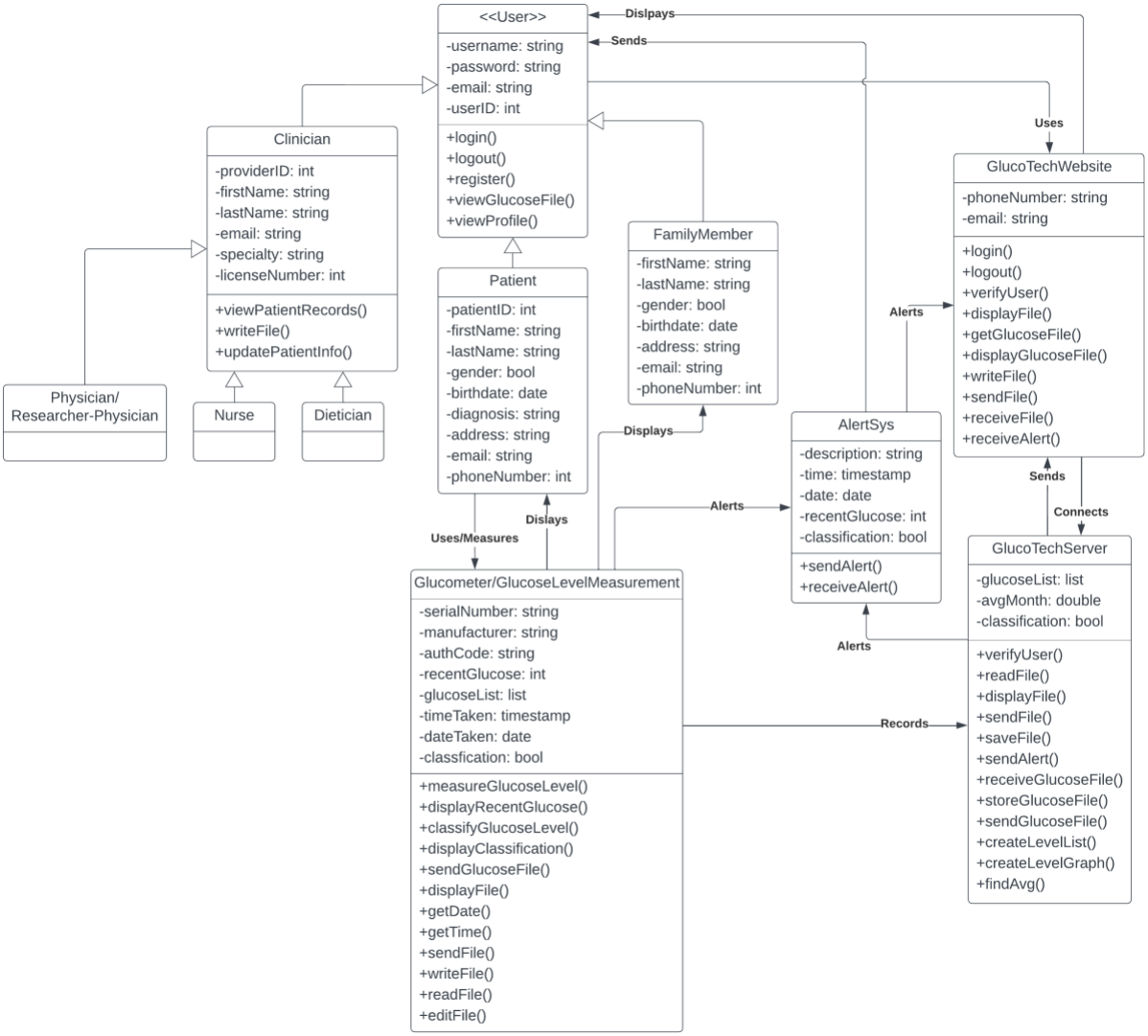
GlucoTech Project
BHI 504

CLASS DIAGRAM



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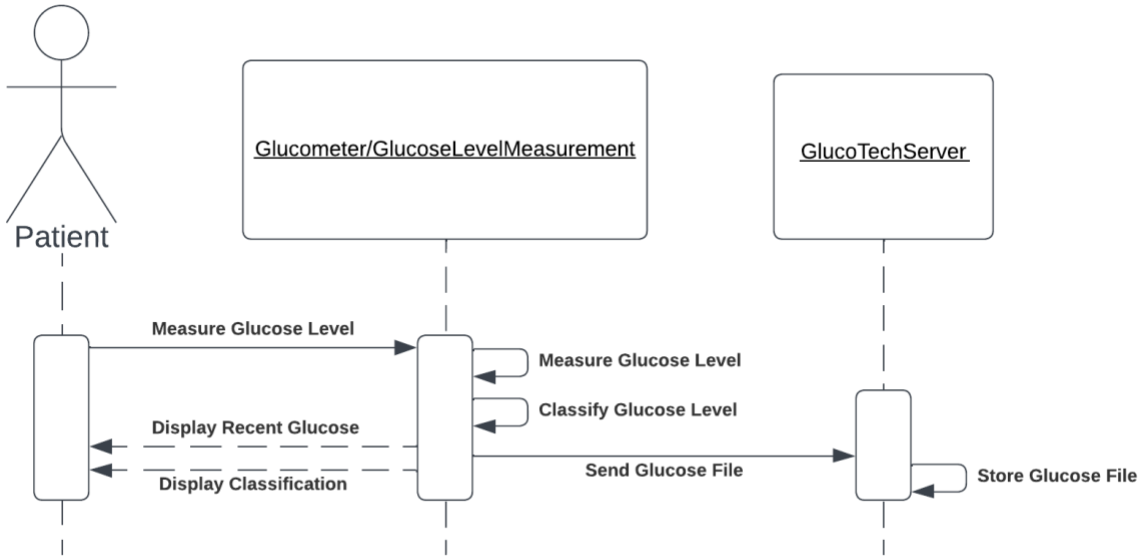
SEQUENCE DIAGRAM

Sequence Diagrams #1 and #2 (User Story #3)

As a diabetic patient, I want to be able to *store* my blood glucose monitoring securely in the cloud storage of GlucoTech and to be able to *access* them easily through their website so that I will limit having errors writing them manually and not have a hard time remembering them.



