Introduction

The NurtureUS iOS application is intended to improve health and wellness outcomes for expectant mothers and their babies in low socio-economic circumstances in the Tower Health Hospital system of West Reading, PA. The app will provide expectant mothers with information regarding health, fitness, appointment scheduling, and methods of accessing care as well as track their activity within the app, providing visual progress indicators of actions taken to motivate continued use.

NurtureUS is being developed by the authors of this document for administration by the project stakeholders, who are medical students from the Drexel University School of Medicine. After handing off the project, the stakeholders intend to utilize the app with a contained test group of approximately 50 users to research and validate the efficacy of NurtureUs to provide education, better access to care, and ultimately better health outcomes for the user.

Included in this document are the requirements for the NurtureUs app, as agreed upon and refined with the stakeholders, example use cases for the app, the architecture employed in building the app, and test documentation and deployment documentation.

Final Requirements

Access and User Accounts

1. As a user, I can access the NurtureUs mobile app on my iOS device.
    1.1. Users in the beta study group will be provided with instructions for accessing the app when they join the study.
    1.2. Stakeholders will create and provide logins to their study participants prior to the user accessing the app for the first time.
2. As a registered user, when I open the app on my iOS device, I can enter my username and password and login.
    2.1. Upon login, the home screen will display.
3. As a logged in user, I can log out by tapping the logout button at the top right of any page.

Home Page

4. As a logged in user, I am directed to the Home screen upon opening the app.

5. I can view a list of suggested activities for the current day within a “To Do” section.
    5.1. I can mark these activities as completed
6. I can view a count of my completed activities over time.
7. I can see a visual progression in the form of a growing plant of my completion of these activities.

Calendar Page

8. As a user visiting the calendar page, I see my calendar for the current month and all scheduled activities.
9. Tapping on an day will open a larger view of that day
    9.1. Within the activity view, I can:
        9.1.1. Delete the activity
        9.1.2. Edit the date and time of the activity
        9.1.3. Edit the name of the activity
10. Tapping on the + sign opens a dialogue to add a new activity.
    10.1. Within the new activity dialogue, I can:
        10.1.1. Enter the name of the activity
        10.1.2. Enter the date and time of the activity
        10.1.3. Save the activity to my calendar
11. Upon saving a new activity, it will be displayed on the calendar on the day and time I defined.
12. I can view previous months or upcoming months as well as the current month.

Locations Page

13. As a user visiting the locations page, I can view a map of maternal healthcare resources in the West Reading area.
    13.1. The map will display location pins based on a list of locations provided by the stakeholders.
    13.2. By tapping on a location pin, I will see the name, address, website, and description for each location.
    13.3. If I tap on an address, the location will open in the Apple Maps app so that I can navigate to the location.

Health/Fitness Page

14. As a user on the Health/Fitness page, I can view educational video content related to maternal health and infant care.
    14.1. I can select different content categories, including breastfeeding, fitness, and health.
    14.2. I can scroll through the content to see each video.

14.3. I can play, pause, adjust the volume, and view each video in full screen

Contact Us Page

15. As a user on the Contact Us page, I can submit feedback to the stakeholders via a feedback form.
    15.1. I can tap in the provided text box and enter text via the default slide out keyboard.
    15.2. Upon tapping the submit button, my text will be saved to the NurtureUs database, which the stakeholders can access.
16. As a user on the Contact Us page, I can view Tower Health contact and appointment information.

Data Collection and Export

17. User credentials and user data will be stored in a database.
18. Data to be stored includes: username, encrypted password, a log of the date and time each time the user opens the app, task completion activity, feedback submitted.
19. Stakeholders can log into Firebase to view this data in the database.

Design and Navigation

20. As a patient of Tower Health Hospital, I know the NutureUs app is related to Tower Health based on its design and branding.
21. As a user, I can navigate between screens of the app using the icon menu at the bottom of each screen
    21.1. The menu will include links to the following pages: Fitness/Health, Calendar, Home, Locations, TowerHealth.

