Learning Log Part 1: Mathematical Logic Notes

$P \wedge (q \vee r)$

Logic is fun and then logic is both either interesting or boring

$(p \wedge q) \vee r$

Logic is both fun and interesting, then logic is either boring

$[(A \to B) \land B] \to Q$

A	B	$A \to B$	$(A \to B) \land B$	$[(A \to B) \land B] \to 1$
0	0	1	0	1
0	1	1	1	1
1	0	0	0	1
1	1	1	1	1

$[(P \to Q) \land P] \to Q$

P	Q	$P \to Q$	$(P \to Q) \land P$	$[(P \to Q) \land P] \to 0$
1	1	1	1	1
1	0	0	0	1
0	1	1	0	1
0	0	1	0	1

$P \land Q = Q \land P$

P	Q	$P \land Q$	$Q \land P$
1	1	1	1
1	0	0	0
6	1	6	0
0	0	0	0

Note: Logic is the study of reason

Proposition - Is a declarative statement that is either true or false, and not both.

Declarative - these are statements that assert a fact or an opinion and can be objectively determined to be either True or false.

Interrogative - these are questions, they do not assert a fact or opinion and therefore cannot be assigned a Truth value

Imperative - these are requests or commands.

Exclamatory - these express strong emotion or surprise.

Ex.

$p \wedge (q \vee r)$

- Logic is fun and either interesting or boring

$(p \wedge q) \vee r$

- Either logic is both fun and interesting, or it is boring

For propositions $p, q,$ and r we have $2^n = 2^3 = 8$

$$n = 3$$

p	q	r
1	1	1
1	1	0
1	0	1
1	0	0
0	1	1
0	1	0
0	0	1
0	0	0

Notes:
Mathematical logic

Proposition: It's a statement that is either true or false.
of course it can't be both.

Ex. "The dog barks" - Can be true or false
None Ex. "Close the door" - A command or statement

Truth values: Every proposition has a truth value - True (1) False (o)
Truth tables: These show all possible True/False combinations for proposition

Ex.
If you have "n" propositions, there are 2^n rows in the table

If p and q, the $2^2 = 4$ rows

LOGICAL CONNECTIVES:
Conjunction ($\wedge$) AND - True only if both parts are true
Ex. "It is sunny $\wedge$ it is warm"

Implication ($\rightarrow$) IF. then
$p \rightarrow q$ is false only if p is true and q is false
Ex.
If you study hard, then you pass" if you study hard (True)
but don't pass (false), the statement is false
Vacuosly true: If the "if" (p) is false, the whole "if. then"
statement is automatically true

Types of Propositions:
Tautology: Always true
"it is raining or it is not raining"

Notes:

Contradiction: Can be true or false (not always one or the other)
Ex. "It is raining"
Contingency: Sometimes true, sometimes false not a tautology not contradiction
Logical Equivalence ($\equiv$): When two propositions have the same
truth tables results, they are equivalent
Ex. $p \wedge q = q \wedge p$ (order doesn't matter for "and"

Arguments and validity:
· An argument is valid if the conclusion must be true when all
the premises are true
· To check validity, if "Premise 1 and Premise 2" = then conclusion
is a tautology, then it's valid

Valid argument
- The conclusion logically follows from the premises.
- Uses Truth tables or rules like hypothetical syllogism, Modus ponens

Sound argument:
- The argument is valid, and all premises are true in reality

Ex.
"if there is peace (p), then there is progress (q).
there is peace (p),
Therefore, there is progress (q)
propositional form.
$$(p \to q) \ p \vdash q \ = q \quad \text{valid form}$$
Ex.
If the country is the philippines then it is in asia $(a \to b)$
If the country is in Asia, then it is densely populated $(b \to c)$
If the country is the Philippines, then it is densely populated $(a \to c)$
$$(a \to b) \wedge (b \to c) = (a \to c)$$

Learning Log Part 2: Mathematical investigation/ Statistics and Data analysis

Mathematical Investigation

- From my understanding, mathematical investigation isn't just about solving a problem, but about exploring a mathematical situation. Its a process of discovering patterns, formulating conjectures, generating questions, testing them and then trying to prove or disprove them.

