Chapter 9 Exercises

Exercise 1: Suppose a node A in a BN was intended to represent the number of patients arriving at a hospital in a one hour period. How would you define the set of states of this node:
a) using static discretisation
b) using dynamic discretisation
What kind of function might it be reasonable to use for the NPT of this node?

Exercise 2: In AgenaRisk create a new simulation node, and define its NPT as a Normal distribution with mean 30 and variance 100. Using the Model properties icon, set the "Maximum number of iterations" to 10, and run the model displaying the graph. What is the mean, medium, and variance of the distribution? Answer the same questions with the number of iterations set to 20, 30, 50, 100, 200 respectively. What can you conclude from this experiment?

Exercise 3: Using dynamic discretisaton (i.e. simulation nodes) construct the BN of Figure 1.13.

Exercise 4: You have just observed seven rolls of a die. Each one was a 3. Build relevant BN models that enable you to answer what are the chances of 1 2 4 5 6 being rolled next from the following perspectives:
a) Someone who is adamant that the seven 3's do not change the 'fact' that $P(k)=1/6$ for each number
b) Someone who bases their prediction only on the evidence observed.
c) Someone who takes account of the evidence observed, but who believes most dice are essentially 'fair' but there could be biases due to either imperfections or deliberate tampering.
How would a classical statistician answer this?

Exercise 5: A wedding car company has four Rolls Royce cars available to hire by the day. The number of Rolls Royce cars ordered per day is a Poisson distribution with mean 2. By constructing an appropriate BN model calculate the probability that on a particular day:
a) the company will receive no Rolls Royce orders.
b) the company will have to turn down some orders for a Rolls Royce.