Tutorial 3 Outline

Some Theoretical and Conditional Probability Problems

Sept. 28, 29, 30

Chapter 2: Some more Theoretical Exercises

TE 19

An urn contains n red and m blue balls. They are withdrawn one at a time until a total of r, $r \leq n$, red balls have been withdrawn. Find the probability that a total of k balls are withdrawn.

Another additional hint should you require it: Have a look inside the front cover at the Discrete Distributions...

TE 20

Consider an experiment whose sample space consists of a *countably infinite* number of points. Show that not all points can be equally likely. Can all points have a positive probability occurring?

Countably infinite, or just "countable", sets refers to sets that can be put in a 1 *to* 1 *correspondence with* $\mathbb{N}$.
$\mathbb{Q}$*, for example, is obviously not finite – but IS countable.*
$\mathbb{R}$*, however, is NOT countable.*
Conceptually, even if counting off the whole set would take forever, you can count to any particular element in a FINITE amount of time. This question is a taste of "Real Analysis".

Chapter 3: Conditional Probabilities & Independence

Example 2f

This is an extension of chapter 2's famous "Matching Problem" – *N men throw their hats into middle, then randomly grab one. What's the probability that NONE get their own hat back?* We will run through this QUICKLY.

Thus, we want to generalize – What's the probability that exactly k of the N men get their hat.

Example 3c

Should you study for a multiple choice test?

Example 3e

Using conditional probability to help make good decisions.

TE 2

Let $A \subset B$, show simplest form for:

$$P(A|B),\ P(A|B^C),\ P(B|A),\ P(B|A^C)$$

TE 3

Comparing 2 strategies.