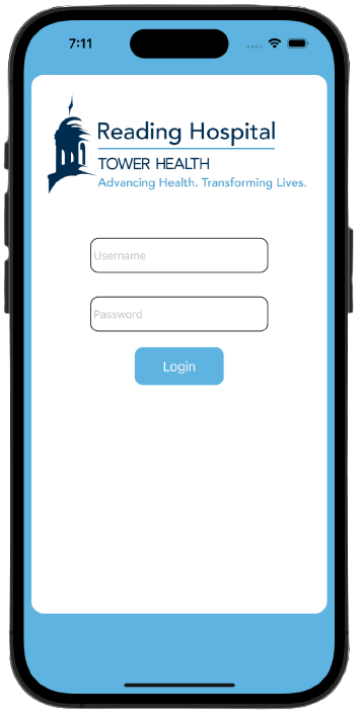
Deployment

22. The NurtureUS app was deployed and is available for download by test users via Test Flight.

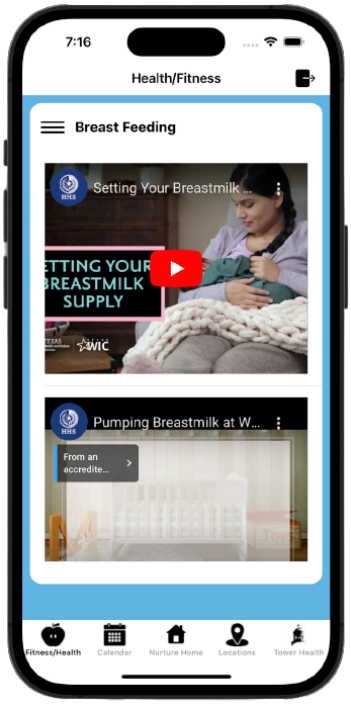
Use Cases

Use Case 1	Log in
Actor	NurtureUs User

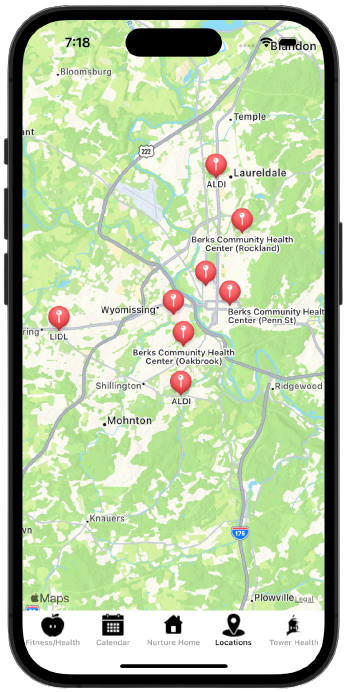
Basic Flow	The NurtureUs User opens the NurtureUs app on their iOS device. There, they will be greeted with a login screen, asking them to fill in the screen with a username and password that was previously created. The login information is sent to the Firebase authentication service to verify that the values provided match the user's expected values. If they match, the NurtureUs User is logged into the NurtureUs app, and will have access to the other sections of the NurtureUs app.
Alternate Flow	If the NurtureUs User provides login information that does not match the expected values, the Firebase authentication service will return an error, and the user will be given a response prompt telling them the information is incorrect and to please try again.



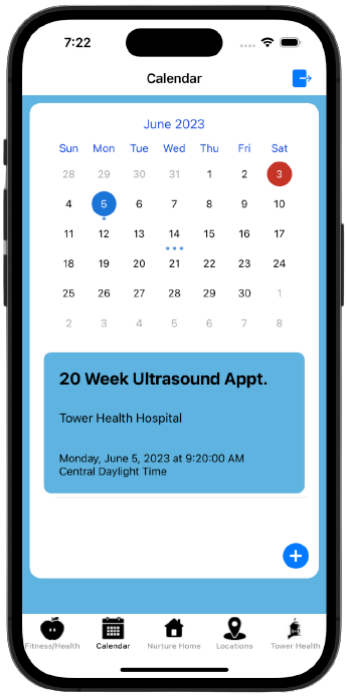
Use Case 2	View Pregnancy Video Content
Actor	NurtureUs User
Basic Flow	The NurtureUs User navigates to the Fitness/Health section of the NurtureUs app. There, the user will have access to Youtube videos related to pregnancy fitness and pregnancy health, sorted into subsections.



