

ECS 170 Homework 3

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1. Consider the figure

(a) Which of the following (if any) are asserted by the network structure?

i. $P(B, I, M) = P(B)P(I)P(M)$

This is not asserted because B, I, M are not independent.

ii. $P(J|G) = P(J|G, I)$

This is asserted because J is conditionally independent of I given G .

iii. $P(M|G, B, I) = P(M|G, B, I, J)$

This is asserted because J is conditionally independent of M given G .

(b) Calculate the value of $P(b, i, m, \neg g, j)$.

$$\begin{aligned} P(b, i, m, \neg g, j) &= P(b)P(i|b, m)P(m)P(\neg g|b, i, m)P(j|\neg g) \\ &= (0.9)(0.9)(0.1)(0.9)(0.0) \\ &= 0.0 \end{aligned}$$

2. Consider the figure.

(a) Give one example of conditional independence and another of unconditional independence.

JohnCalls is conditionally independent of **Burglary** given **Alarm**.

Burglary is unconditionally independent of **Earthquake**.