The Coq Proof Assistant

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Background

- Coq began in 1984 as an implementation of the CoC type theory.
- It was first released in 1989 as an interactive theorem prover.
- Coq was developed by Thierry Coquand, Gerard Huet, Christine Paulin-Mohring, and 200 others.
- Coq is free-software and is distributed under the LGPLv2.1

Classification/Rationale

- Coq is a proof assistant.
- A proof assistant is a formal proof management system, which means that it is used to manage and test proofs.
- Coq is written like a functional programming language.
- Coq also offers Gallina, which is a formal specifications language.
- It makes sense to use Coq when we want help with finding formal proofs.

Evaluation

- Very readable, but there’s a catch.
- Very writable and concise, making it a productive language.
- Exceptionally reliable, which is fitting.
- No monetary cost, but steep learning curve for some.

Evaluation

- Coq is very portable, and runs on Windows, macOS, and Linux.
- Coq has a small but dedicated community, and even has textbooks available to learn from.
- Coq is very expressive, as it was purposefully designed to enable users to express mathematical assertions.
- Coq was used to make a surveyable proof of the four color theorem.

Code Sample

Works Cited

https://en.wikipedia.org/wiki/Coq
https://coq.inria.fr/
https://en.wikipedia.org/wiki/Proof_assistant
https://coq.vercel.app/ (Code Example)
https://www.openaccessgovernment.org/proof-assistants-2/80852/
https://coq.inria.fr/download