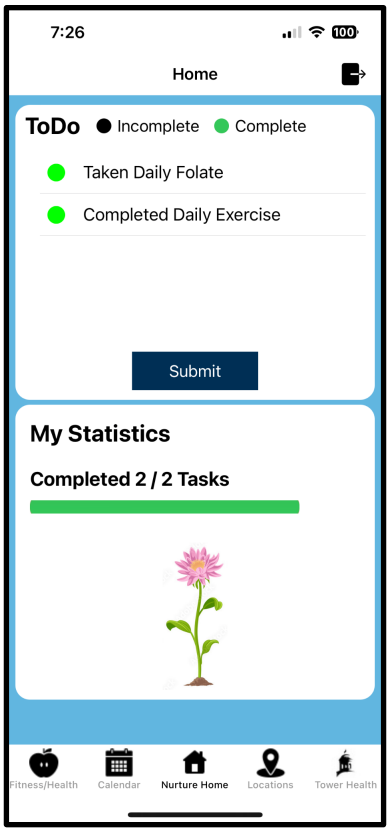
Use Case 3	View Clinic Locations
Actor	NurtureUs User
Basic Flow	The NurtureUs User navigates to the Locations section of the NurtureUs app. There, the NurtureUs User will see all clinics partnered with the NurtureUs app as pins on a map. If the User selects one of these pins, location information will be displayed, including a link to the clinic's website.



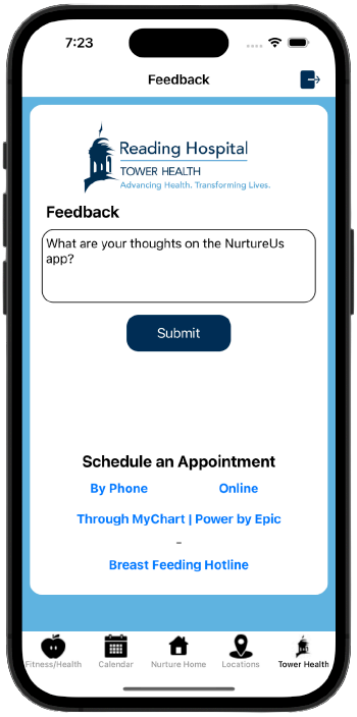
Use Case 4	NurtureUs Calendar
Actor	NurtureUs User
Basic Flow	The NurtureUs User navigates to the Calendar section of the NurtureUs app. There, the NurtureUs User will have a separate, private calendar for the User to add appointments or other pregnancy health and fitness related events. The User may import these events to their phone calendar if they wish.



Use Case 5	NatureUs Home page
Actor	NurtureUs User
Basic Flow	The NurtureUs User navigates to the NurtureUs home section for the NurtureUs app. There, the user will see a To Do checklist consisting of two daily resetting items: “Completed Daily Exercise” and “Taken Daily Folate”. The user may check these off as they complete them, and select the “Submit” button to store these into the database. At the bottom of the screen, the User will see a “My Statistics” subsection, where they can see how many days they have done each of the daily activities compared to how many days they have been in the study, coupled with a picture of a flower growing as a visual representation of their progress.
Alternate Flow	If the NurtureUs user does not submit activity completion by 12:00 AM ET, then the database will update those days as not completed and the “My Statistics” subsection will be updated accordingly. The “To Do” subsection will then be cleared out for the next day’s activities.

