

## Bonus Task: AI Tool Proposal – SmartDocGen

**Purpose:** SmartDocGen is an AI-powered tool designed to automate the generation and maintenance of software documentation. Developers often spend significant time creating README files, API references, and usage examples. SmartDocGen uses code analysis and natural language processing (NLP) to automatically produce human-readable documentation from codebases, comments, and version histories.

**Workflow:**

- Code Parsing:** The tool scans source files to extract function signatures, parameters, and class hierarchies.
- Context Understanding:** Using NLP models, SmartDocGen interprets developer comments, commit messages, and variable names to generate meaningful explanations.
- Document Generation:** It produces structured documentation in Markdown, HTML, or PDF formats.
- Continuous Sync:** When the codebase updates, SmartDocGen automatically regenerates only the affected documentation sections.

**Impact:** SmartDocGen improves developer productivity by reducing manual documentation effort and ensuring consistency between code and documentation. It enhances onboarding for new team members, increases codebase transparency, and minimizes errors caused by outdated documentation. By integrating with GitHub Actions or CI/CD pipelines, SmartDocGen ensures that all released versions of software remain fully documented and compliant with organizational standards.