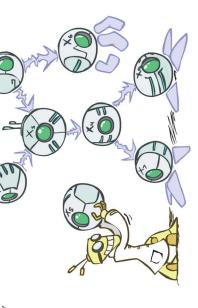# Bayes' Net Semantics

- A directed, acyclic graph, one node per random variable

- A conditional probability table (CPT) for each node

  - A collection of distributions over X, one for each combination of parents' values

  $$P(X|a_1 \ldots a_n)$$

- Bayes' nets implicitly encode joint distributions

  - As a product of local conditional distributions

  - To see what probability a BN gives to a full assignment, multiply all the relevant conditionals together:

$$P(x_1, x_2, \ldots x_n) = \prod_{i=1}^{n} P(x_i | parents(X_i))$$