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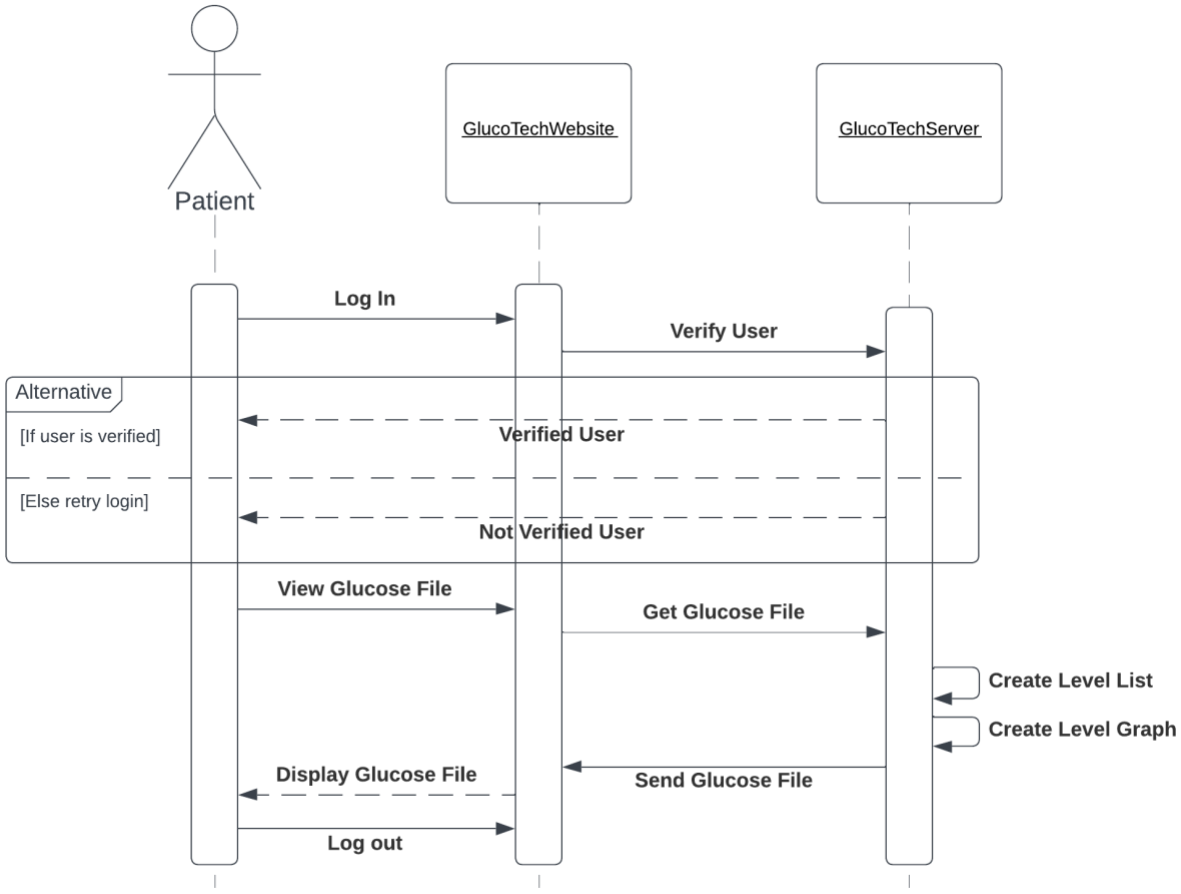

This sequence diagram shows how the patient utilizes the glucometer and how the device classifies and sends the blood glucose monitoring to the GlucoTech Server/Cloud. The device will then display the recorded blood glucose monitoring. Patients who want to monitor their blood glucose levels can access them through the GlucoTech Website. They must use their credentials to log in, and the GlucoTech Server/Cloud will verify their identity. Once verified, they can access their server-generated blood level monitoring in list and graph formats. After accessing their data, they can log out of their accounts.

