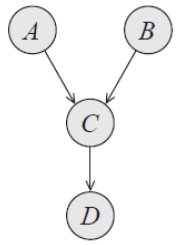
Chapter 19: Partially Observed Data

H.W

For the BN:



With the posterior parameter:

$$
\begin{aligned}
\theta_{a^1} &= 0.3 \\
\theta_{b^1} &= 0.9 \\
\theta_{c^1|a^0,b^0} &= 0.83 \\
\theta_{c^1|a^0,b^1} &= 0.09 \\
\theta_{c^1|a^1,b^0} &= 0.6 \\
\theta_{c^1|a^1,b^1} &= 0.2 \\
\theta_{d^1|c^0} &= 0.1 \\
\theta_{d^1|c^1} &= 0.8.
\end{aligned}
$$

For the observations: $o' = \langle a^0, ?, ?, d^1 \rangle$, $o = \langle a^1, ?, ?, d^0 \rangle$.

1. Calculate the gradient of maximum likelihood by the parameter $\theta_{c^1|a^0,b^1}$ using Gradient Ascent (do one calculation).
2. Do one update for the parameter $\theta_{c^1|a^0,b^1}$ using EM algorithm.