

PROOF101 Project Proposal

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- **Title:** Error-Correcting Codes: Disjoint Spheres Theorem
- **Overview:** In this project, I will introduce some basic error-correcting linear code theory (not yet formalized in mathlib). The project will be centered around proving the Disjoint Spheres Theorem.
- **Core Property:** If d is the minimum distance of a linear code \mathcal{C} and $t = \lfloor (d - 1)/2 \rfloor$, then spheres of radius t about distinct codewords are disjoint.
- **Challenges:** The main anticipated challenges are formalizing the definitions in an effective way and proving the necessary results. Luckily, some Hamming distance/weight definitions and theorems are already in mathlib, as well as the necessary algebraic structures.