

Universidad de Las Palmas de Gran Canaria
Escuela de Ingeniería Informática
Grado en Ingeniería Informática
Programación de Aplicaciones Móviles Nativas



Pill APP

The mobile application adapted for seniors, designed as a supplement to the interactive medicine dispenser, aimed at helping them in everyday life by systematizing the process of taking medicines.

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1. Introduction

Over the past three years, the Covid-19 pandemic has shaken the world, changing people's attitudes to health and the number of drugs they take. According to a report by The IQVIA Institute from December 2021, over the last few years, we can see an upward trend in prescribed drugs, "especially drugs thought to treat COVID-19, supplements, antidepressants, and stimulants for attention-deficit hyperactivity disorder (ADHD)". [1]

According to Health Policy Institute, in 2021, about 66% of U.S. adults were taking prescription drugs. [2] The statistics mentioned above refer only to prescription drugs. So how many drugs do we use, including over-the-counter medications? In 2011, the average number of pills taken by a British citizen in a lifetime was 40,000. [3] These numbers are shockingly large and will increase due to the "growing demand for novel drug discovery to combat the growing incidence of cancers and other diseases across the globe". [4]

Not surprisingly, people over the age of 65 are most likely to take medication. Around 8 out of 9 use prescription drugs daily. [5]

Due to the high demand and the small number of applications adapted to elderly users, the idea of creating the Pill App emerged.

2. Problem definition and analysis

From observations of those closest to me and my own experience, I have noticed that it is difficult to remember to take all medications, particularly when their number increases with age. Medicine dispensers available on the market are underdeveloped, and mobile applications that remind you to take pills are not appropriately adapted to seniors who have problems using smartphones and need the interface to be as simple as possible.

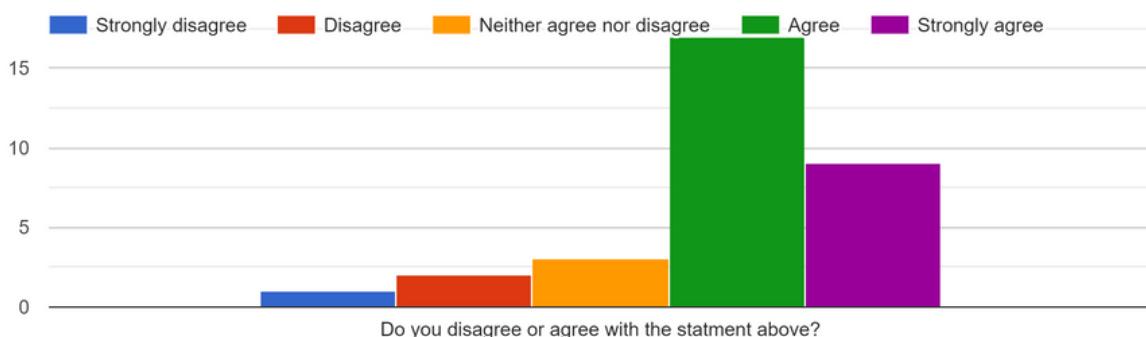
3. The aim of the project

The idea to create an interactive medicine dispenser adapted specifically for seniors was born as the subject of my diploma thesis. As a supplement, this I decided to create a dedicated mobile application that would enable the operation of the device and have several useful functions while maintaining the highest possible simplicity.

