The University of Edinburgh

ABSTRACT OF THESIS

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Degree Sought:	PhD	*No. of words in the main text of Thesis:*	57500
Title of Thesis:	Ordered Geometry in Hilbert's *Grundlagen der Geometrie*		

Insert the abstract text here - the space will expand as you type

The *Grundlagen der Geometrie* brought Euclid's ancient axioms up to the standards of modern logic, anticipating a completely mechanical verification of their theorems. There are five groups of axioms, each focused on a logical feature of Euclidean geometry. The first two groups give us *ordered geometry*, a highly limited setting where there is no talk of measure or angle. From these, we mechanically verify the Polygonal Jordan Curve Theorem, a result of much generality given the setting, and subtle enough to warrant a full verification.

Along the way, we describe and implement a general-purpose algebraic language for proof search, which we use to automate arguments from the first axiom group. We then follow Hilbert through the preliminary definitions and theorems that lead up to his statement of the Polygonal Jordan Curve Theorem. These, once formalised and verified, give us a final piece of automation. Suitably armed, we can then tackle the main theorem.

All your abstract text must be contained on this side