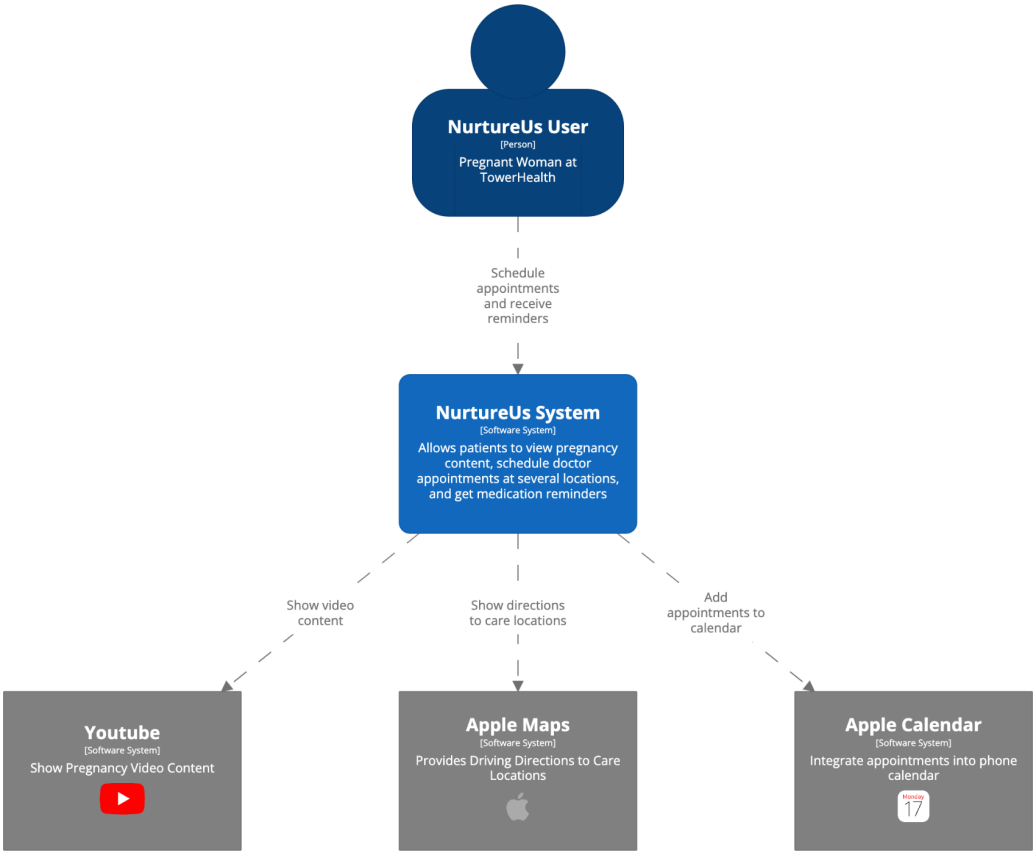


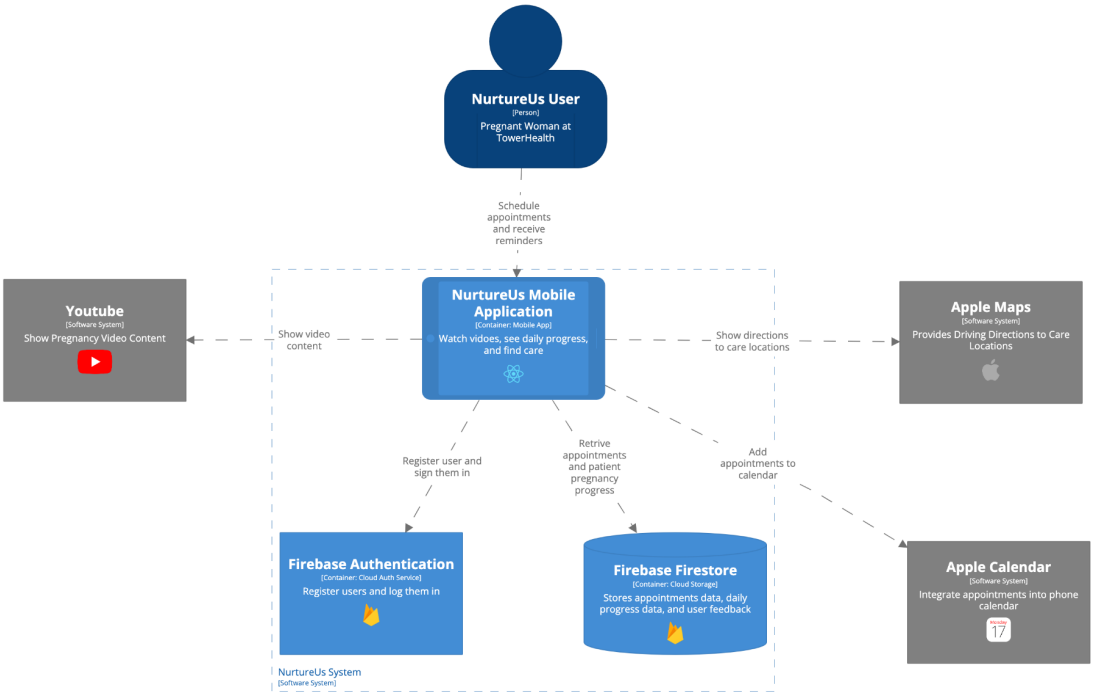
Use Case 5	TowerHealth Section
Actor	NurtureUs User
Basic Flow	The NurtureUs User navigates to the “Tower Health” section of the NurtureUs app. There, the user will see contact information to contact Tower Health and schedule appointments, as well as a fillable feedback form for the User to submit any feedback they would like to the team running the NurtureUs study. This feedback will then be saved in the database.

