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 DeepL translated

Is logic formal, mathematical or linguistic?

a)

Foreword:

The considerations outlined here were a by-product of our language developments at our Prague Institute in 2016.

Their peculiarity is that they have not adopted any preconceived ideas, judgments or even formulations (as is customary in the field of formal logic), but have developed all their findings themselves in heuristic procedures.

A second advantage is the deliberate renunciation of the scientific complication of thoughts and terms in order (as it occurs all too frequently and unnecessarily in technical literature) to prove expert knowledge or even to conceal possible intellectual ambiguities with text modules.

The above text is therefore not only clear and easy to understand, but is new and independent in all respects.

1. The low and insufficient level of Aristotle's syllogisms with regard to possible logic should be clear after this paper at the latest. If, moreover, the often missing deduction on our part was rightly criticized, then this was possible through the in-house development of a rule that defines the order of terms, words and contents. The fact that Aristotle argued in different directions according to this rule could also be proved by this rule.
2. It is consequently proposed in this paper to a) use only two (2) logical operators, b) change the terms for the computer scientists in the direction of greater clarity and time gain, and c) in the case of "Castell logic" (internal term) to replace the 2 above-mentioned logical operators by the analog arithmetic ones.
3. The reflections on the term "logic" in this essay are either totally new (we have not found them defined anywhere in the literature) or have at least been consistently applied here for the first time. Although they too are simple, this stringent and uniformly applied logic definition (e.g. "Reality gives us the laws. And we reconstruct it"....for reconstructions of the past or plans for the future).

b)

Mathematical logic: A collective error of reasoning that keeps computer science alive

Apart from the fact that there was (so far) no binding definition for logic (in this essay a new definition is proposed), the so-called language logic is consistently dismissed in any literature as imprecise "belly logic", "women logic", "children logic", etc. and provided with sophisticistic and other sham logical examples, while the so-called mathematical logic pretends to be the hoard of logic.

But this so-called mathematical logic is critically questioned by us in this and other essays and judged to be logically inadequate and exaggerated in its claim to represent the only calculable and exact logic.

Computer science is based on the mathematical operators (+ / - / / \*), but does not use these simple arithmetic operators directly, but makes the detour via the so-called logical operators from the mathematical logic, which then represent the mathematical operators mentioned above.

A certain benefit of mathematical logic for computer science (in some cases as namesake and bearer of very simple properties) should not make mathematical logic untouchable for criticism. Although computer science could emphasize that there is no reason to question logical operators that (perhaps with the exception of fuzziness) have so far fulfilled the requirements for them, there is also no compelling reason for declaring the so-called "mathematical logic" infallible simply because computer science has found a small use for a part of this bloated word system. The latter cannot change the fact that the terms "mathematical" and "logic" are wrong and that the whole system is faulty and has almost nothing to do with logic.

c)

The Origin of Formal Logic: A Bad Start

It is generally said that logic should help to understand reality. According to Leipniz, she is even supposed to calculate the "truth".

What the formalisers from Aristotle made of it, however, was far from being applicable in practice. Even the syllogisms, which are over 2000 years old, look more like word games than examples of sophisticated logic.

Thus the best known syllogism is "All men are mortal, Greeks are men, so Greeks are mortal" anything but a significant logical conclusion. The second sentence, that all Greeks are human, establishes an overly clear link between the first sentence and the alleged conclusion, which merely repeats the first sentence in other words. Instead of "all men" being mortal, "all Greeks" are mortal this time (as a supposedly logical conclusion), but this is not an impressive "logical" conclusion, since Greeks are components (elements) of the set of "men.

It is Aristotle to whom we owe the more than 2,300 years of stagnation with the "excluded third", i.e. with only 2 single truth values!

He called for this untenable principle of stagnation for the sake of the accuracy of mathematics. This was his most fundamental misconception, because language has nothing to do with mathematics. Language does not meet a single criterion of the numbers.

