

Paradox – The One Thing Logic Can't Explain (other than women)

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Abstract—Paradox often refers to a contradiction in an argument or statement, something that has no definite value and most likely seems absurd, but still have something essential to understand the meaning behind it. The word Paradox was derived from latin word “para” that means contrary to and “doxa” that means opinion. So basically it means “contrary with your opinion” or was contradictive with itself

Index Terms—About four key words or phrases in alphabetical order, separated by commas.

which was found by M. C. Escher, which was a lithograph print called Ascending and Descending. It was a lithograph that depicts a large building roofed by a never-ending staircase. Two lines of men appear on the staircase, one line ascending while the other descends. Two figures sit apart from the people on the endless staircase. One in the courtyard and one on a lower set of stairs.

I. INTRODUCTION

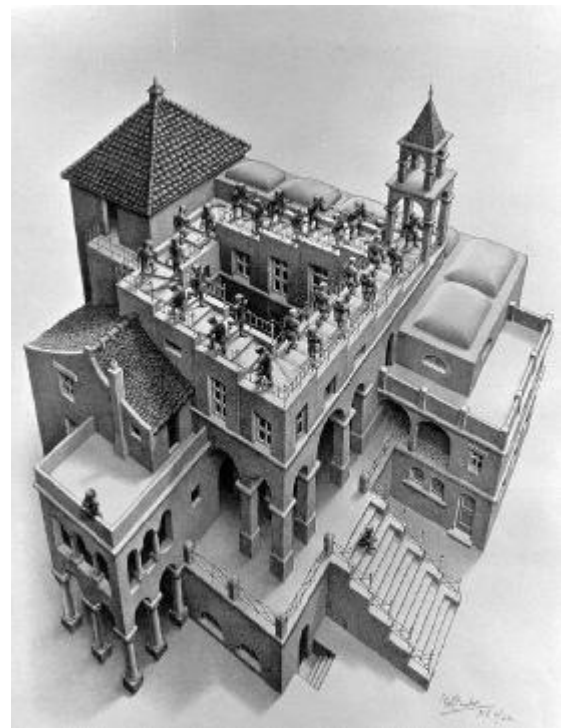
First of all, let's begin by defining the exact meaning of “Paradox”. So what is a paradox? Basically paradox is a Situation where a number of premises that was acknowledged as an axioma but resulting in a contradiction.

According to Patrick Hughes, there are three types of paradox. The first is Self-reference. This form of paradox is a statement that referring to itself. A good example of this type of paradox is “Nothing is impossible”, this statement means that it is possible to do something that was said impossible.

The second type is contradiction, it's a bit close to the first one (self-reference). This form of paradox often seen in a statement that referring to oneself. “This statement is false”, There are no exact value either if the statement was true or false. For instance, if we assume that the statement was true, then because the statement “This statement is false” was true, it needs to be false at the same time, hence contradict itself and making it a paradox.

The third type is called infinite regress. Have you ever heard of the wooden doll called pinocchio whose nose will grow if he told a lie? With that assumption, imagine someday pinocchio suddenly said “My nose will grow !”. what will happen? If his nose doesn't grow that means he told a lie and his nose will grow, but if his nose grows, then his previous statement wasn't a lie and his nose should'nt have grown. If pinocchio was made using algorithm, i think his nose will grow and shrink indefinitely.

