**Grocery Item Frequency Tracker – Enhancement Narrative**

**Artifact Overview** The artifact I chose was a C++-based grocery item frequency tracker. It reads a list of grocery items from a file and counts their frequency. The original version was created during my CS-250 Software Development Lifecycle course in 2023.

For this capstone enhancement, I rewrote the program in Python, updated it to include a GUI using Tkinter, added case-insensitive search functionality, and preserved the ability to export data to an output file. I also refactored the code into a more modular design to support maintenance and scalability.

**Why I Selected This Artifact** I selected this artifact because it showcases my growth in Python programming, user interface development, and modular software design. While the original program was functional, enhancing it gave me the opportunity to demonstrate software engineering principles, refactor legacy code, and improve usability through a modern graphical interface and better file handling.

**Enhancements Performed**

* Modularized the program by separating logic into reusable functions (logic.py)
* Added a Tkinter GUI (main\_gui.py) for better usability  
  Implemented case-insensitive search functionality
* Wrote a README.md file for documentation
* Ensured clean input/output file handling

**Skills Demonstrated** This project demonstrates:

* My ability to use Python and Tkinter to develop complete applications
* Knowledge of software engineering practices like modularization and GUI design
* Problem-solving and debugging skills
* Clear, professional-quality documentation and communication

This enhancement supports the following Computer Science program outcomes:

* **Design and evaluate computing solutions** using algorithmic principles and appropriate trade-offs
* **Demonstrate innovative software engineering/design techniques**
* **Communicate technically** through coherent code, GUI design, and project documentation

**Challenges Faced** One challenge was designing a GUI that remained intuitive while integrating all existing functionality. Another challenge involved ensuring accurate case-insensitive searching without introducing bugs. These issues helped refine my testing approach and improve my attention to user experience.

**Reflection** This enhancement demonstrates my readiness to contribute to real-world software projects. It reflects my understanding of professional development practices, as well as my ability to improve existing work using modern tools and user feedback. This experience reinforced the importance of writing maintainable code, thinking about end users, and clearly documenting software projects.