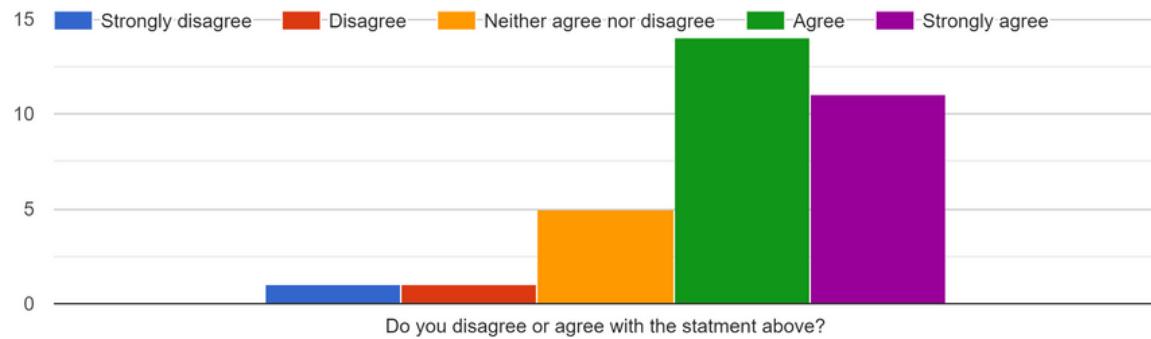
4. Survey

To better understand the future users of the Pill App and respond to their needs in the best possible way, the team prepared an anonymous multi-question survey. One hundred users from various age groups and many nationalities responded to the form. The cumulative results are presented below in the form of charts.

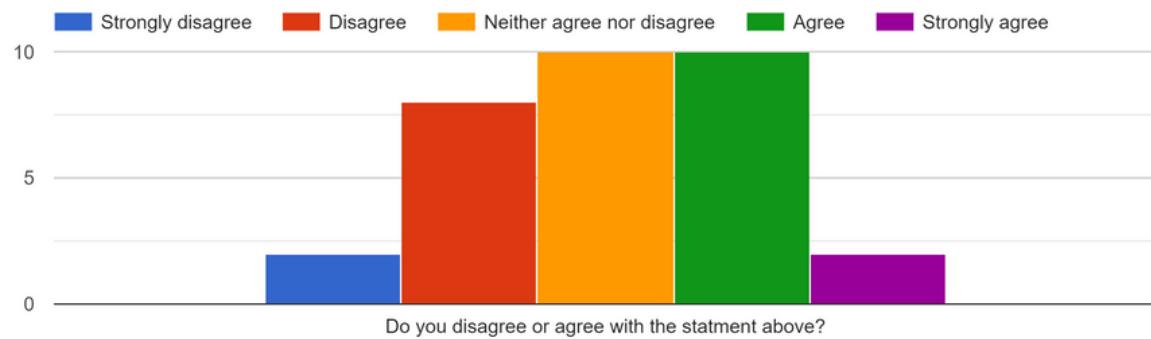
I have trouble remembering to take my medications at the right times, or someone close to you have this problem.



I find medication organizers useful.

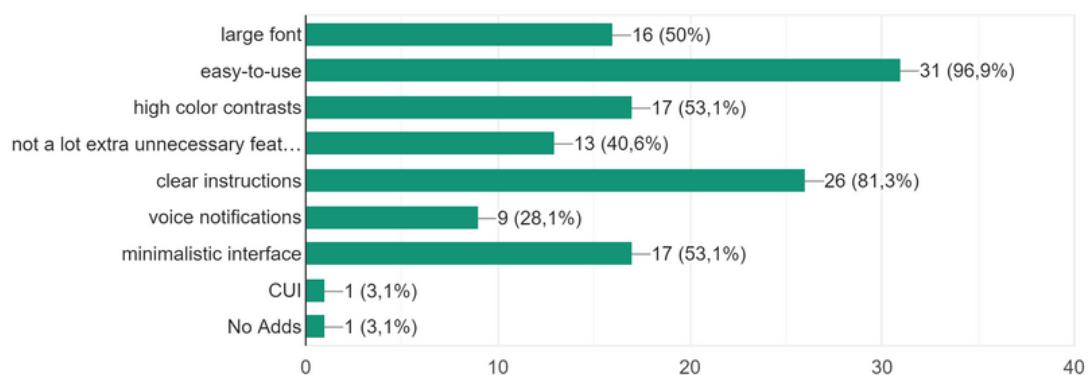


I know about the existence of the application helping to systematize the process of taking medicines.



