Tutorial 9

Solutions should be given till 7th January 2008, 16:00

Exercise 1   Construction of cluster trees (25 points)

   a) [5 pts.] What is a cluster tree?
   b) [5 pts.] Construct a clique cluster tree for the Markov network in Figure 1, please.
      (If necessary, you may add some new edges to the graph.)
   c) [5 pts.] In which case is it necessary, to add new edges to the graph, before constructing
      the cluster tree?
   d) [5 pts.] Construct an equivalent Markov network for the Bayesian network in Figure 2.
   e) [5 pts.] Construct a clique cluster tree for the Markov network constructed in step (c),
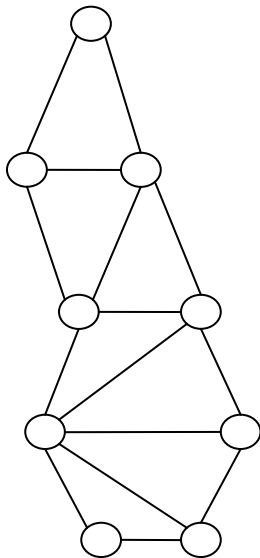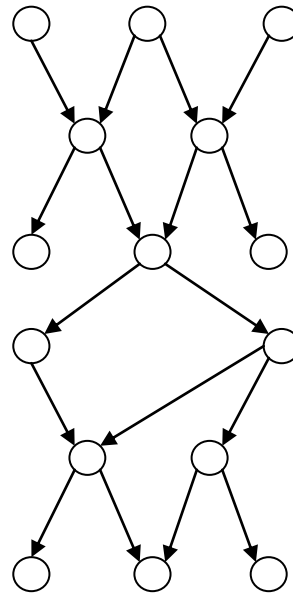   please.

Figure 1.

Figure 2.

Exercise 2   Triangulation (10 pts + 10 bonus pts)

   a) [5 pts.] What is the difference between minimal and minimum triangulation?
   b) [5 pts.] Show a graph, where the MCS-algorithm does not find the optimal triangulation!
   c) [bonus 5 pts.] Is the optimal triangulation unique? (Are there any graph, which has several
      optimal triangulations?)
   d) [bonus 5 pts.] Is there any efficient algorithm, which finds the optimal triangulation?