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Homework for Lecture 6 - do not post

① Mathematicians used the strategy of meta-proving that the Parallel Axiom does not follow from the other four axioms. They constructed a model where they gave new meanings to basic objects, such as points and lines, checked that the other four axioms were true, and then showed by counterexample that the Parallel Axiom was not true. If the Parallel Axiom was correct, then this would not make sense.

② The general idea of Gödel's proof is that you consider a statement that says "This statement is false." The previous statement can not be proved true, because that would lead to a contradiction. Also, it can not be proved false, as that leads to another contradiction. Therefore, it can not be proved or disproved by logic.

③ Dr. Z's version of Gödel's famous theorem states that Gödel concluded that some statements were thought to be important and correct, however in reality, they were worthless. This happened because too much emphasis was placed on the concept of infinity.

Turing's undecidability of the Halting Problem states a similar conclusion to Gödel's, since they used the same idea of meta-proving. Turing's results were worthless as well, as it was based on fantasies and faulty logic. Dr. Z's version states that if you restrict memory up to a (symbolic) value M, then it is finite, so the undecidability question can be reworded as "Does it halt in less than N steps?"

(4) i.) There are two possible scenarios that work in this situation:

Scenario 1: A is a truth teller, B is a lie teller.

This works because if A tells the truth, then B is a liar, and when B lies, he says that A is a truth teller, which confirms this scenario.

Scenario 2: A is a lie teller, B is a truth teller.

This works because if A lies, then B is a truth teller, and when B tells the truth, he says that A is a liar, which confirms this scenario.

ii.) There are no possible scenarios in this situation.

iii.) There are no possible scenarios in this situation.

iv.) There are two possible scenarios that work in this situation.

Scenario 1: A is a truth teller, B is a lie teller, C is a truth teller, D is a lie teller

This works because if A tells the truth, then B is a liar, and when B lies, he says that C is a truth teller, so when C tells the truth, he says that D is a liar, so when D lies, he says that A tells the truth, which confirms this scenario.

Scenario 2: A is a lie teller, B is a truth teller, C is a lie teller, D is a truth teller

This works because if A lies, then B is a truth teller, so when B tells the truth, he says that C is a liar, so when C lies, he says that D is a truth teller, so when D tells the truth, he says that A is a liar, which confirms this scenario.