Understanding the Four Color Theorem and Attempts to Prove It

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This essay aims to understand the basics of the four color theorem, why it was so hard to prove, and why false proofs failed to prove the theorem. The four color theorem states that a map can be colored so that no adjacent regions are colored the same color. It originated in England in the 19th century when a map maker noticed that all counties in England could be colored using only four colors. This theory is related to graph theory; maps can be transformed into graphs with vertices replacing regions and edges connecting vertices that represent bordering regions. Before exploring the false proofs of the four color theorem, the five color theorem, a simpler version of the original problem, was investigated. The five color theorem has a simple, intuitive proof which was the basis for one of the false proofs that was disproved in this investigation. The necessary graph theory to understand the four color theorem is investigated, as well as the false proofs of the theorem. As no intuitive proof for the four color theorem has been found yet, the only proofs available are proofs by exhaustion that were made by computers.

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