. \( P(A \cap B) = P(A) \cdot P(B|A) \)).

Decision trees are useful for visualizing conditional probability and *reverse conditional probability*. 