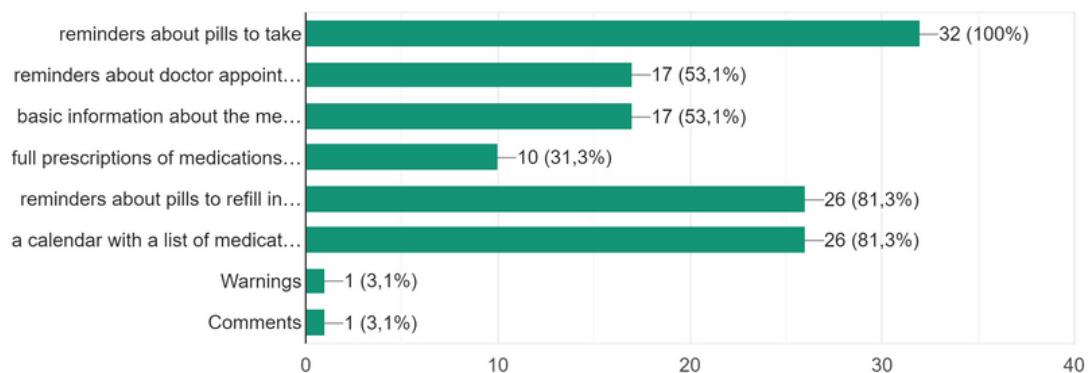
What is important for the elderly people using mobile applications? Answer from your own experience or the experience of people from your closest environment.

32 odpowiedzi

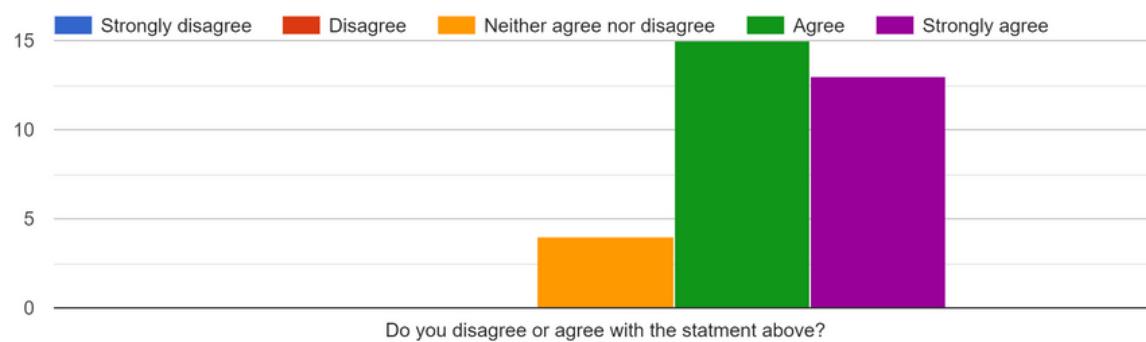


What features should such an application have?

