Division by Zero is Partially Solvable

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Euclidean division is modulo division. It is repetitive subtraction until we're left with a remainder. For this style of division, division by zero is not a problem. It's only a problem for the style of division which we are more familiar with.

The best way to inform ourselves, of the answer to the problem of this blog, is to think of this problem in terms of asymptotic limits rather than in terms of discrete answers.

For instance, if we ask the question: what is 'A' divided by infinity, and we have difficulty achieving any sensible answer, then we should not impose upon ourselves any pursuit of a distinct answer. Instead, we should merely want to know what the limits of the answer are — which will be much easier to solve. Under these conditions, the answer is intuitively the opposite of the divisor, namely: zero. Hence »

$$\frac{A}{\infty} = 0$$

This is true because we don't want the answer (especially if we can't get it). We merely want to know what the limit of the answer would be should we also want to pursue this any further to achieve an answer. Knowing what the limit is, will help us imagine what the answer may be should we also encounter any difficulty in discerning the discrete answer. So »

$$\frac{A}{0} = \infty$$

We've been taught to disregard this type of problem on the presumption that it has no solution. Yet, it does have a limit to its solution should we also be fortunate to discover what that solution is. We, usually, are never able to discover what its solution is. So, we give up at this point without even bothering to achieve a partial solution.

But I've just shown you that you can *begin to achieve* a solution even if you can't culminate that precursor (of a solution) into a full-blown version.

Isn't that better than giving up? I think so.

This partial solution was discovered 45 years ago when I was taking assembler computer language programming at West Los Angeles Community College somewhere around 1980 to 1982.

I had prepared for that fall semester class by spending my summer pouring over the Yi-Ching (also known as the 'I Ching', or Chinese Book of Changes). This programed my brain to think in terms of the duality of opposites, namely: the binary number system. It also prepared me to think in terms of the octal base number system since the eight trigrams of the Yi-Ching are organized into a sort of base-eight but with a style of logic which is not predicated upon the logic of counting.

But I won't get into the various flavors of binary logic in this blog.

The partial solution of division by zero comes about due to the nature of assembler math operators and how they have solved the challenge of representing the subtraction of a number from itself. They solve this challenge by implementing one's compliment arithmetic.

The following is a little background on how this system of arithmetic depicts the two limits of our numeric world, namely: how is zero depicted and how is infinity described.

In assembler logic, the first bit of a register contains the sign bit. If this sign bit has a zero, then all of the other bits to its right are considered to be positive. They're filled with ones and/or zeros depending upon what their absolute magnitude may be in base two numbering system.

But if this first bit is a one, then all of the bits to the right are negative.

Thus, if the first bit is a zero, and all of the other bits are filled with zeros, then this number is positive zero.

$$0000 = (0 \times 2^3) + (0 \times 2^2) + (0 \times 2^1) + (0 \times 2^0) = +000 = 0$$

But if the first bit is one, and all of the other bits are zeros, then this number is negative zero.

$$1000 = (1 \times 2^3) + (0 \times 2^2) + (0 \times 2^1) + (0 \times 2^0) = -000 = \infty$$

And negative zero is the inverse of positive zero, namely: (positive) infinity.

$$-0 = +\infty$$

Likewise, if the first bit is a zero, and all of the other bits are ones, then this number is positive infinity since it is the largest positive number which this register can hold as the result of counting upwards from zero towards infinity. Thus, we may wish to call this: "relativistic infinity" to be more precise.

$$0111 = (0 \times 2^3) + (1 \times 2^2) + (1 \times 2^1) + (1 \times 2^0) = +111 = \infty$$

But if the first bit is a one, and all of the other bits are ones, then this number is negative infinity which is the same as saying positive zero.

$$1111 = (0 \times 2^3) + (1 \times 2^2) + (1 \times 2^1) + (1 \times 2^0) = -111 = 0$$

Computer scientists (in the Western culture) are not accustomed to solving problems from an Oriental perspective. They wish to impose a monotheistic ideology which may be fine for depicting the absolute nature of reality but is atrocious at attempting to approximate the dualistic nature of the relative. This is why computer scientists get it all wrong when they interpret what the answer to a number minus itself would be in one's compliment arithmetic.

Without going into the details of that operator, it is sufficient to say that the initial answer is negative infinity. This would require its interpretation into its alternative answer of positive zero. But computer scientists don't want to have to think. Nor do they want their computers to think. They want to be told what the answer is so that they can demand the same answer from their computers.

So, they fibbed an answer. They cooked up a funny dance routine called two's compliment arithmetic which gives them the answer of positive zero by avoiding any imposition of having to think, i.e., interpret, what the answer is. Because one's compliment arithmetic — although honestly straightforward — requires a broad perspective which computer scientists don't want to entertain.

The consequence is that they never learned (they refuse to learn) what they do not know. Had they been less snobbish (in assuming that other ethnicities might have something worthwhile to contribute to Western culture), then they might have done what I had done in my preparation for that class.

But, …, alas. They're clueless over what opportunity they have ignored.

There's a gimmick which gets tossed around in which the speaker asks the listener to pick an integer, and perform various operators upon their initial choice, and the result is an inequality of one equals zero or something similar. So, the speaker concludes with his/her remark that: "See, division by zero is not possible."

The problem with that routine (sorry; I don't remember what that routine is nor how I exactly resolved it) is that it is flawed. But only by creating a chart in which each row was devoted to each step of that routine and each column was devoted to a different perspective, such as: a running total of all of the operations leading up to that point, etc, only then could I conclude that it was in error — but not right away.

By reviewing that tablature (which was two to four columns deep), I sensed that something was wrong at one step. So, I looked up the Euclidean axiom for that step and found that it had violated that axiom having something to do with the addition or subtraction of squares or something similar.

$$a^2 + b^2$$

$$a^2 - b^2$$

Thus, that “magical” routine is logically fallacious. It cannot be used as an argument against division by zero.