In the following Aristotle himself proved nothing to the contrary. All his efforts for a ("traditional") formal logic were concerned with nothing else but language.

His so-called syllogisms, which represent an incredibly low level of logic, have remained the best known and most durable to this day. In fact, they have nothing to do with logic at all, unless one calls repeating a statement a logical conclusion only because two previously existing words were exchanged in the premises.

In a logic worth mentioning, new insights and new terms emerge, and no showmanship by words that already exist, i.e. are "set-theoretical" components of another word. So anyone who thinks it logical that, for example, book pages burn when the corresponding book burns may continue to waste his time with Aristotle's syllogisms.

Anyone who examines Worerter "set theory" has an idea of upper and lower terms. "("middle terms" are unnecessary, because they are (also) subterms of the subterms above them and (also) subterms of their subterms).

Even without set-theoretical ideas of whole, partial or missing overlaps of equivalent or superordinate or subordinate words, the so-called upper or lower terms of Aristotle are "intuitively" easy to determine.

To be on the safe side, the definition developed in this House is proposed: the term containing the (comparable) criteria of another term plus one or more others is the next higher "generic term" until it is also enhanced by another term.

(1) For example, a Greek includes the criteria that distinguish him as a Greek. The human species also has these criteria of the Greek plus further characteristics, e.g. from other nations. Above man stands the living at all (circumscribed with the word "mortal", which can only be a "living"), which goes beyond the genre of man.

(2) A square has 4 corners. A superordinate rectangle also has 4 corners plus the criterion of rectangularity. A square has all the above plus an additional 4 equal pages.

(3) The same principle applies to abstracts: love has more qualities than, for example, affection, followed by sympathy, etc.

ad (1)

Since the (only) three terms in Aristotle's syllogisms are defined "set-theoretically", i.e. they form upper and lower terms (and, if Aristotle so desires, also unnecessarily "middle terms"), the syllogism with humans (point a)) can be presented as follows:

-) Humans ("middle term" and No. 2, when the three existing terms of any syllogism are numbered 1, 2, 3 from bottom to top) are mortal ("generic term", No. 3 at the top),

-) Greeks ("subordinate term", i.e. the number 1 at the very bottom) are human beings ("middle term", i.e. the number 2 in the middle),

-) Greeks ("subordinate term", No. 1) are mortal ("generic term", No. 3).

On the left sides of the 3 sentences mentioned above are the lower terms, which (to the right) lead to the upper ones. However, it is followed from top to bottom (right from "mortal" to human, left from human to Greek), i.e. deductively.

ad (2)

In the second syllogism with the rectangles, the picture is reversed. This deviation may be due to the fact that the definition developed by us (that the terms with more criteria are above the terms with fewer criteria) is incorrect or may be due to the fact that the author of the present syllogism (which is said to have been Aristotle) has made a mistake. In his first syllogism with the people in the sense of the definition here (the more elements, the higher standing), it was correctly deductive, i.e. from the top to the bottom, i.e. from the large to the smaller, but in this second syllogism it was concluded in the other direction.

This second syllogism was:

-) Rectangles ("middle term", no. 2) are squares ("sub-concepts", no. 1),

-) Squares ("generic term", no. 3) are rectangles ("middle term", no. 2),

-) Squares ("generic term", no. 3) are squares ("subordinate term", no. 1).

On the left sides of the 3 sentences mentioned above are the respective upper terms, which (to the right) lead to the respective lower ones. However, it is followed from bottom to top (right from "squares" to "rectangles", left from "rectangles" to "squares"), i.e. inductively.

So it can already be seen from only two examples that Aristotle was only concerned with language (and if it was "logic", only with language logic). For only the colloquial language decides here from which term to which term it is deduced (in other words, it does not work the other way round, which is also "intuitively" easy to establish: For a Greek is a human being, but a human being is not necessarily a Greek, and a square is (among other things also) a rectangle, but a rectangle is not a square).