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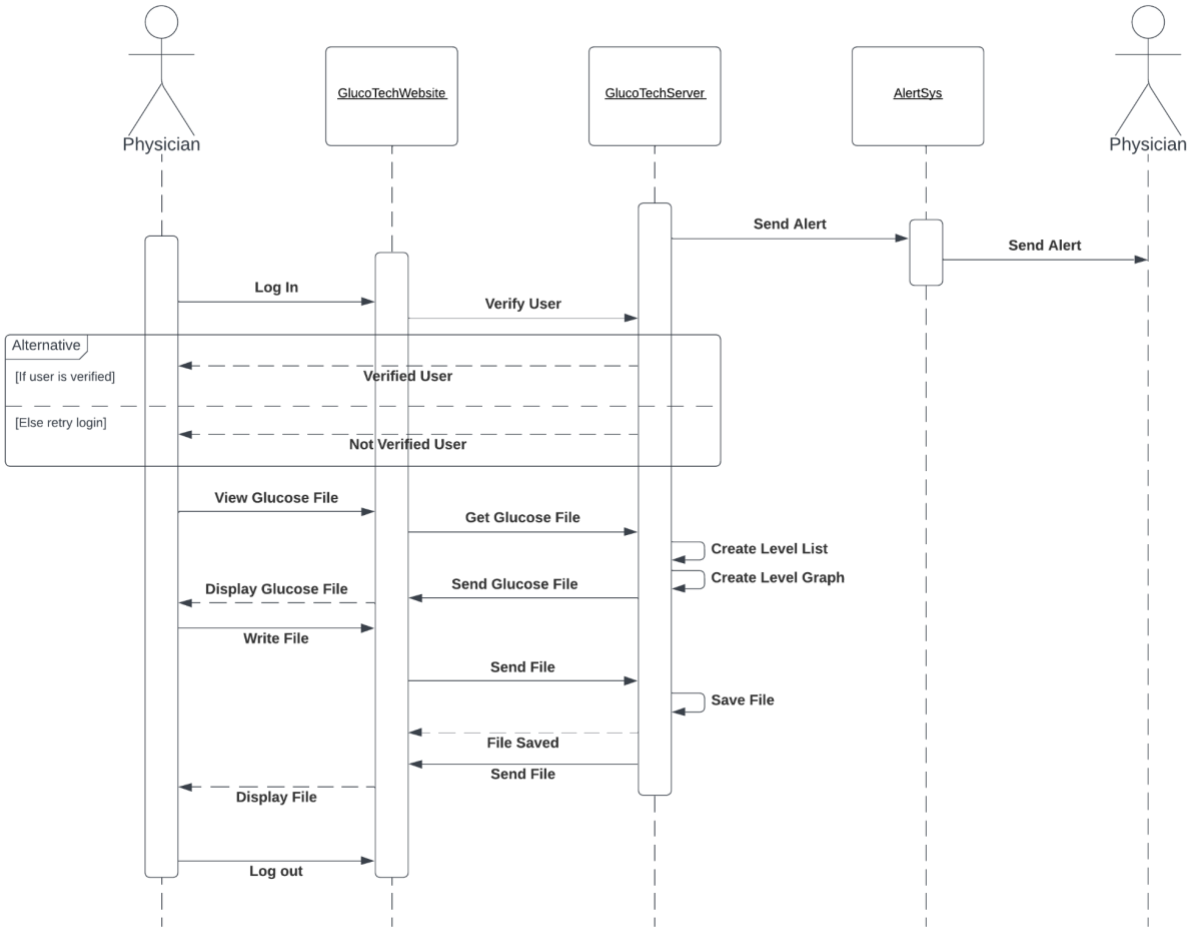
Sequence Diagram #3 (User Story #6)

As a physician, I want to be able to *track and monitor* my patient's blood glucose levels and to *receive* alerts and notifications about their abnormal blood glucose levels remotely so that I can adjust and personalize the treatment and provide insights and recommendations (e.g., tests and referrals).



This sequence diagram illustrates how a physician receives an alert message from the GlucoTech Server/Cloud when it receives an abnormal blood glucose level from the blood glucose level measurements. The Alert System will automatically send a notification message that can be accessed through GlucoTech Website or text message. The physician can log in using their credentials via the GlucoTech Website. Their credentials will be verified from the GlucoTech Server/Cloud. Once verified, the physician can access the server-generated list and graph and write a recommendation for their patients. The recommendation will be uploaded and stored in the GlucoTech Server/Cloud. The new recommendation will be displayed once it is saved. After updating their patients' files, the physician can log out of their account.

