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CptS 327: Cybersecurity & Cryptography  
Washington State University  
First Milestone

**Title:** Simulating a Multi-Factor Authentication Service

**Status:**

My project thus far has surpassed significant stages in the design/planning phase, and will soon be ready for test-driven construction. I have drawn how the project structure shall be organized (repository structure), have constructed a UML Structural Diagram, a flow-chart for the user account registration process, and a sequence diagram for the user login process that which includes requesting an MFA token request-response prompt. There are still some design decisions I need to construct, including an attack-tree to identify potential vulnerabilities with the MFA software that I can use to design test cases during the construction phase. I have gone against my previous idea described in the original proposal, about using a question-answer authentication method, and have instead opted for a time-based one-time password authentication method. TOTP is more secure since it involves entering a passcode that only exists temporarily at time of its generation, while a question-answer method involves permanent storage in a database.

I have also decided to implement this project in Python, using Tkinter for its user-interface. Though I am not opposed to deploying this project on a web-service, implementing the front-end with Django, I am not willing to pay for the service. Thus, I will be designing the user-interface to simulate such an environment to the best of my ability. After I've created an attack-tree, as well as a component diagram that demonstrates low cohesion and high coupling, I'll begin moving into the construction phases, beginning with abstract implementations of the components and well-designed test cases. I expect to begin test-driven construction by the end of this coming week, and spend a matter of four to five weeks on it, before concluding the project and creating a presentation. I will be including screenshots on the following page(s) of my diagrams and git repository, as well as a link to the git repository.