There is no formal or even mathematical-logical reason for the (normally hardly noticeable) different horizontal and vertical directions of these two syllogisms.

The splitting into figures chosen above proves this:

ad (1)

In the human syllogism the 3 last parts of each sentence are higher (i.e. they contain three times the upper terms), in the conclusion they are even higher by two digits. However, this is followed from top to bottom, from number 2 to number 1.

ad (2)

In the rectangle example, the 3 rear parts of the sentence are lower (i.e. they contain the lower terms three times), in the conclusion they are even lower by two digits. However, this is followed from bottom to top, from number 2 to number 3.

If Greeks are (ascending) humans but not Greeks, and if squares are (descending) rectangles but not squares, then there are probably "colloquial" reasons:

Rules for these reasons were not found on our part. Perhaps a living being may be described with higher terms ("a worm is a living being"), but only one object (especially an exact one, like a geometric structure) can be represented smaller, i.e. for example reduced to its function or individual parts. A square can be a square, but a square must not call itself a square).

While the generic terms (although with the limitation that the context has to be taken into account) can be counted mathematically, it seems to be possible to deduce correctly from the larger terms to the smaller ones, but in other cases to have to deduce from the smaller ones to the larger ones, without binding rules.

Examples that allow deductive reasoning (which does not work in the opposite direction) are, besides

-) "the Greeks are men" e.g.

-) "Dogs are animals" and

-) "Bacteria are pathogens",

 which looks as if (for linguistic reasons!) it is possible to name terms of living beings with superordinate terms. However, there are also examples of inanimate objects that require this order (to be able to name small things with larger ones), e.g. "a car is a vehicle" etc..

The above breakdown suggests that Aristotle was not able to fulfill his own highest rule (logically deducible only deductively) with the second syllogism (and many others that have the lower values above). Because to conclude from deeper (lower) terms to higher (upper) terms is nothing else than inadmissible inductive conclusion.

In addition to the indisputably low logical level of Aristotle's syllogisms, the latter (in the sense of Aristotle's demand) also seem to be flawed, which is another reason not to dwell on the untenable formal and mathematical logic with its history.

Above all, however, it became obvious from the two examples above that this is not about mathematics, nor about formal matters, including formal logic. Aristotle was always all about language. And this has not changed even with his spiritual heirs.

d)

-) Mathematical logic vs. language logic:

Although the linguistic logicians have not fought back so far, what the mathematical logicians claim is based on confrontation and differentiation with linguistic logic in such a way that, in the opinion of the mathematicians, it is clear from the outset that only their side is "in possession of the truth", i.e. that only they are right when dealing with linguistic logic (see also Tarski's Sprachebenen).

The arguments used by the mathematical side are reminiscent of illogical child quarrels, in which the cheeky ones claim "they are right because they are right" (similar to: "Why?". Answer: "Therefore"). But this conflict also reminds us of a struggle in which there is no equality of arms. While the linguistic logic (of course, because unsemantic logic is a contradiction in itself. Logic is not a question of beautiful form!) is still concerned with the content of the statements (ambiguities, sophisms and paradoxes are pitfalls, but they can be avoided with clean thought processes, as they are also and especially possible in language), the mathematical side simply claims, she does not need all this (she is such a flawless, exact and formally perfect system as mathematics and can therefore afford to develop her logic without reference to concrete questions), it is sufficient for her if she determines in advance which premises are "true" or "true". "are "wrong", in order then to define (arbitrarily) in a less impressive conclusion, from which a true and a false argument result. The right form alone is sufficient to know that one is in the right, i.e. in possession of the right, "valid" arguments. Russell's three "laws of thought" also allow logical conclusions to be drawn without knowing reality.

Comparing such points of view (one side is "bound" to the semantics, the other fights free-style without acknowledging any rules) is by no means appropriate. Someone who is not interested in the content of the arguments within logic should not want to be taken seriously as an alternative to language logic, which so far is the only one able to reflect the whole logic.