Another type of paradox is a paradox of perspective

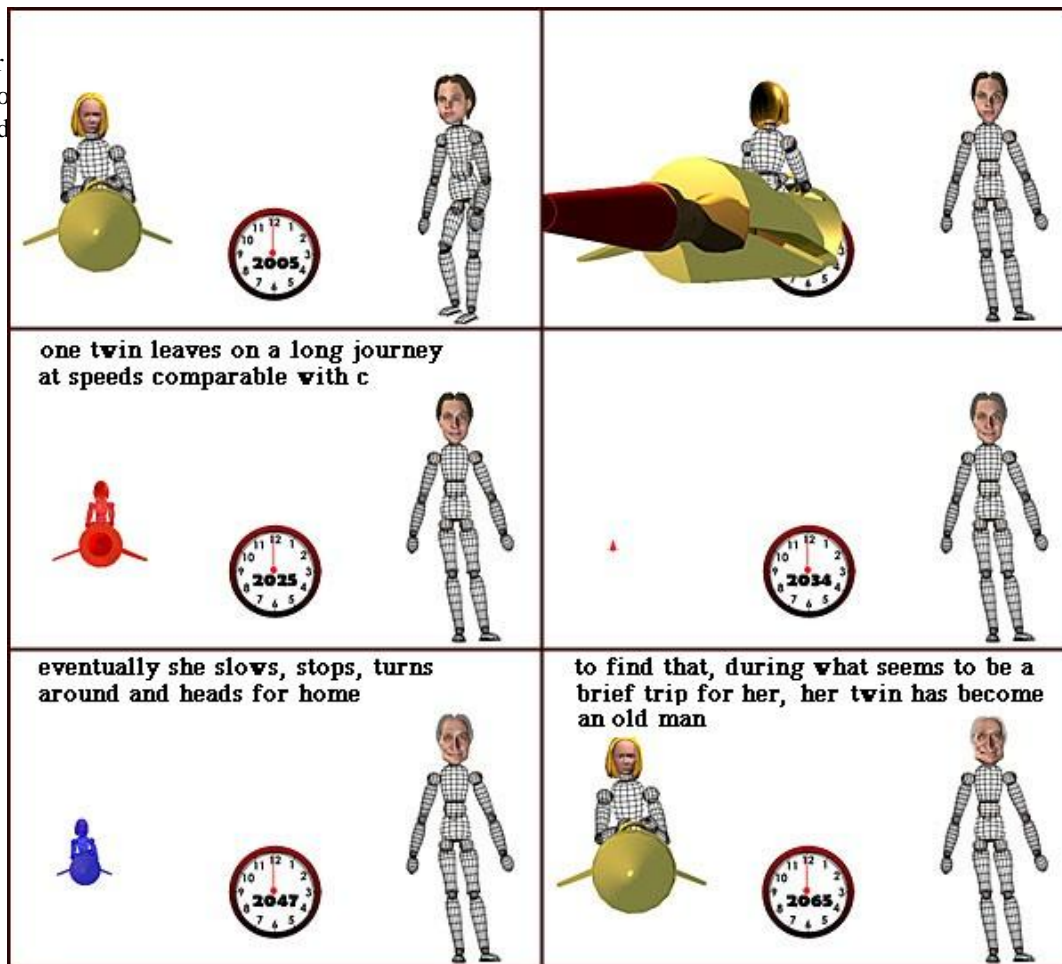


Picture 1. Ascending and Descending Lithograph

II. The Twin Paradox

Twin paradox was a Phenomenon where an identical twin, which one of them travels at speeds comparable with c (3×10^8 m/s) for a relatively long period of time. And after they came back, only to find that their twin was

much older
symmetry of
seems parad



a speed
correct
axioma.

Picture II. Twin Paradox

Rachel and Radolph are twins. Rachel travels in a straight line at a speed comparable to c to another planet doing a mission while his twin brother Radolph stays at earth. She then return to earth after finished her mission.

Radolph than observes that his twin sister onboard clock, which run at Rachel's proper time, run slowly. He therefore concludes that she will be younger than he will be when she returns. On the outward leg, Rachel observes Radolph's clock to run slowly. So jane conclude that joe will have aged less? And if she does, who is correct? According to the proponents of the paradox, there is a symmetry between the two observers, so, just plugging in the equations of relativity, each will predict that the other is younger. This cannot be simultaneously true for both so, if the argument is correct, relativity is wrong.

Why was this called paradox? To explain this matter, we need to go back to Chapter I. “

Paradox is a Situation where a number of premises that was acknowledged as an axioma but resulting in a contradiction”

So with the information given above, we could say that the twin paradox, is created by the premise that Einstein's Special Relativity Theory was correct. Because there is no way to prove that it was correct in actuality (because at

Now, the premises acknowledged as an axioma result in a phenomenon that contradicts, not itself, but the law of the universe that time is absolute.

If this phenomenon called the Twin Paradox could be proved in actuality, then the altering of time such as time machine will probably become more than just a dream. But if this phenomenon proved to be false, then the paradox would be solved.

