Credit to Thomas Nielsen & Manfred Jaeger for
the slides   in "junction tree propagation .... 4-4.6," which
I will use today for a review.   I was asked not to
distribute them, so   I will not post them   on the web site

4.5 Exploiting the Information Scenario with
     Lazy Propagation (in Junction Trees)
Lazy propagation (i.e., delaying multiplications of
potentials as much as possible) was invented to make
the junction tree algorithm competitive with (variations
of) variable elimination that take advantage of
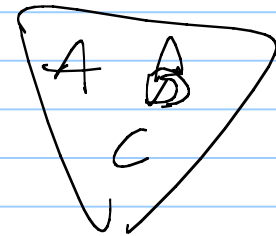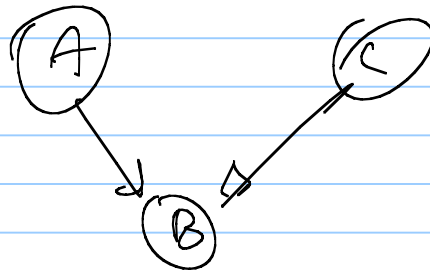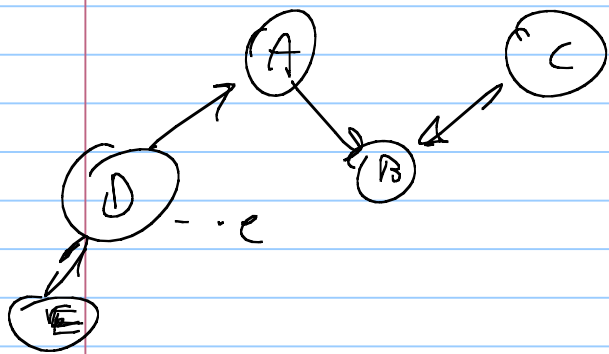independencies (unconditional or induced by the evidence).

Ex 1: Barren nodes

A node is barren if neither it nor its descendants have evidence.

Observation - If you are interested in computing $P(A|e)$, you may remove all barren nodes that are not ancestors of A.

Ex 2: Remove nodes that are d-seperated from the node(s) of which you want to compute the posterior marginal(s).

Observation If you are interested in $P(A|e)$, you may remove all nodes there are d-seperated from A by e.

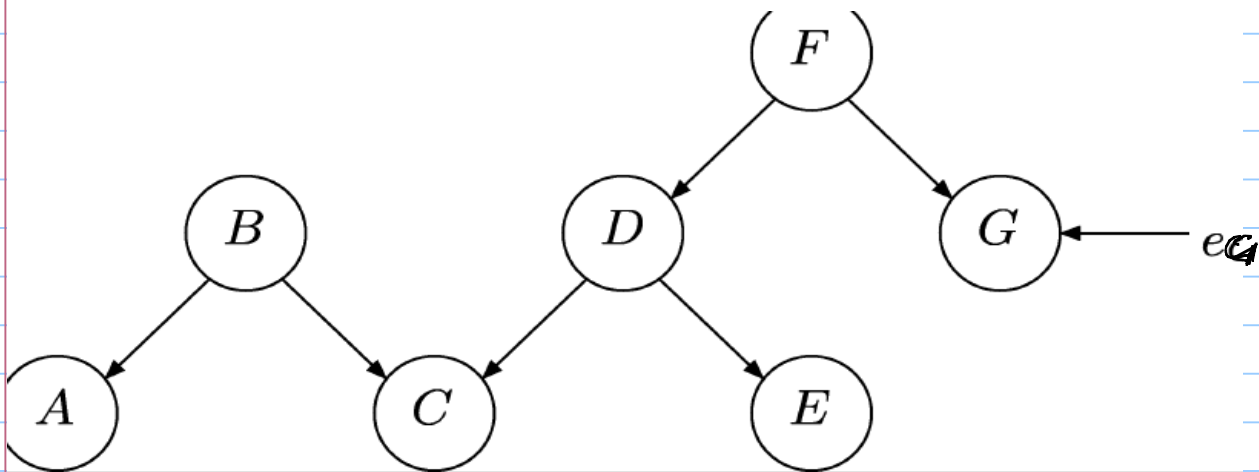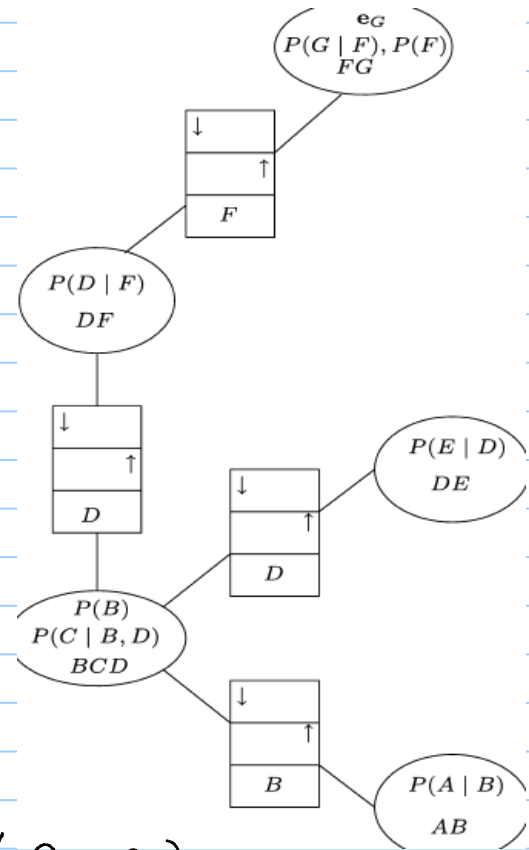The original junction tree algorithms did not perform these optimizations — explicit preprocessing needed to be done.

e_G

e_A

Fig. 4.22 [J07]

$$P(B) = \begin{pmatrix} P(A|B) = & A\backslash B & b_1 & b_2 \\ & a_1 & & \\ & a_2 & P_1 & P_2 \end{pmatrix} \cdot \begin{pmatrix} 0 \\ 1 \end{pmatrix} = (P_1, P_2)$$

$P(A|B) \cdot e_A$

evidence

On the right (junction tree):

$P(G \mid F), P(F)$ — FG — e_G

F

$P(D \mid F)$ — DF

D

$P(E \mid D)$ — DE

D

$P(B)$ $P(C \mid B, D)$ — BCD

B

$P(A \mid B)$ — AB