Group 07 – Unit Converter with History

Project Design

Our project is a Unit Converter Application built in Python with a Tkinter GUI. It allows users to convert between Length, Mass, and Temperature units.

The design follows a modular structure:

- converters.py implements polymorphism through converter classes for each category.
- history.py manages persistence using JSON, allowing conversions to be saved, displayed, and cleared.
- gui.py provides a user-friendly interface with dropdown menus, buttons, and a history panel.

We used pipenv for environment and dependency management, pytest for automated testing, and GitHub Actions for continuous integration across Python 3.10–3.12.

Challenges Faced

1. Python Version Compatibility – Team members had different Python versions installed. We solved this by setting the Pipfile baseline to Python 3.10 but allowing overrides for 3.11 and 3.12.
2. Collaboration with Git and Branching – As beginners, managing branches, commits, and pull requests was challenging. We overcame this by adopting clear branch naming conventions and role assignments.
3. GUI with Tkinter – Designing a clean and intuitive GUI required learning how Tkinter widgets work together which was (very) excruciating.
4. Persistence Issues – Ensuring the history JSON file was always saved in the correct location so that data persisted between sessions was initially tricky, especially when running from different directories.

Future Work

- Extend functionality to support currency conversion using live exchange rate APIs.
- Improve the GUI with modern designs or migrate to PyQt for more advanced features.
- Add search and filtering to the history panel.
- Use a unit search feature using regex
- Use hotkeys for quick conversion.