BUS 232 Discrete/Continuous Random variables

Terminology

Bayes Rule

P(A|B) = (P(A and B)) / P(B)
`Substitute what P(A and B) is equal to`
P(A|B) = (P(A)P(B|A)) / P(B)
`Determine what P(B) is equal to`
We can split the probability into disjoint spaces and add those to get B.
P(A|B) = (P(A)P(B|A)) / (P(C)P(B|C) + P(D)P(B|D) + ...)

Discrete random variables

- has possible values that can be given in an ordered list
- It has either a finite number of possible values or a countably infinite number of values
- The probabilities of each possible value must add up to 1

To find the mean of X (the expected value of X), multiply each possible value by its probability then add all the products.

sigma will give you the standard deviation.

So should you play a ton of gambling games or play one big game?
It is better to go big or go home baby!
Because many games will average out to losing money.
One game could have a chance of losing a lot or winning a lot.

If mu (mean) higher then standard deviation theta will be smaller

Continuous random variables

- Takes all values in an **interval** because a point (line) has an area of 0
- There are infinitely many values between 0 and 1
- The probability distribution of X is described by a density curve
- These have means, variances and std. deciations (we use calculus)
- We can use the z-table for getting the areas
- It doesn't matter if we put <= or just <

Uniform distribution - another Continuous RV

Generating random numbers (0, 1). So each point has an equal chance of being generated.
(b-a)h = 1 => h = 1/(b-a)
so,
P(c < x < d) = (d-c)/(b-a)

Several random variables

$$Z = aX + bY$$
$$Mz = aMx + bMy$$