III. Liar Paradox

Liar paradox was the oldest paradox history ever known. Basicly liar paradox is the sentence “this statement is false”. If "this sentence is false" is true, then the sentence is false, which would in turn mean that it is actually true, but this would mean that it is false, and so on ad infinitum. Similarly, if "this sentence is false" is false, then the sentence is true, which would in turn mean that it is actually false, but this would mean that it is true, and so on ad infinitum.

Another popular example of this paradox was the man who wants to travel to to the village of truth, when suddenly he run into a crossroad with 2 man guarding it. One of them was clearly from the village of truth, but the

other one is from the village of lies, which was full of liars. Then what should the man do to get into the correct path? If the man asks:

“which one of you are from the village of truth”

Obviously both of them will point themselves as the one from the village of truth, this was due to the legit one was pointing himself as the one from the village of truth, while the other guy lied and said he was the one that comes from the village of truth. Right, that was not the correct question to ask because it would not solve anything. So what should the man ask to get to the village of truth? Fortunately this old man was quite brilliant. He asks both of them :

“where is your village?”

Now, with this question, the legit one will definitely pointing the real village of truth, because he’s an honest man while the fake one will lied about where is his vilage and would surely point at the path leading to village of truth.



Picture III. Crossroad

IV. Other Paradox

IV.1 Paradox Russell

Paradox Russell was found around may or june 1901 by Bertrand Russell. The question was

“Does the “list of all list that do not contain themselves” contain itself?”

This was indeed a paradox, If the "List of all lists that do not contain themselves" contains itself, then it does not belong to itself and should be removed. However, if it does not list itself, then it should be added to itself. And the contradiction goes on and it still cant be defined whether the “list of all list that do not contain themselves”

will contain itself or not.

IV.2 Paradox Zeno

This paradox was one of the most popular paradox in greek history and math. This is one of the example of Paradox Zeno

“A runner can run half of it’s remaining track at a set of time, let’s say T seconds. So how many seconds the runner will need to finish his track?”

Let’s say the track was P Kilometres **Asuming that p cannot be zero** . So the equation is $P / 2^n = 0$, meaning N is the number of “half of the remaining tracks” finished by the runner and the time he will need to finish the course is $X * N$ seconds. But unfortunately, to find the value of N in the equation $P / 2^n = 0$ is rather hard, so the easiest way to solve that is to have 2^n near ∞ and that also makes N near ∞ . Hence making the time needed by the runner to finish his course is $T * \infty = \infty$

So there is no way the runner will be able to finish his course since the time needed to finish the course was ∞

That aside in actuality of course the runner will be able to finish his course, this makes a contradiction of whether the runner be able to finish his track based on the premise of the speed of the runner, the lenght of the track and the time he needs to finish the track. Thus making this a Paradox.

V. The History Behind Liar Paradox

There were a lot of people that tried to analyze the truth behind paradox, one of them was the previously discussed Betrand Russell with his theory of list. After what Russell found, there were many russell-like paradoxes that was found including the barber theory, “If a barber belongs to City A, and he said that he will cut the hair of all citizen of city A that can’t cut his own hair. Will he be able to fulfill his promise”. Well basicly it’s the same as the List paradox, the question is whether the barber will cut his own hair or not.

There was also the card paradox,

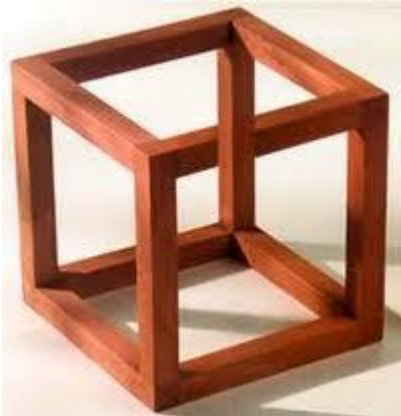
Side A: “The statement behind this card is a lie”

Side B: “The statement behind this card is a truth”

Those 2 sentence that affect each other will resulting in an infinite loophole :

