

git-unlocked: An Open-Source Modular Curriculum for Git and Version Control Education

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Abstract

Version control literacy is increasingly recognised as a foundational competency for software engineers, yet structured and openly licensed educational resources targeting beginner and intermediate learners remain scarce. This technical note introduces git-unlocked, an open-source modular curriculum for teaching Git and version control principles. The repository comprises 202 files organised across 11 thematic sections, covering topics from repository initialisation and branching strategies through to collaborative workflows and conflict resolution. Released under the MIT licence, git-unlocked is designed to be freely reused, forked and extended by educators and self-directed learners. The structure, content organisation and design rationale of the curriculum are described, along with intended use cases and future development directions.

Keywords: version control, Git, computer science education, open-source curriculum, software engineering pedagogy

1. Introduction

Version control systems, and Git in particular, are ubiquitous in professional software development. Despite this, many undergraduate programmes do not include dedicated instruction in version control, leaving students to acquire these skills informally or on the job. The absence of freely available, structured and openly licensed curricula compounds this problem for independent learners and resource-constrained educators alike.

git-unlocked addresses this gap by providing a complete, modular and openly licensed learning resource for Git and version control. The project is hosted publicly on GitHub and is intended to serve learners at multiple levels, from those encountering version control for the first time through to practitioners seeking to consolidate their understanding of advanced workflows.

2. Repository Structure and Content

The git-unlocked repository contains 202 files organised into 11 thematic sections. Each section is self-contained and progresses logically from foundational concepts to more advanced material. The sections cover the following topics:

Section 1: Introduction to version control concepts and the rationale for using Git.

Section 2: Repository initialisation, configuration and basic commit workflow.

Section 3: Branching and merging strategies, including best practices for branch naming.

Section 4: Remote repositories, push/pull operations and working with GitHub.

Section 5: Collaborative workflows including forking, pull requests and code review.

Section 6: Conflict resolution and strategies for managing divergent histories.

Section 7: Git history inspection, log navigation and diffing techniques.

Section 8: Undoing changes: revert, reset and restore.

Section 9: Tagging, releases and versioning conventions.

Section 10: Git hooks and automation in development pipelines.

Section 11: Advanced topics including rebasing, cherry-picking and submodules.

3. Design Rationale

The curriculum is structured modularly so that educators can adopt individual sections without committing to the full sequence. Each section includes explanatory content, worked examples and exercises. The MIT licence was chosen deliberately to maximise reusability, permitting derivative works without restriction provided attribution is maintained.

The repository follows open science principles: all content is version-controlled, change history is publicly visible, and contributions via pull request are welcomed. This structure also serves a pedagogical purpose, as the repository itself demonstrates the Git practices it teaches.

4. Intended Use Cases

git-unlocked is suitable for use as a self-directed learning resource, as supplementary material in undergraduate software engineering or computer science modules, or as a reference for educators designing version control instruction. The modular structure supports integration into existing curricula without requiring wholesale adoption.

5. Future Development

Planned extensions include interactive exercises with automated feedback, integration with GitHub Classroom for cohort-based deployment, and translated versions to broaden accessibility. Contributions from the open-source community are actively encouraged via the project's GitHub repository.

6. Availability

git-unlocked is freely available at <https://github.com/zaccesss/git-unlocked> under the MIT licence. The repository includes a README with setup instructions, a CITATION.cff file for citation metadata and a CONTRIBUTING guide for prospective contributors.

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