

1. Requirements Gathering and Design (1-2 Weeks)

- **Tasks:** Define required features (highlighting, text annotations, drawing shapes, commenting, etc.), design the UI, and select necessary libraries.
- **Estimation:** 1–2 weeks.

2. Setting Up Project and Libraries (1 Week)

- **Tasks:** Install and configure libraries like PyMuPDF, ReportLab, or PDFMiner for PDF handling, along with a GUI framework such as Tkinter or PyQt for the interface.
- **Estimation:** 1 week.

3. Core Development (4-8 Weeks)

- **Tasks:**
 - **PDF Rendering and Loading:** Code to load and render PDF files (1–2 weeks).
 - **Annotation Tools:** Code for text annotation, highlighting, drawing, and shapes (2–3 weeks).
 - **Saving and Exporting Annotations:** Implement functionality to save annotations directly into the PDF or export them separately (1–2 weeks).
 - **User Interface:** Design and implement a user-friendly interface (2 weeks).
- **Estimation:** 4–8 weeks.

4. Testing and Debugging (2-3 Weeks)

- **Tasks:** Test for bugs, fix issues, and optimize performance.
- **Estimation:** 2–3 weeks.

5. Final Adjustments and Deployment (1 Week)

- **Tasks:** Make any necessary refinements and prepare for deployment.
- **Estimation:** 1 week.

Total Estimated Time: 9-15 Weeks

Project Setup and Team Roles

1. **Developer 1:** PDF Processing and Annotation Logic
 2. **Developer 2:** File Handling, Annotation Saving, and Exporting
 3. **GUI Designer:** User Interface and Experience Design
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Week 1: Requirements Gathering and Initial Design

- **Duration:** 1 week

Tasks:

- **All team members:** Collaborate to define tool requirements, including:
 - Supported annotation types: text comments, highlights, drawing (e.g., freehand, shapes).
 - Saving features: options to embed annotations within the PDF or save separately.
 - User experience (e.g., buttons, color selectors, annotation controls).
 - **GUI Designer:** Begin designing wireframes for the interface.
 - **Developers:** Research suitable libraries for PDF handling (e.g., PyMuPDF, ReportLab, PDFMiner) and determine compatibility with required features.
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Week 2: Setting Up the Development Environment and Libraries

- **Duration:** 1 week

Tasks:

- **Developers:**
 - Set up version control (e.g., Git).
 - Install required libraries for PDF handling and a GUI framework (e.g., PyQt or Tkinter).
 - Create an initial codebase with basic project structure.
 - **GUI Designer:** Finalize interface wireframes and share with developers for feedback.
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Week 3-4: Core PDF Loading and Rendering

- **Duration:** 2 weeks

Tasks:

- **Developer 1:**

- Implement PDF file loading functionality.
 - Create a rendering component to display PDF pages in the GUI window.
 - **Developer 2:**
 - Design file handling functions (open, save, and close).
 - Collaborate with Developer 1 on PDF rendering, ensuring smooth scrolling, zooming, and navigation.
 - **GUI Designer:**
 - Design UI components for navigation (e.g., next/previous page, zoom controls) and work on color schemes and iconography.
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Week 5-6: Annotation Tools Development

- **Duration:** 2 weeks

Tasks:

- **Developer 1:**
 - Implement text-based annotations (comments on pages).
 - Create highlight functionality for selecting and marking text areas.
 - **Developer 2:**
 - Implement drawing tools for freehand annotations and shapes (e.g., rectangles, circles).
 - Develop an eraser or "clear annotations" function.
 - **GUI Designer:**
 - Create a toolbar with annotation options, colors, and other settings.
 - Finalize icons and layout for annotation tools.
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Week 7-8: Annotation Data Storage and Exporting

- **Duration:** 2 weeks

Tasks:

- **Developer 1:**
 - Design a structure to store annotations (e.g., JSON format or embedded metadata).
 - Develop functions to update annotations on-the-fly as the user interacts with the PDF.
- **Developer 2:**
 - Implement saving functions that allow annotations to be embedded within the PDF or saved as a separate file.
 - Add export options (e.g., export to an annotated PDF or save annotations in a separate file).
- **GUI Designer:**
 - Design modals or dialogs for "Save" and "Export" actions, with user options for embedding or separate file saving.

Week 9: UI Integration and Polishing

- **Duration:** 1 week

Tasks:

- **All team members:** Integrate the GUI with back-end functionalities and ensure seamless interaction between the interface and annotation tools.
- **Developer 1 & Developer 2:** Work with the GUI Designer to refine UI/UX aspects, fixing any functionality inconsistencies.
- **GUI Designer:** Finalize the layout, colors, and alignment of all components, ensuring a smooth user experience.

Week 10-11: Testing and Bug Fixing

- **Duration:** 2 weeks

Tasks:

- **Developers:**
 - Test for issues like annotation persistence, rendering performance, and file handling.
 - Fix any bugs or usability issues found during testing.
 - Optimize the performance of PDF loading and annotation rendering.
- **GUI Designer:**
 - Conduct usability testing with sample users (if possible).
 - Make any last UI tweaks based on feedback.

Week 12: Final Adjustments and Deployment

- **Duration:** 1 week

Tasks:

- **All team members:** Review codebase and perform final tests.
- **Developers:** Ensure the tool is ready for deployment, with proper installation instructions or packaging for users.
- **GUI Designer:** Prepare a final design document and ensure UI assets are appropriately licensed and documented.