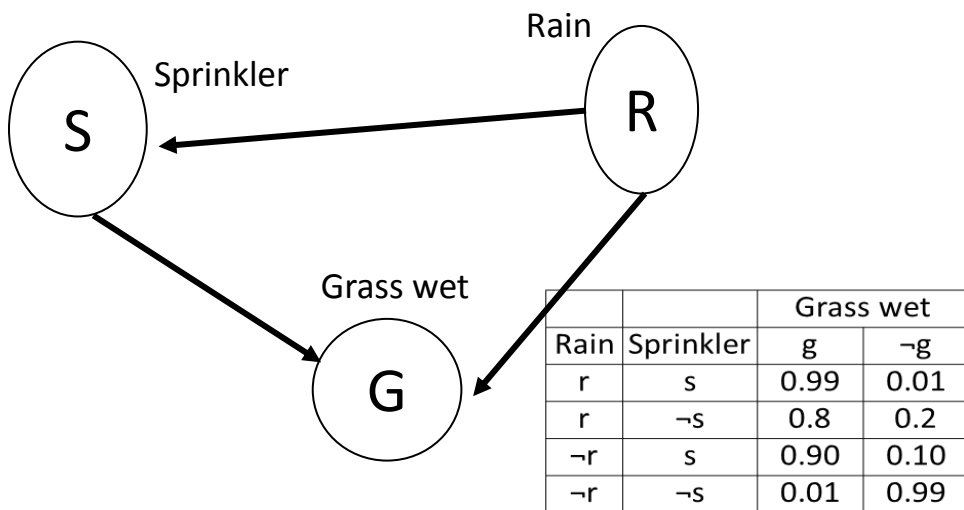


Quiz 7. Bayesian Belief Networks

	Sprinkler	
Rain	s	¬s
r	0.40	0.60
¬r	0.99	0.01

Rain	
r	¬r
0.20	0.80



Write the expression for joint probability of rain given an observation: grass is not wet. Expand summations. Do not compute actual values.

$$P(r | \neg g) = \alpha P(r, \neg g, S_{\text{true or false}})$$

Joint probability

$$P(r, \neg g, S_{\text{true or false}}) = P(r) * P(\neg g | r, S_{\text{true or false}}) * P(S_{\text{true or false}} | r) =$$

$$= P(r) * P(\neg g | r, s) * P(s | r) + P(r) * P(\neg g | r, \neg s) * P(\neg s | r) =$$

$$= 0.20 * (0.01 * 0.40 + 0.2 * 0.60) = 2.48\%$$