

## Bayesian Models CSE458 Exercise 4

### NOTE:

- For this assignment you will be required to construct various networks in Netica.
- You are required to save the all the networks you construct, put them in a directory called **CSE458-Ex4-loginId** then tar and zip this directory and email it to me.

### Oil Drilling Problem

Consider again the oil drilling problem stated in Exercise Sheet 2.

1. Construct a decision network in Netica which models the oil drilling problem.
2. Suppose now that the price of oil changes so that the expected payoffs are:

State	Drill	Don't Drill
Dry	\$0	\$0
Wet	\$1,200,000	\$0
Soaking	\$7,000,000	\$0

Table 1

and the wildcatter uses the utility function from Exercise Sheet 2:

$$u(x) = 1 - e^{-x/2,000,000}.$$

What decision should the wildcatter now make?

### Urn Problem

Consider the urn problem given in Lectures and in H. Raiffa, *Decision Analysis: Introductory Lectures on Choices under Uncertainty*, Addison-Wesley, 1968.

1. Construct a decision network in Netica which models the urn problem, and the experiments  $e_0$  (no sample),  $e_1$  (sample one ball),  $e_2$  (sample two balls), and  $e_s$  (sequential samples).
2. Now, suppose for any experiment you can get Charlie to draw a balls on your behalf for one quarter the cost. However, Charlie only correctly states it is a **Red Ball 80%** of the time, and correctly states it is a **Black Ball 70%** of the time. What decision should you now make?