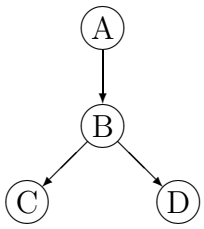
Bayesian Networks Winter 2012/2013
Prof. Dr. R. Kruse / Pascal Held

Exercise Sheet 7

Exercise 22 Probabilistic Propagation

Consider the following Bayesian network and the corresponding (conditional) probability distributions:



$P(A)$	a_1	a_2
	0.4	0.6

$P(B\|A)$	a_1	a_2
b_1	0.1	0.6
b_2	0.9	0.4

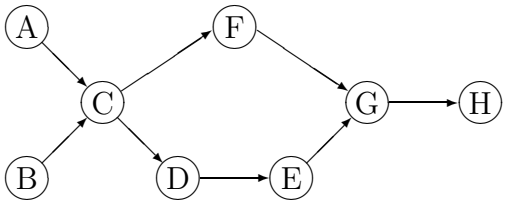
$P(C\|B)$	b_1	b_2
c_1	0.4	0.8
c_2	0.6	0.2

$P(D\|B)$	b_1	b_2
d_1	0.7	0.2
d_2	0.3	0.8

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

b) It becomes evident that variable C assumes value c_2. Propagate this evidence across the network with the tree-based propagation algorithm presented in the lecture, i.e., compute all four a-posteriori distributions!

Exercise 23 Construction of Clique Trees



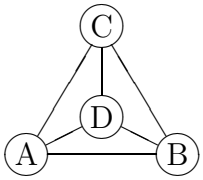
Construct stepwise for the depicted Bayesian network

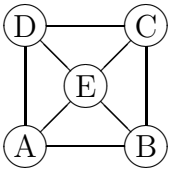
a) the moral graph,
b) a triangulated moral graph, and
c) a cliquen tree/join tree!

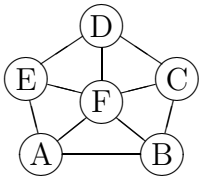
At which steps of the construction do you have multiple options to proceed?

Exercise 24 Triangulation and Joint Tree Construction

Given the following three undirected graphs:







a) Check which graphs are triangulated! Try to recognize this without applying the triangulation algorithm from the lecture.

b) Triangulate the graphs that are not yet triangulated and determine for each of them a join tree!