Tik-79.230 **Kevät 1999**
Agenttipohjaisen tietojenkäsittelyn perusteet
Laskuharjoitus 2
Tehtävät

1. (15.2) In your local nuclear power station, there is an alarm that senses when a temperature gauge exceeds a given treshold. The gauge measures the core temperature. Consider the boolean variables A (alarm sounds), F_A (alarm is faulty), F_G (gauge is faulty) and the multivalued nodes G (gauge reading) and T (actual core temperature).

   a) Draw a belief net for this domain, given that the gauge is more likely to fail when the core temperature gets too high.

   b) Is your network a polytree?

   c) Suppose that there are just two possible actual and measured temperatures, Normal and High, and that the gauge reports the correct temperature 95% of the time when it is working, but only 40% of time when it is faulty. Additionally, the alarm works correctly when it is not faulty, and it never goes off when it is faulty. The alarm has 0.01 prior probability of failing and the temperature gauge has 0.01 prior probability of failing when temperature is normal, and 0.05 probability of failing when temerature is high. The core temperature has 0.001 prior probability of raising to dangerous level. Calculate the probability tables. probability tables of the network which you can.

   d) If your network is not a polytree, transform it to one using clustering method.

   e) Suppose that the core temperature rises too high. What is the probability that the alarm sounds.

   f) Suppose that the alarm and gauge are working and the alarm sounds. Calculate the probability that the core temperature is too high.

   h) Suppose we add a second temperature gauge H connected so that the alarm goes off when either gauge reads high. Where do H and F_H (the event of F_H failing) go in the network.