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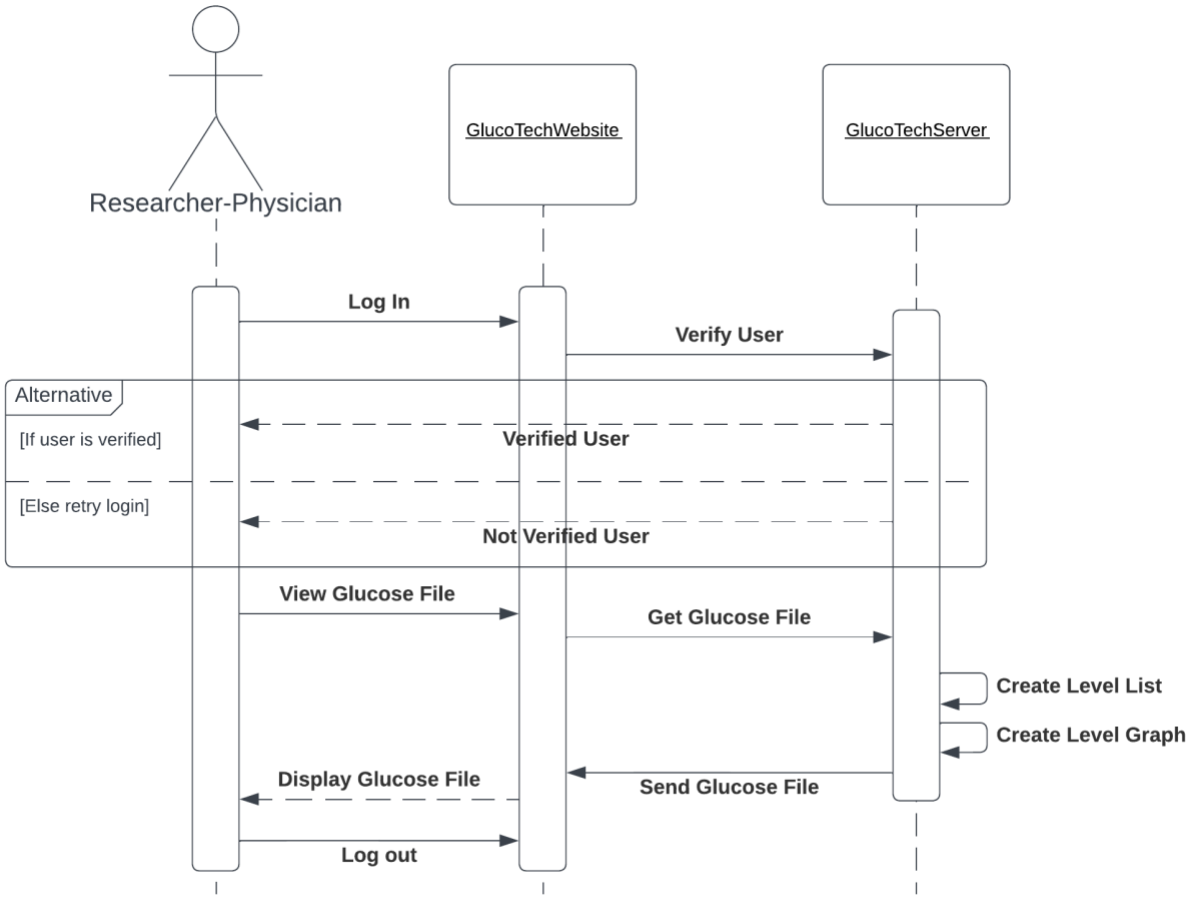
Sequence Diagram #4 (User Story #7)

As a researcher-physician, I want to be able to *use* the anonymized data information with consent about blood glucose monitoring so that I can understand and provide innovative works regarding diabetes.



This sequence diagram shows how a research physician can access the recorded glucose levels of patients from the GlucoTech Website. The research physician must log in through the website using their username and password to gain access to the data. The username and password will be sent to GlucoTech Server for verification. Once the information is verified, the research physician can access the data. The website will display a server-generated blood glucose level list and graph for better data visualization. After obtaining the data, the research physician can log out of their account.

DESIGN RATIONALE

The design of our project focuses on creating a secure, safe, and accessible way of accessing a verified individual's, esp. patients, blood glucose level measurements and sharing them with their clinicians and family members.

The design of the GlucoTech Project is made in a way that is easy to understand and navigate while maintaining security and privacy for the user class, the GlucoTechServer class, and the GlucoTechWebsite class. The user interface of the project mainly revolves around the GlucoTechWebsite class. Once the user is logged in and verified, the GlucoTechWebsite class will now have access through a connection to the GlucoTechServer class for data acquisition and storage. The available actions that the user can take will depend on the user type function of the specific user subclass. Most user subclasses can only access data, and only a few can add. The two classes that can control data addition and editing in the GlucoTechServer class are the Glucometer/GlucoseLevelMeasurement class and the clinician class to achieve an even distribution of coding. The Glucometer/GlucoseLevelMeasurement class can only add blood glucose level data to the GlucoTechServer class, and it is automatically done as it measures the user's blood glucose level. The clinician class, on the other hand, can only control recommendation data getting stored as a file in the GlucoTechServer class. The restricted access to control the stored data information in the GlucoTechServer class lessens the chances of data manipulation and error. All the data obtained and recorded are stored in the GlucoTechServer class, where the glucose lists and graphs are generated.

