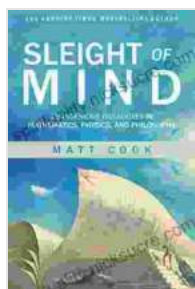


75 Ingenious Paradoxes In Mathematics, Physics, And Philosophy

A paradox is a statement that contradicts itself. It can be a logical contradiction, a mathematical contradiction, or a philosophical contradiction. Paradoxes can be used to challenge our assumptions about the world and to explore the limits of our knowledge.

Here are 75 ingenious paradoxes in mathematics, physics, and philosophy:



Sleight of Mind: 75 Ingenious Paradoxes in Mathematics, Physics, and Philosophy by Matt Cook

★★★★☆ 4.3 out of 5

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Print length : 478 pages
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Mathematics

1. **The Banach-Tarski paradox:** It is possible to take a solid ball, cut it into a finite number of pieces, and reassemble the pieces into two balls, each of which is the same size as the original ball.
2. **The Berry paradox:** If a set contains all sets that do not contain themselves, does it contain itself?

3. **The Cantor's paradox:** The set of all sets that are not members of themselves is a set that is not a member of itself.
4. **The Curry paradox:** If a function takes two arguments and returns the first argument, is it a function of one argument or two arguments?
5. **The Epimenides paradox:** The statement "I am lying" is a paradox because if it is true, then it must be false, and if it is false, then it must be true.
6. **The Goodman paradox:** The word "grue" refers to all green objects examined before a certain time and all blue objects examined after that time. Is "grue" a real property of objects?
7. **The Grelling-Nelson paradox:** The word "heterological" means "not applicable to itself." Is "heterological" heterological?
8. **The Russell's paradox:** The set of all sets that do not contain themselves is a set that does not contain itself.
9. **The Ship of Theseus paradox:** If a ship is gradually replaced, one piece at a time, until every part has been replaced, is it still the same ship?
10. **The Sorites paradox:** How many grains of sand make a heap?

Physics

1. **The Arrow paradox:** If an arrow is shot into the air, is it ever actually moving?
2. **The Grandfather paradox:** If you travel back in time and kill your own grandfather, do you cease to exist?

3. **The Ladder paradox:** If a ladder is placed against a wall and the bottom of the ladder is moved away from the wall at a constant speed, will the top of the ladder ever reach the ground?
4. **The Maxwell's demon paradox:** A hypothetical being, known as Maxwell's demon, is able to sort gas molecules into two containers, one containing only hot molecules and the other containing only cold molecules. Does this violate the second law of thermodynamics?
5. **The Münchhausen trilemma:** In order to prove something, you need to rely on something that is already proven. But what if everything is unproven? How do you get started?
6. **The Newcomb's paradox:** You are given two boxes, one of which contains a million dollars and the other of which is empty. You are told that one of the boxes has been randomly selected and given to you. You are also told that the other box contains a note that says whether or not the box you have contains the money. Should you open the other box?
7. **The Olbers' paradox:** If the universe is infinite and filled with stars, why is the night sky dark?
8. **The Schrödinger's cat paradox:** A cat is placed in a sealed box along with a radioactive atom. The atom has a 50% chance of decaying, which will trigger a mechanism that will kill the cat. If the atom has not decayed after a certain amount of time, the cat will be alive. However, according to quantum mechanics, the cat is both alive and dead until the box is opened.
9. **The Zeno's paradoxes:** A series of paradoxes that challenge the idea that motion is continuous. For example, in the Achilles and the tortoise

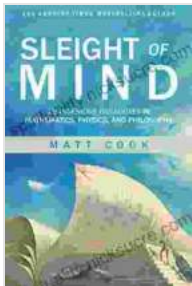
paradox, Achilles can never overtake a tortoise because every time he takes a step, the tortoise moves forward a little bit.

Philosophy

1. **The Buridan's ass paradox:** A donkey is placed equidistant between two identical bales of hay. It is assumed that the donkey is equally hungry and thirsty and that it cannot choose between the two bales of hay. Will the donkey starve to death?
2. **The Euthyphro dilemma:** Is something good because God commands it, or does God command it because it is good?
3. **The Free will paradox:** If we have free will, then why are we responsible for our actions?
4. **The Liar paradox:** The statement "I am lying" is a paradox because if it is true, then it must be false, and if it is false, then it must be true.
5. **The Meno paradox:** How can we know anything if we don't already know it?
6. **The Münchhausen trilemma:** In order to prove something, you need to rely on something that is already proven. But what if everything is unproven? How do you get started?
7. **The Omnipotence paradox:** Can God create a rock that is too heavy for him to lift?
8. **The Ship of Theseus paradox:** If a ship is gradually replaced, one piece at a time, until every part has been replaced, is it still the same ship?
9. **The Sorites paradox:** How many grains of sand make a heap?

10. **The Trolley problem:** A runaway trolley is headed toward five people tied to the tracks. You are standing next to a lever that can divert the trolley to another track, where it will kill only one person. Do you pull the lever?

These are just a few of the many paradoxes that have been discovered throughout history. Paradoxes can be fascinating and thought-provoking, but they can also be frustrating and confusing. They can challenge our assumptions about the world and force us to think more deeply about the nature of reality.

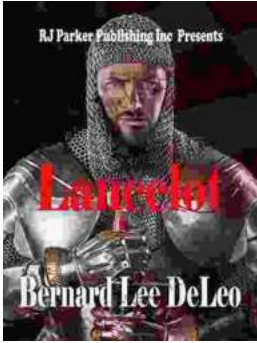


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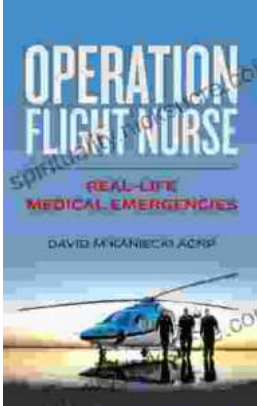
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