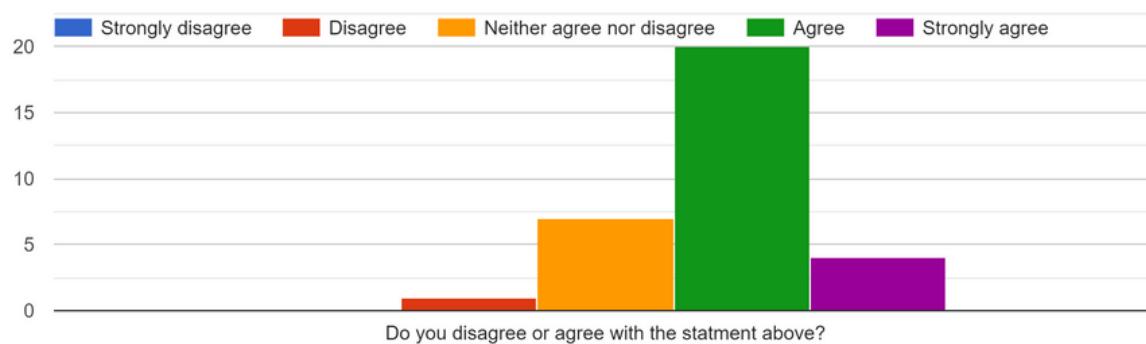
32 odpowiedzi



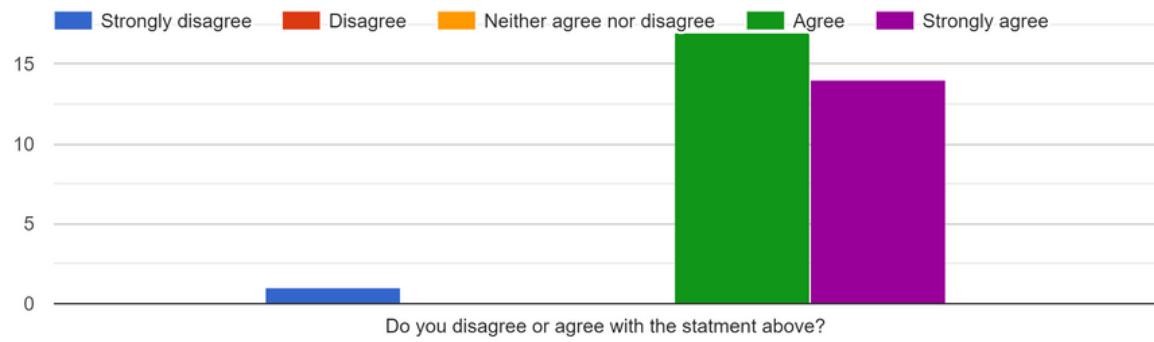
I find such an application useful.



I would use such an application to control my medication.

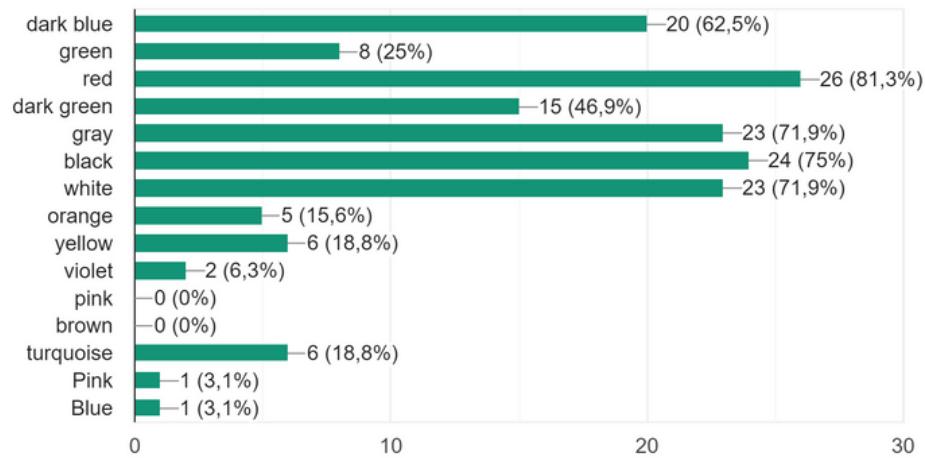


I would use such an application as a caregiver for an elderly or sick person.



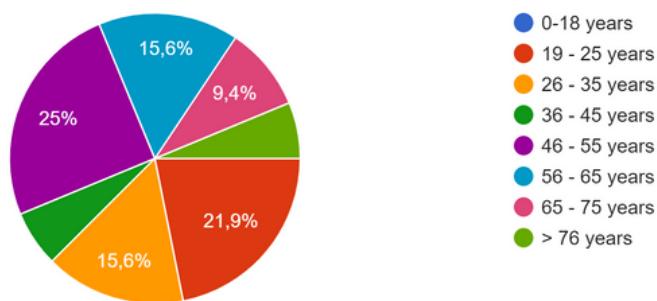
what colors do you like the most in an app?

32 odpowiedzi



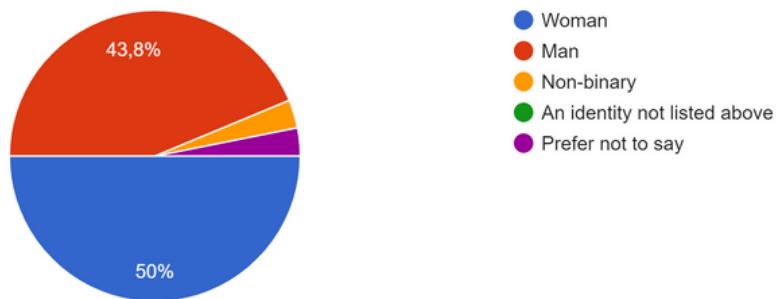
How old are you?