The whole construct of mathematical logic can also be summarized in this way: A complex system has been developed here that cannot be applied. Since this is the case and mathematical logic experts know it, mathematical logic can uphold its outlandish claims.

e)

Definition of the term "logic":

The common claim is that logic should help to understand reality. But that phrase doesn't apply. We must understand and take knowledge of reality and its modes of action irrespective of logic.

The correct definition must be: Reality gives us the laws. And with that logic, we're re-enacting it!

Gravity forces can be handled logically even without detailed knowledge of their physical realities, simply by taking note of their appearances. The attraction of mass per se is not yet logical. It is only logical to take this attraction into account and to refrain from using logic, for example, without jumping technical safety devices from a high-rise building.

More appropriate is the idea that logic helps us to make reality more predictable. With logic we can act in both directions on the time axis, especially if we have enough knowledge and data at our disposal. In the past we could understand or reconstruct past facts by using logic.

And in the future, a little hypothetical analogy takes place. We assume, as realistically as possible, future constellations and build our plans logically on them.

The so-called present, in which we seem to be permanently located, does not mathematically exist at the interface of past and future. And also subjectively it cannot exist for us humans on earth, since we are constantly in motion together with time. From this "car" (only) moving in one direction, we work through the present that just passed, which is further and further away from us, since it is outside our danger by perceiving it and reacting to it.

Therefore it is efficient not to react to large unproductive parts of the near past ("present") and to invest time, energy and logical thinking rather in planning the future, whereby we can plan and prepare and shape the future present.

So if we a) reconstruct something unknown from the past according to the laws and observations of reality or b) plan something not yet known in the future, we need logic, whether linguistically or graphically or mathematically, to make references to reality.

However, the so-called formal and mathematical logic is not even in a position to do so. It is not even in a position to present itself in a convincing and logical way.

f)

The language logic (polemically called "everyday logic" by the mathematical logicians), represented by only one argument:

The complexity of logical solutions is particularly evident in the logic of language. One area that everyone can understand is criminology. A forensic physician, for example, determines from the lung contents whether the person apparently drowned in the sea had already died before he was left to the waves. This is simple, but pure logic, since the breathing reflex of a living person does not allow manipulations, except perhaps that he could hold his breath until death.

The latter will therefore be deducted with a low probability from the argument that the dead person drowned in the sea. In order to weigh the probability of this counterargument not only intuitively and arbitrarily, its probability could be approximately calculated in a separate addition (including possible subtractions). Praemisses such as medical feasibility (death by voluntary air holding), statistical frequency of such an event, personal characteristics and possible motives of the dead, etc. would then flow into this partial argument (voluntary air holding until death).

Such an indication of dead being pulled out of the water but not having water in the lungs thus proves with almost 100% probability that death occurred before immersion in the water. Murder has not yet been proven (the apparently drowned person may also have fallen into the water from a boat, standing at the railing, dying), but the peculiarity of the circumstances will cause a forensic murder investigation.

This logic is based on causalities and is useful in practice, i.e. it helps to "understand reality". deductions of a few percent, the above mentioned probability for the mentioned not very probable, but theoretically possible, voluntary holding of the air in the water until death occurs.

Standardization and standardization of the procedure must therefore typically prevent intuitive logic errors, such as confusing positive and negative statements, skipping intermediate logical steps, not complying with the logically correct sequence, etc., by defining fixed rules.

These rules are:

To draw an inference from a previous inference,

1) the previous "then" conclusion (subconclusion) must be the "if" premise of the next step.

2) In addition, the individual steps of the "chain of argumentation" must be as small as possible. Nothing should be taken for granted or assumed to be known. This prevents an intermediate step from being skipped and the chain of argumentation from going in the wrong direction.

3) It could begin with laws of reality (with the "laws" of reality), after which the "facts" researched and more or less certain and correspondingly variably weighted should flow into the arguments.