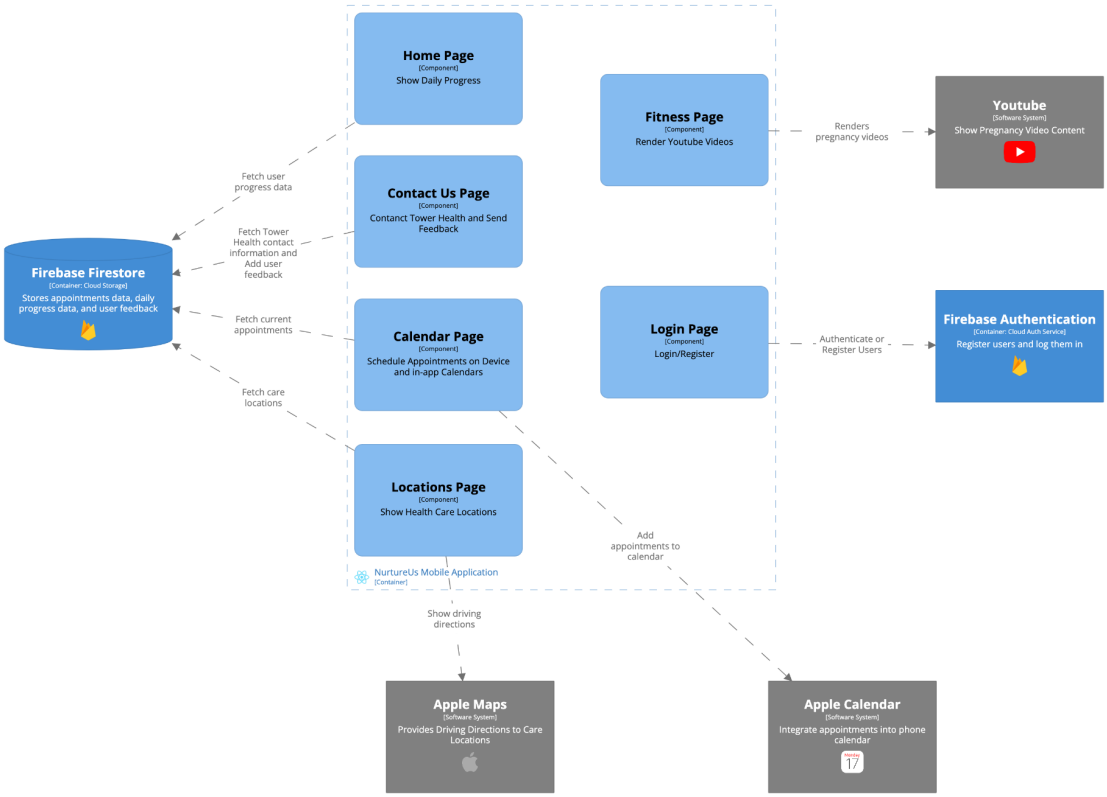

7:23
Feedback
Reading Hospital
TOWER HEALTH
Advancing Health. Transforming Lives.
Feedback
What are your thoughts on the NurtureUs app?
Submit
Schedule an Appointment
By Phone
Online
Through MyChart | Power by Epic
-
Breast Feeding Hotline
Fitness/Health
Calendar
Nurture Home
Locations
Tower Health

Architecture

C4 Model




NurtureUs User
[Person]
Pregnant Woman at TowerHealth
Schedule appointments and receive reminders
Youtube
[Software System]
Show Pregnancy Video Content
Show video content
NurtureUs Mobile Application
[Container: Mobile App]
Watch vidoes, see daily progress, and find care
Show directions to care locations
Apple Maps
[Software System]
Provides Driving Directions to Care Locations
Register user and sign them in
Retrive appointments and patient pregnancy progress
Add appointments to calendar
Firebase Authentication
[Container: Cloud Auth Service]
Register users and log them in
Firebase Firestore
[Container: Cloud Storage]
Stores appointments data, daily progress data, and user feedback
Apple Calendar
[Software System]
Integrate appointments into phone calendar
NurtureUs System
[Software System]