Under the user class, there are patient, clinician, and family member subclasses who will be given a unique ID (i.e., patientID, providerID, or userID), username, and password to allow them to log in to the GlucoTech Website to access the blood glucose level monitoring safely and securely.

In this project, the patient utilizes a WIFI-connected glucometer that accurately measures blood glucose levels. The measurements are classified as whether they are normal or not; they are displayed on the glucometer device for the patient to view and uploaded and stored electronically in the GlucoTech Server/Cloud. As the server/cloud receives the data, it will create a list and a graph for better data visualization. The patient or other user can access the blood glucose level monitoring by logging in to the GlucoTech Website.

One of the features of this project is the incorporation of the Alert System. Before the measured blood glucose level is sent to the server/cloud, it gets classified as whether it is normal or not. Suppose the measured glucose level is abnormal; an alert notification

message will be sent to the user class via a text message, email, or notification message on the GlucoTech Website. The user class can choose the ways of being notified by turning off or on the notification by accessing the settings on the GlucoTech Website.

Another feature of this project is the ability of the clinician to input recommendations and insight for every patient based on the stored blood glucose level monitoring. The clinician must log in to the GlucoTech Website using their unique username and password; then, they can access their patient from the patient list to view the stored blood glucose level monitoring and write recommendations and insight based on the stored measurements.

This project will allow patients to quickly and securely access their blood glucose level measurements and share them with their family members and clinicians. In addition, clinicians can efficiently and timely provide recommendations as they can access stored blood glucose level monitoring and input/update their treatment plans.

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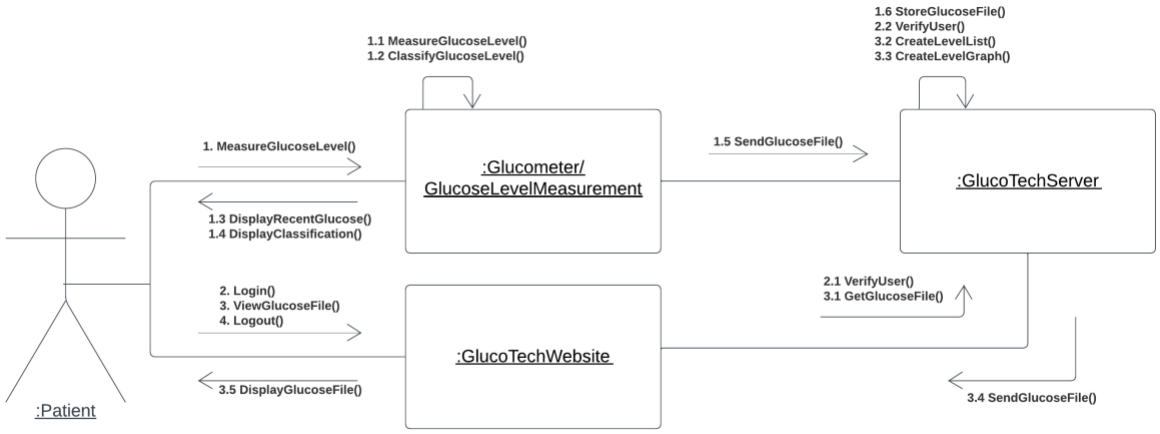
COLLABORATION DIAGRAM



The user's initial contact with the GlucoTechWebsite is shown in this collaboration diagram. To demonstrate the evolution of this system component, the diagram is numbered. The patient's information and blood glucose levels are directly sent to the database from the Glucometer/GlucoseLevelMeasurement. The user enters their assigned login and password to access the GlucoTechWebsite. When a user interacts with the website and requests specific patient information, the result is a patient's blood glucose level record. This interaction is finished when the interface receives the data from the GlucoTechServer and displays it back to the user via the GlucoTechWebsite.