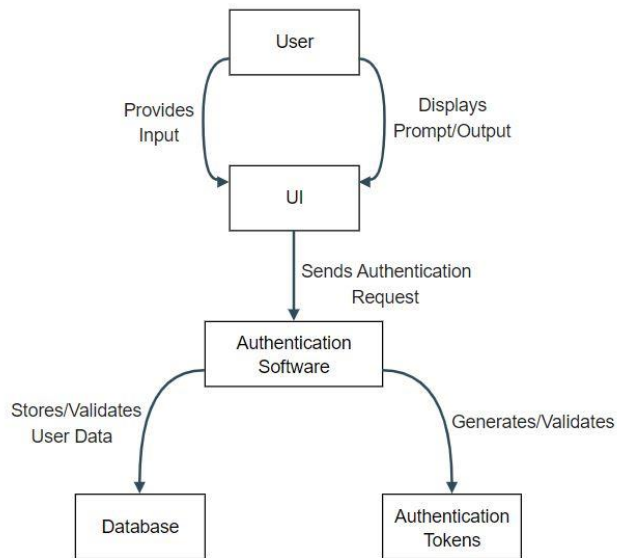


Figure 1: UML Project-Structural Diagram

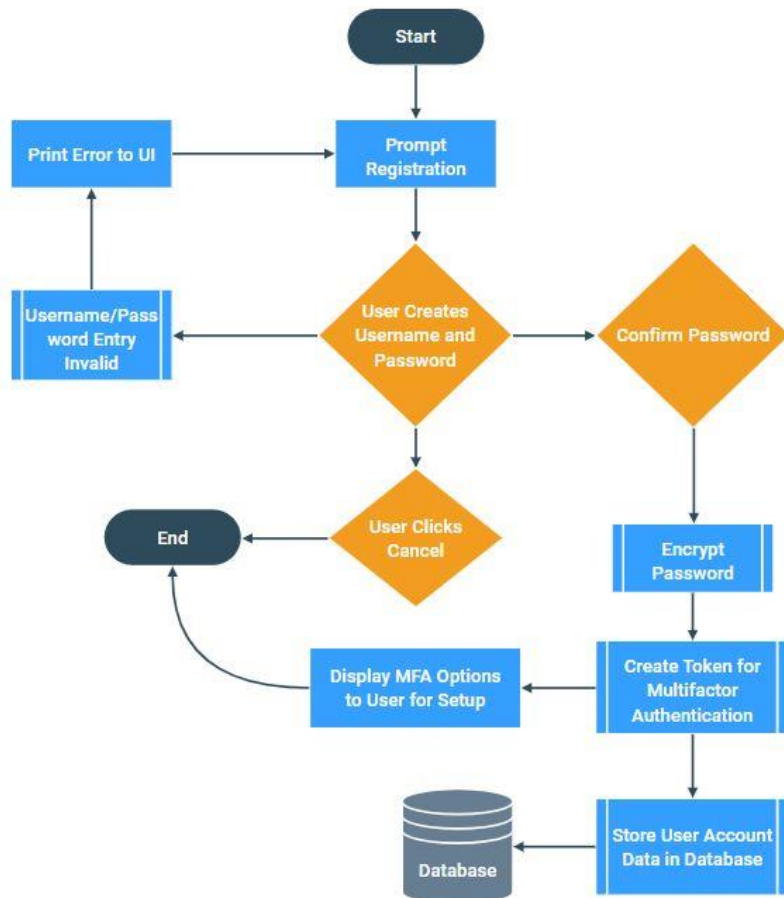


Figure 2: Registration Process Flow-Chart

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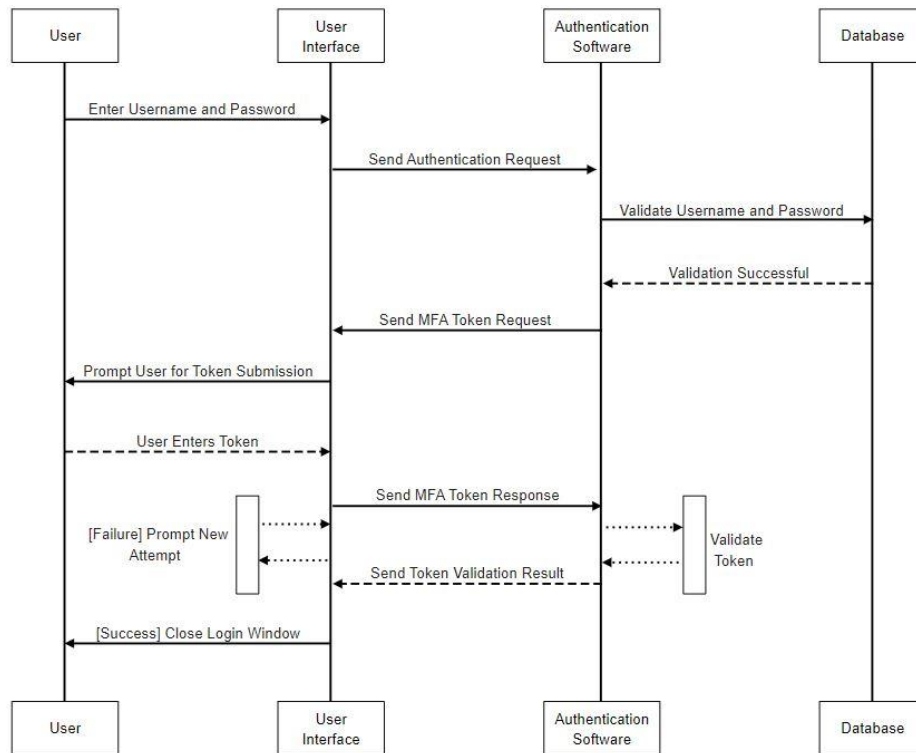


Figure 3: UML Sequence Diagram of Login Process with MFA

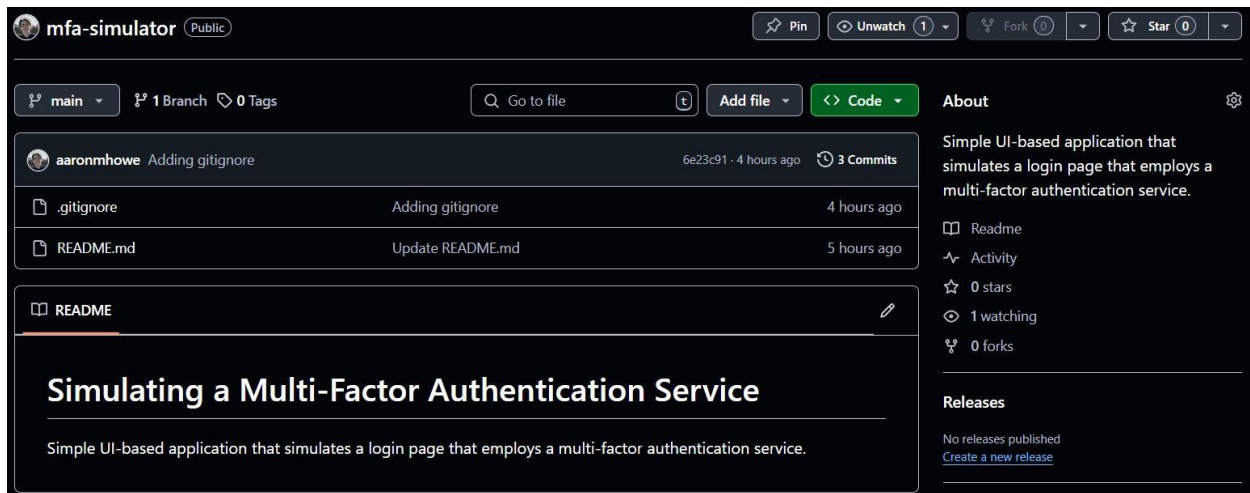


Figure 4: Remote Github Repository <https://github.com/aaronmhowe/mfa-simulator>