Bayesian Networks Winter 2010/2011
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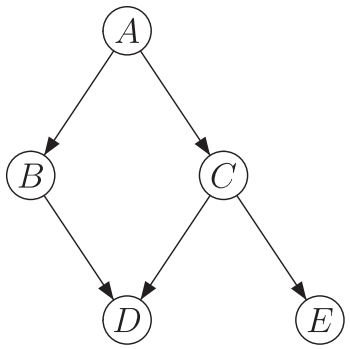
Exercise Sheet 8

Exercise 25 Clique Tree Propagation

Recall the example network from the lecture:



$$P(e_1 \mid c_1) = 0.8 \qquad P(e_1 \mid c_2) = 0.6$$
$$P(d_1 \mid b_1, c_1) = 0.8 \qquad P(d_1 \mid b_1, c_2) = 0.8$$
$$P(d_1 \mid b_2, c_1) = 0.8 \qquad P(d_1 \mid b_2, c_2) = 0.05$$
$$P(b_1 \mid a_1) = 0.8 \qquad P(b_1 \mid a_2) = 0.2$$
$$P(c_1 \mid a_1) = 0.2 \qquad P(c_1 \mid a_2) = 0.05$$
$$P(a_1) = 0.2$$

a) Determine the a-priori distribution for all five variables!

b) It becomes evident that the patient has severe headache ($E = e_1$). Propagate this evidence across the network with the clique tree propagation algorithm presented in the lecture, i.e., compute all five a-posteriori distributions!

c) In addition to b), we now learn that the patient has no increased serum calcium ($B = b_2$). Again, propagate this additional evidence!

You may use the HUGIN tool to check your calculations, before using them to address the next assignment.