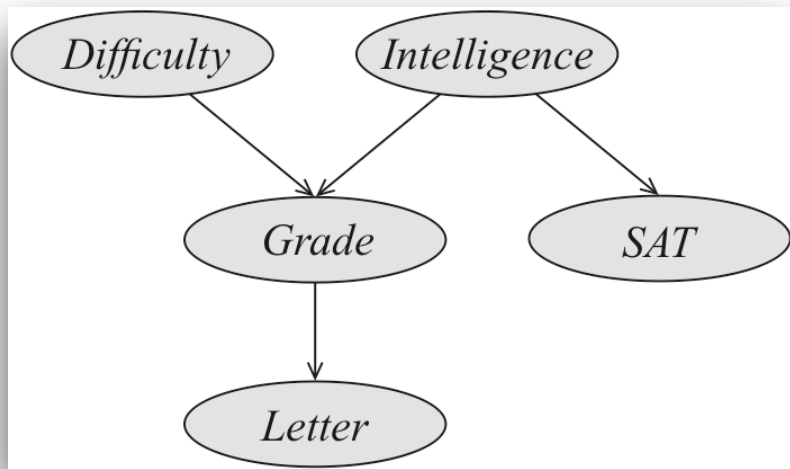




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DGM INDEPENDENCE APPLIED MARGINAL

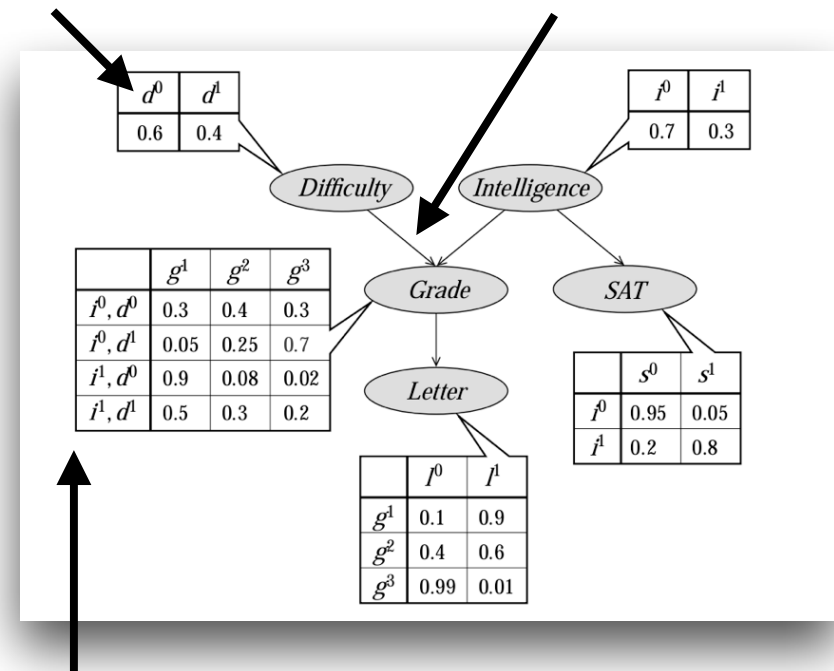
DGM - GRAPH AND CPDS VS JOINT



$P(D, I, G, S, L)$

d has value 0

DAG



	g^1	g^2	g^3
i^0, d^0	0.3	0.4	0.3
i^0, d^1	0.05	0.25	0.7
i^1, d^0	0.9	0.08	0.02
i^1, d^1	0.5	0.3	0.2

	l^0	l^1
g^1	0.1	0.9
g^2	0.4	0.6
g^3	0.99	0.01

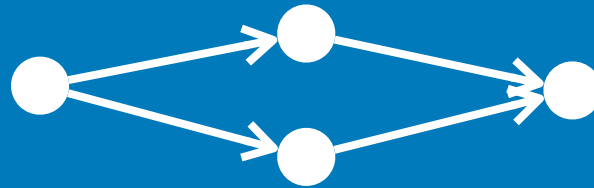
	s^0	s^1
i^0	0.95	0.05
i^1	0.2	0.8

	d^0	d^1
	0.6	0.4

	i^0	i^1
	0.7	0.3

WHEN ARE X AND Y
CONDITIONALLY INDEPENDENT?

$$p(x_1, \dots, x_N) = \prod_{n=1}^N p(x_n | \mathbf{x}_{\text{pa}(x_n)})$$



AN HMM CAN BE SEEN AS A DGM

$$\begin{array}{ccccccc} Z_1 & \rightarrow & Z_2 & \rightarrow & Z_3 & \rightarrow & \cdots \rightarrow Z_T \rightarrow Z_{T+1} \\ \downarrow & & \downarrow & & \downarrow & & \downarrow \\ x_1 & & x_2 & & x_3 & & x_T \end{array}$$

- Z_i hidden
- X_i observable
- Hidden often not observable when training, never when applying