Process of investigating
- Understanding the problem   • Pattern recognition
- Experimenting and exploration   • Formulating conjectures
- Justification   • Testing conjectures

Statistics and data analysis

- It is a collection of science, organization, presentation, analysis, and interpreting data.

Scales of measurement:

"Nominal"
Purpose - Its about naming or categorizing data
Properties - Data can be put into distinct categories, but there no inherent order or numerical meaning. You cant perform mathematical operations
Ex.
Eye color, gender, types of cars, Number on Jersey

"Ordinal"
Purpose - this scale orders or ranks data
Properties - It has all the characteristics of a nominal state, but the categories have meaningful order.

Ordinal

Ex.   Satisfaction scale, finishing order in a race 1st 2nd 3rd

Interval "
- Purpose - This scale measures data where the difference between data points is meaningful and consistent
- Properties - It includes all the properties of nominal and ordinal scales. the key is that the intervals between measurement are equal and quantifiable. You can add and subtract values. However - it lacks a "true zero" point, Meaning zero doesnt indicate the complete absence of the quantity being measured. that means you cant meaningfully multiply or divide values to form ratios.

Ex.
      Temperature (Celsius or fahrenheit), IQ scores

"Ratio"
- Purpose - This is the highest level of measurement, providing the most information. It allows for meaningful ratios and comparison.
- Properties - It possesses all the characteristics of nominal, ordinal, and interval scales, Plus it has a true zero point. Because of the true zero, you can meaningfully perform all mathematics operations and form ratios.

Ex. Height, weight, age, income, distance

Hypotesis testing
- A method of using data to test an assumption about a population

Learning Log Part 3: GE LEAPS - The Director's chair

GE Leaps Director chair : Aliar, Mae Cruz Ozparing.

Main focus:
- She was focused on the topic of workplace communication and dedication
- the problem came when an issue that cause misunderstanding in teams like the one she said when she accidentaly ear dropped her boss while sort of trashtalking her

Story
- she always wanted to be a director way back when she was a kid reading comics and watching films.
- She even studied in Philipines Diliman and agustin makati
- She started at the lowest job and aimed to be a director
- gained a lot of knowledge from a lot of experienced Directors like
  - Lauríce Guillen
  - Marilon Diaz
  - Rowell santiago
  - Rory Anintos

- By those Directors, she become even more dedicated and more motivated
- She even become more motivated when her father said to her that "You cant put a price tag or experience"
- since at that time, she was getting a job offer from star films and she was doubting herself since she was quite high position on her current job, and asked the knowledge of her father

End of story:
- she finally become a director herself after all the hardwork
- but not all endings are good, since she reached her goal she still seek the guidance of other directors
- and after 40 years she finally got married but unfortunately she cannot have a child, so she adopted a child and live happily ever after.

Learning Log Part 3: GE LEAPS – Election of the youth

GE Leaps "Election and the youth"
by: Ms. Ria Pevilla Simpson, PPC RV

It really opened my eyes to the complexities of elections beyond just casting a vote

· It was disheartening to learn that issues like voting buying and selling and unsolved complaints are recurring problems. What stood out even more was the statistic that 54% of filipinos apparently rather choose candidates based on personality rather than addressing these underlying issues. This made me reflect on how challenging it is truly promote informed choices.

The speaker also touched on ideal Filipino traits, but the speaker emphasized the need for a "north star" a guiding goal to keep working towards. Grit, or never giving up was also highlighted as a vital quality. The book "7 Habits of highly effective people" was recommended.

· Engr. James Luongs part on the importance of discernment was particularly relevant, especially with the discussion on misinformation and malinformation (MDM). I learned that misinformation is false info believed to be true, disinformation is false info known to be false, and malinformation is true info used to cause harm. The session underscored how social media amplifies these.

The dangers of MDM in elections are severe, ranging from voter suppression to black propaganda. To protect ourselves, the key takeaways were to "go back to the basics" be discerning and always fact check using criteria like Relevance, Currency, Accuracy, Purpose.

- being concise and ensuring the audience understands.

