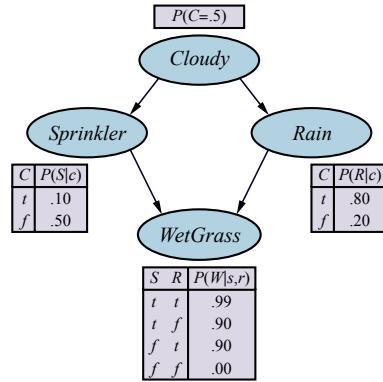


# Bayesian Networks Review

## 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:**

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

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

- Elsa is unlikely to chew up slippers,  $P(ElsaChews) = 0.1$ , Anna is more likely,  $P(AnnaChews) = 0.3$ . If the slippers are chewed, whether she or her sister did it, Elsa is likely to go into her crate and look concerned,  $P(ElsaConcerned | SlippersChewed) = 0.8$ . 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  $AnnaChews$ .