ENGI 9874 – Software Design & Specification

Project Proposal

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Project Idea:

Tittle: Design by Contract in a Layered Library Management System.

Proposal:

This project showcases how Design by Contract (DbC) can be used to boost the reliability, organization, and strength of a Library Management System (LMS). The system is designed to let users borrow and return books, check which ones are available, and follow borrowing rules based on the type of membership they hold.

As of now we are planning to apply the below software design and validation practices:

- The LMS will be built using a Layered Architecture with separate layers for Presentation, Service, and Data.

- UML diagrams, including Class and Sequence diagrams, will visually represent the structure and flow of the system.

- DbC principles will be implemented using PyContracts in Python (as of now), ensuring every function has clear preconditions, postconditions, and invariants.

- A small formal specification, written in Z or Alloy (Not Sure yet), will be included to show the correctness of a key functions like borrowing books etc.