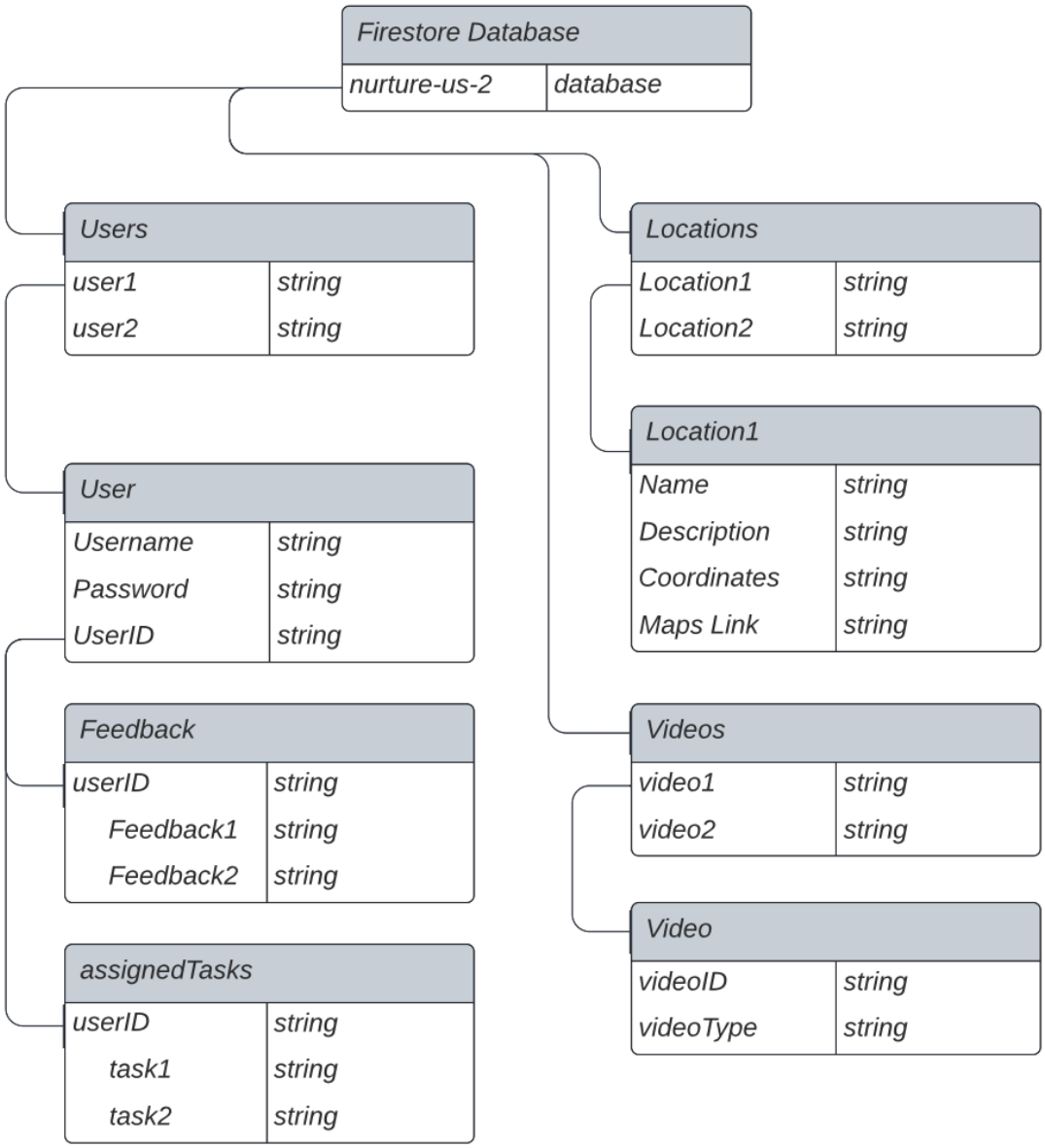


Supporting Technology

NurtureUs was initially developed in React Native but was then converted to Swift using XCode. Additional supporting technologies included Firebase for database and authentication management and Test Flight for beta test deployment. Login and management credentials for these supporting technologies are included in the Testing and Application Management section of this document.

Database Schema

Firebase was used to create and manage the NurtureUs database for both data and authentication. The database consists of several tables as outlined below.


Firestore Database
nurture-us-2
database
Users
user1
string
user2
string
User
Username
string
Password
string
UserID
string
Feedback
userID
string
Feedback1
string
Feedback2
string
assignedTasks
userID
string
task1
string
task2
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Locations
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Location2
string
Location1
Name
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Description
string
Coordinates
string
Maps Link
string
Videos
video1
string
video2
string
Video
videoID
string
videoType
string