STATS 412

Second Class Note

In Son Zeng

10 September, 2018

My Office Hour:

I will keep this statement every time. My office hours are on **16:30 - 18:00 Tuesday** and **13:30 - 15:00 Friday**, at **USB 2165**. You may check the campus map to get to my office.

Key points during lecture:

• **Interpretation of Probability:** You encountered this statement during the class. You are told that the probability that the weight of a randomly selected item from a manufacturing process is greater than 10 grams is 0.75. How do you interpret that statement?

Based on the definition of probability, one of the possible interpretation of this statement is that if we repeat the experiment infinitely many times, 75 percent of the items from a manufacturing process will be greater than 10 grams.

• **Probability for Equally Likely Outcomes:** In this case we can always enumerate all the possible outcomes, even if this process can be long. It is always true that under this assumption, given a sample space S and event E, the probability $P(E)$ is calculated as:

$$P(E) = \frac{\#outcomes\ in\ event\ E}{\#all\ possible\ outbomes\ in\ S}$$

• **De Morgan's Law:** I assume many of you have some background in Computer Science or Engineering. De Morgan's Law is applicable in boolean algebra and computer engineering fields. Given sets X and Y, the rules are as follows:

$$(X \cup Y)^c = X^c \cap Y^c$$
$$(X \cap Y)^c = X^c \cup Y^c$$

To interpret by words, we have:
• The complement of the union of given two sets is equivalent to the intersection of the complements of the two sets.
• The complement of the intersection of given two sets is equivalent to the union of the complements of the two sets.
• If you are interested in learning the De Morgan's Law by examples, it is great to consult http://www.probabilityformula.org/de-morgan-s-law-examples.html.

Last Comment:

Please inform me to fix the typos and grammatical mistakes if they exist. It is a great practice of writing and I appreciate your help!