Evaluation thoughts: the session concluded by reminding us that perfection isn't the goal instead we should record ourselves to identify areas for growth. A powerful closing thought was "Trust yourself".

Learning Log Part 3: GE LEAPS – Speaking with confidence no matter the audience

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GE Leaps "speaking with confidence
No matter the audience"
by: Danielle Marie "Dani" De Castro

- This session immediately grabbed my attention by acknowledging how common public speaking anxiety is apparently, around 75% of people feel nervous. Dani De Castro, drawing from her 32 years of experience, really emphasized that while its common, its also a skill we can train ourselves in highlighting its importance for life.

• A tip she said was to aviod coffe before speaking. 3 pronged appe
  - Preparation
  - Performance
  - Evaluation

Preparation insights- Its not just about knowing your material but also practicing by talking to yourself. The idea of "neurostimjlation" activites was completely new to me, like brushing your teeth with your non-dominant hand or saying "I love you" to yourself in the mirron. These apperently help build confidence and activate the brain. Another quick tip was clicking your fingernails to divert nervousness.

Performance pointers. Maintaining composure is key, with deep breaths and staying hydrated being fundimental. Dani also stressed the importance of effective notes not full scripts, but easy to read poits like topics, purpose, and conclusions. For eye contact, I liked the advice to imagine the audience as a friend or look at foreheads if really shy, and to use bullet points for notes, only glancing at them. Pacing was also discussed.

Learning Log Part 4: LinkedIn Courses

LinkedIn Courses
Statistics Foundations 1: The basics

Statistical terms

- Mean   • Range
- Median   • Standard deviation
- Mode   —

Mean - Commonly refered to as the average of the dataset. To find the mean, first count up the total number of data points. Add all the data points, sum of the data points. Divide the sum of the data points by the number of data points.

Median - It is the middle data point in a data set where the numbers are listed from smallest to largerst. Organize the data points the middle data point in this arrangement is the median.

Mode - Is the data point that is most common in the dataset

Range - is the difference between the biggest and smallest numbers in thee dataset.

Standard deviation - It is a measure of how far the data points are from each other. calculating standard deviation is a bit more complicated, but most statistical tools can help you calculate standard deviation.

Examples:
Imagine you are given nine test scores:
40, 50, 60, 70, 70, 70, 80, 90, 100

Mean = $(10 + 50 + 60 + 70 + 70 + 70 + 80 + 90 + 100)/9 = \underline{70}$

Median = 70
- smallest to largest the middle point is 70

the mode there is 70 since it is the most popular number

The range is, the biggest point is 100 and smallest is 40
so $100 - 40 = \underline{60}$

Standard deviation nine datapoints is 18.7 so basically how far apart is every number
Ex:
65, 66, 67 = 1
20, 50, 90 = 35.1

NORMALLY distributed Datasets

- Datasets often take the shape of the famous bell curve, often called the normal curve.
- Lots of data points near the center, the top of the bell
- Small number of the data points at the right and left ends of the bell.
- When datasets look like a bell curve, we say that the data is normally distributed.

Emperical Rule :
69% of all the data points would be within one standard deviation of the mean.

95% of all the data points would be within two standard deviation of the mean

99.7% of all the data points would be within 3 standard deviation of the mean

Outliers

- Data points more than three standard deviations of the mean are sometimes referred to as outliers.

"Introduction to data and charts"

• Data Generation : Data generated constantly through various activities like buying products, searching online, voting, or watching shows.

• Visualization : Charts, graphs and tables are essential tools that make data meaningful and help tell a story

• Empowerment : Understanding data through these visual tools can educate and empower us, driving curiosity and better data collection in the future.

"Data and charts"

• Data visualization tools : Various tools like tablets, dot plots, histograms, and pie charts can be used.

• Simplifying Data : Visual representations such as bar charts and histograms make it easier to understand and interpret data compared to raw numbers.

• Interpreting charts: When looking at charts or tables, its important to read them like a story and think about what the data means to you, rather than looking for a single "right" answer.

"The middle of your data set"

• Central Tendency tools: Mean (average), median (middle value) mode (most common value)