4) In order to always remain clear and concise, most premises should be developed in separate, separate "if-then-argumentation chains" and only be integrated into the higher-level argumentation chains when acceptable results are achieved.

5) Even negative arguments (which add up the superior argumentation chains for both pro- and contra-arguments or narrow them down by subtraction in the total value) do not make use of premises or (partial) arguments which are described as "wrong" from the outset.

Indeed, the purpose of logic is to gather true premises. Absurd, unrealistic or theme-distant premises, which are wrong and untrue from the outset, there are (as already mentioned) an unlimited number, but nobody needs them. Especially not in logic. And certainly not a true argument needs false premises from the outset.

Nonsense and false premises do not become correct by reinterpreting the logical criteria "true" and "false" to other terms. The word "true" does not at all mean the same thing as "one" or "tension on", etc. A statement claiming that voltage is present at one or more inputs of a gate may be true or false, but the voltage applied to a pole itself has nothing to do with "truth"!

The statement that there is no voltage at an input can also be true. However, this technical 0-state also makes the above statement not untrue, i.e. wrong.

True arguments can only be arrived at with the help of true premises. This also applies to counterarguments which, in the logic developed here, can reduce the already achieved significance by subtraction from the sum of an argument or individual premises already achieved.

This retention of the old 0 and 1 terms could (like any false language with misleading language words) be the reason for possible ambiguities and creative blockades! This relic from previous centuries and millennia is reminiscent of the petrol engine, which over 150 years was slowly improving a little by experts, but always defended an outdated technology and hindered new developments.

The fact that one can take somewhere once fixed (here the allegedly correct conclusions from allegedly logical statements) as a yardstick for something true and meaningful like computer science, does not make the taken over itself meaningful. Here, possibilities of logic are not used to come to surprising logical results, but only with the help of incorrect terms (instead of "true" = "tension applied" etc.) the once definitively defined in so-called truth tables with their useless and arbitrary statements and conclusions are used as an orientation aid.

g)

if....then

It is not obvious why there should be a difference in logical operators between "if - then" and "then and only then, if" or "if...and only then...if". Logically speaking, there is no difference unless we know that the first condition is not taken seriously and we therefore need a more emphatic repetition of it.

But this distinction shows, comparable to the "or" and "exclusive or", how the formal logic "tries", not to say, is abused in order to prescribe the necessary variations for computer science.

The result of false-true in the case of the biconditional operator may also be "hair-raising". For it is anything but "logical" if "wrong -> true" = "wrong" results here, because logically it depends here on the "truth" of the right part, the left (if-) part is only a subordinate indication for the right fact (also the terms "antecedens" for the left part and "Konsequens" for the right side point to this ranking). If it were not so, "wrong -> wrong" should certainly not result in "wrong".

In general, how can "true -> true" = "true" with "truth values" (both with the logical "if...then" and with the "if...and only if...-operator"), but also "false -> wrong" = "true"?

This is not possible from a logical point of view. This does not even require a reference to Russell's second "law of thought", according to which only one of the two statements can be "true" in contradictory statements, and the other "false" accordingly.

If "wrong -> wrong" = "true", then this is only possible in the sense that with the result "true" it is said that some formula was formally correct (comparable to a school grade for fine writing). But if this alleged logical conclusion only concerns aesthetics and formality, then logic and truths can no longer be spoken of in all mathematical logic.

But of course "wrong -> wrong" = "true" is not about formal beauty, but about logic, about the supposedly most flawless and exact logic at all, namely about absolute, perfect mathematical logic. But their creators are obviously not in a position to use them in their own cause.

h)

Our "Castell" logic, instead of logical operators only two arithmetic operators:

As far as it seems that the "if-then" operator is used here in this representation of the "castell logic", the impression is deceptive, because the formulation here merely reminds us of the one single case ("if the if part is true and the then part is also true, then the entire statement is true"), in which the "if-then" operator is rather unintentionally correct, since this is logically not otherwise possible. In fact, the logic representation here has nothing to do with this operator, which voluntarily uses constantly wrong premises and produces mostly wrong statements.

