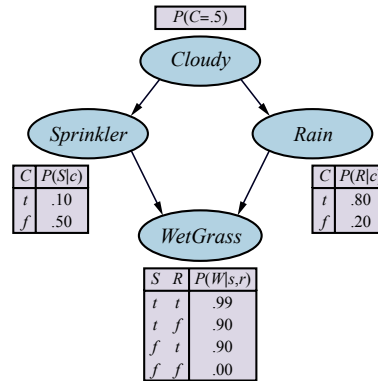


# Bayesian Networks Review

## Artificial Intelligence



- Given the following Bayes' net:

What is the probability that the grass is wet, the sprinkler didn't run, it rained recently, and it is cloudy?

**Solution:**

$$Pr(x_1, \dots, x_n) = \prod_{i=1}^n Pr(x_i | \text{parents}(X_i)) \quad (13.2)$$

$$\begin{aligned}
 Pr(w, \neg s, r, c) &= Pr(w | \neg s, r) Pr(\neg s | c) Pr(r | c) Pr(c) \\
 &= (0.90)(0.90)(0.80)(0.5) \\
 &= (0.81)(0.45) \\
 &= 0.324
 \end{aligned}$$

- Elsa is unlikely to chew up slippers,  $P(\text{ElsaChews}) = 0.1$ , Anna is more likely,  $P(\text{AnnaChews}) = 0.3$ . If the slippers are chewed, whether she or her sister did it, Elsa is likely to go into her crate and look concerned,  $P(\text{ElsaConcerned} | \text{SlippersChewed}) = 0.8$ . If you were constructing a Bayesian network, in which topological order would you include the variables *ElsaConcerned*, *SlippersChewed*, *ElsaChews*, *AnnaChews*?



**Solution:**

*ElsaChews, AnnaChews, SlippersChewed, ElsaConcerned*

You could reverse the order of *ElsaChews* and *AnnaChews*.