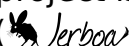
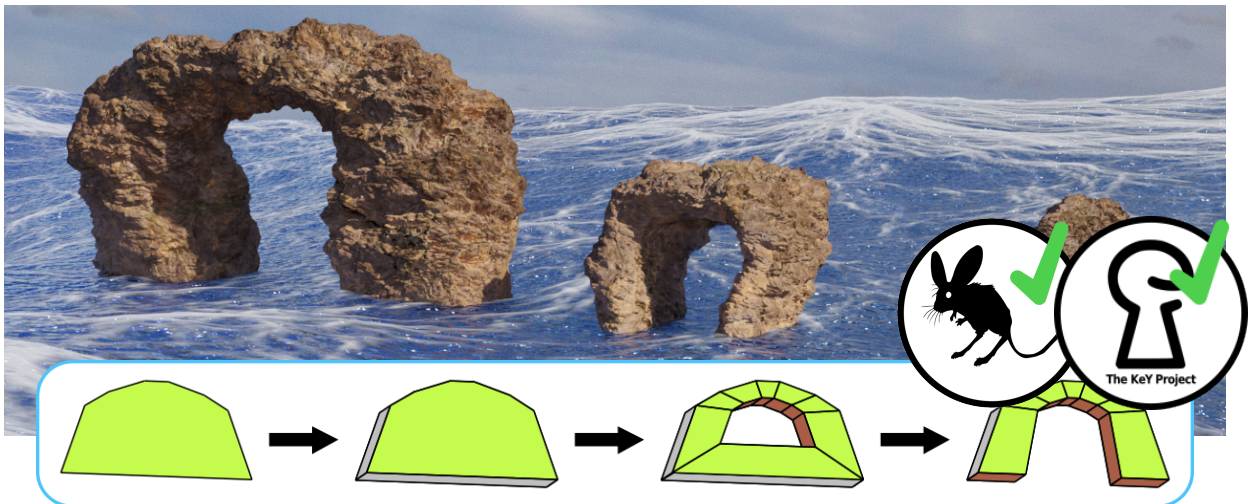


## Bachelor/Master thesis

# KeY for the verification of

The goal of this project is to use a formal tool (KeY), to verify the implementation of a formal tool ().



**Background: Jerboa.** Jerboa is a Java-based platform for topology-based geometric modeling, enabling the manipulation of 2D and 3D objects through rewriting operations. These operations, defined as rules  $A \rightarrow B$ , transform a pattern  $A$  into  $B$  within a larger context. Patterns are graphs that represent topological abstractions of geometric objects. To ensure well-formed outputs, Jerboa's rules must satisfy conditions that can be analyzed at design time, eliminating the need for runtime checks.

**Background: KeY.** KeY is a formal verification tool for Java, using symbolic execution and deductive reasoning based on JavaDL. It verifies Java programs against specifications written in JML (Java Modeling Language).

**Your Task.** The goal is to verify part of Jerboa's rule analyzer with KeY. You will identify sections of the implementation needing refactoring for KeY compatibility, create JML specifications from the mathematical constraints, and derive correctness proofs using KeY.

**Your Profile.** A background in formal systems is required (e.g., from relevant KIT lectures). Ideally, you have attended "Formale Systeme 2: Anwendung", where an introduction to KeY is provided.

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