The "if-then" used here is only intended to illustrate the basis and the conclusion from it, but is logically not necessary. For with the logic presented here all premises are "true" (otherwise it was not necessary to use them), and it goes without saying that a result should be achieved which is also (more or less) true. So this formulation aid used here is not a logical operator from Boolean algebra.

Since with the logic developed here all false premises are rejected from the outset as absurd, any true-wrong, false-true and false-wrong combinations are omitted. What remains then corresponds to the only useful operator besides the "not" operator, i.e. the "and" operator, in which true & true = true in bivalent logic.

This case in the 2-value logic corresponds in the n-value "fuzzy-like non-fuzzy logic" developed here to as many premises as possible, which are "more or less true" plus "more or less true" plus "more or less true" ... etc. and both with their "more or less true" weighting, and with their number, which support the argument with their total sum determined by addition (minus subtraction of counter-arguments).

In the case of the apparently drowned man fished from the sea, many facts would have to be collected for a reconstruction of his death and the decision within criminology whether there was external fault. But to stick (ceteris paribus) to the simplified example chosen at the beginning, the line of argument could look like this:

Laws (rough version):

1) If alive ------- it's breathing reflex.

2) If breathing reflex ------ then the dying inhale the last thing that surrounds him.

a) If the last is seawater ------ then that fact indicats that he drowned in the sea.

The chance of external influence must be reconstructed then on the basis of other facts.

b) If the last is fresh water------then that fact indicats that he drowned on the land (in a lake or river etc.) or in a swimming pool, bath tube etc. on land or on boat.

c) If the last is air ------ then this suggests that he died in the air.

The chance of external influence in the event of death and transport into the sea water increases slightly.

Only „slightly“, because deductions result from counter-arguments or possible restrictions, such as:

-) If someone dies in the air ---------- then this can also be due to the railing of a ship, from where the deceased then falls into the sea.

The logic developed here in the house (internal name "Castell-Logik") goes with its as many intermediate solutions as possible between zero (0) and 0.999... (wrongly called "1") in this relation towards fuzzy logic, but strives between 0 and 0.999... (maximum possible number of decimal places within the scope of technical possibilities), quite contrary to fuzzy logic, does not refer to the processing of vague and unclear statements and circumstances, as they are used e.g. in control engineering with its blurred transitions, but uses the infinitely many intermediate positions for particularly clear results.

The only two logical operators that are still useful in practice are "and" and "not". If one then exchanges the logical operators "and" and "not" with the arithmetic operators similar to them (not least because algorithms can only be calculated numerically!), i.e. into the arithmetic operators plus and minus, arguments can really be calculated, and indeed unlimited multi-valued, i.e. also and especially those with unlimited (more or less) true premises. This calculation consists of the addition of percentage weighted pro-arguments and the subtraction of percentage weighted contra-arguments, which finally form the overall result of a higher-level overall argument.

In order to execute logic arithmetically, it is not necessary to convert logical statements into arithmetic statements. The logical operators can also be bypassed from the beginning. Why should & operators be used for multiplications if no multiplication in logic is required? And why should additions be made with the XOR operator when the "and" operator (logical and above all arithmetic) is available?

In order to capture as much data as possible, it is possible, depending on the task of the argument to be examined, with our simple addition and subtraction procedure (quote A. Einstein: "Make it as simple as possible, but not simpler"), and even recommendable to calculate their partial sums for totals in separate processes and to have them included in the overall results only afterwards.

The counterarguments also apply to all pro-arguments and their premises and partial solutions: In order to make their probabilities, to what extent they are correct, more or less true and weighty, largely independent of personal assessments and opinions, they can and should be calculated in separate additions (minus their possible subtractions for restrictions or counter-arguments) and only then included with their final result as a premise in the final calculation of the respective argument.

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