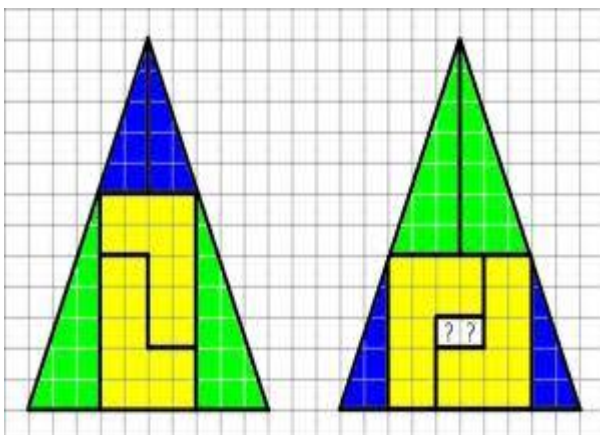
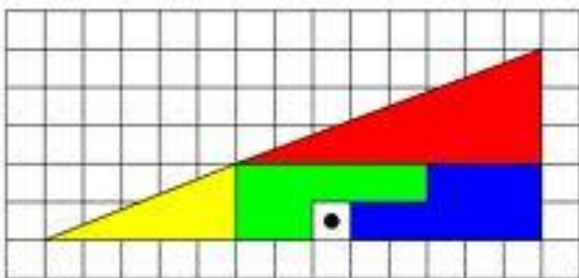
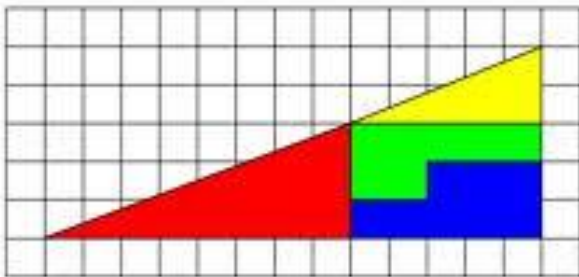
“If the statement behind this card is true then this statment is false, but if the statment behind this card is false then this statement is true”

This will result in a loophole because if Side A was false then side B must be true, but if side B is true of course the statement “The statement behind this card is a truth” must be true as well, so A must be true as well as being false.



Picture IV. Example of paradox build

There was also the triangle paradox, this is basically a 2d illusion made by some person:



Picture V. Triangle Paradox

Those triangle was absolutely made from the exact same figure, so how in the world one of it was 1 square bigger than the other one?

VI. Conclusion

There are many types of paradox in this world that cannot be explained with logic and math, and it will be a mystery until someone can prove that does that paradox is a fake one or not. There were a lot of people trying to solve the mystery behind paradox using many ways of different approaches, but sadly no one can perfectly explain the true nature of this phenomenon

Same goes to the twin paradox that contradicting the law of the universe, maybe someday, when man could travel at the speed comparable to c , someone would be able to prove either that phenomenon was true or not. And no longer making it a paradox.

VII. Acknowledgement

As of the completion of this paper, author would like to give a much appreciation to all party that support author and give author a chance to finish this assignment given by the lecturer in time. This paper that author write was dedicated for science and have absolutely no business intent or whatsoever.

VIII. Reference

1. <http://strangepaths.com/modernity-of-zenos-paradoxes/2007/01/16/en/.html> (18 Desember 2012, 23:00)
2. Munir, Rinaldi. Diktat Kuliah IF2091 Struktur Diskrit. Edisi keempat. Program Studi Teknik Informatika, Institut Teknologi Bandung
3. <http://www.cut-the-knot.org/selfreference/russell.shtml> (18 Desember 2012, 23:00)
4. <http://www.mathpages.com/rr/s3-07/3-07.htm> (18 Desember 2012, 23:00)
5. <http://brainden.com/forum/index.php/topic/203-liar-paradox-eubulid-or-epimenides-paradox/> (18 Desember 2012, 23:00)
6. <http://www.telacommunications.com/misc/compet.htm> (18 Desember 2012, 23:00)
<http://plato.stanford.edu/entries/paradoxes-contemporary-logic/> (18 Desember 2012, 23:00)

PERNYATAAN

Dengan ini saya menyatakan bahwa makalah yang saya tulis ini adalah tulisan saya sendiri, bukan saduran, atau terjemahan dari makalah orang lain, dan bukan plagiasi.

Bandung, 11 Desember 2011

A handwritten signature in black ink, appearing to read 'KEVIN VERDI', with a stylized, somewhat abstract shape below it.

KEVIN VERDI 13511079