32 odpowiedzi



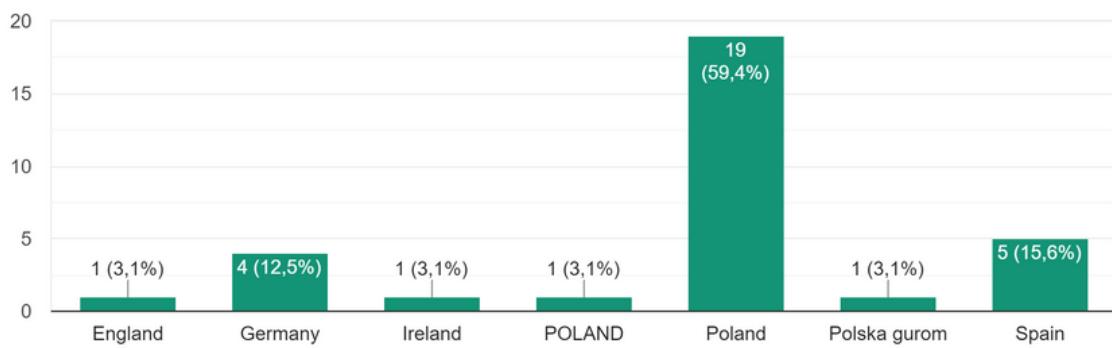
What is your gender identity?

32 odpowiedzi



What country are you from?

32 odpowiedzi



I created this survey using Google Forms.

Link to the survey:

<https://forms.gle/68YUxaUxzhFa61xx5>

5. Objectives

After in-depth research and analysis of the survey results, I defined the most crucial project objectives.



icons labeled with text whenever possible



no complex gestures that require more than two fingers



every part of the interaction kept easy to understand and complete



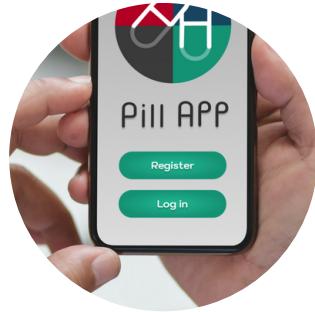
good readability and color contrast



including reminders and tooltips



scaled up anything that's meant to be read or clicked



big font sizes (minimum 16 px), easy to read and sans serif fonts

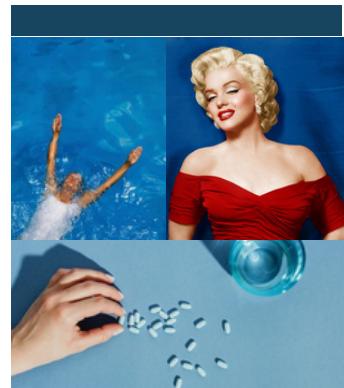


simple to use navigation and proper onboarding to introduce users to functions they might not be familiar with



progressive disclosure and minimalist design (help prevent cognitive overload from slower mental processing speeds in older adults)

6. Design



Moodboard

Based on user preferences and research, I chose the main color themes of the application. Then I created different color versions of the interface to show them to users, to get their opinions and to study their reactions.

Version 1.0

The grid displays the following screens:

- Splash Screen:** Shows the app logo "pill_app" with a red and green capsule icon.
- Login Screen:** Contains fields for "E-mail" and "Password", and a "Log in" button.
- Registration Screen:** Contains fields for "Name", "E-mail", "Password", "Repeat password", and a "Register" button.
- My schedule Screen:** Displays a calendar for the week (Thu 10 to Tue 15). It shows scheduled medications: Ibuprom at 8:00 a.m., Victoza at 8:30 a.m., Optrex Intensive at 12:00 p.m., and Ibuprom at 1:30 p.m. A time indicator shows it's 8:34 a.m.
- To refill Screen:** Shows a dropdown menu set to "Ibuprom" and a field for "Number of refilled pills".
- Change schedule Screen:** Features a "Add medicine" button with a capsule icon and a "Add a doctor's appointment" button with a stethoscope icon.
- Add medicine Screen:** Contains fields for "Name" (Ibuprom), "Days" (Monday), "Hour" (12:00 p.m.), and "Day to refill" (Monday).
- Add appointment Screen:** Contains fields for "Date" and "Time", and dropdowns for "Name of the hospital", "Name of the doctor", and "Concept". It also includes a "Register" button.

Version 2.0

The grid displays the same 8 screens as Version 1.0, but with a dark background. The buttons and text colors are adjusted to be more legible against the dark background.

Version 3.0

The wireframe for Version 3.0 consists of the following screens:

- Home Screen:** Features a logo with two overlapping capsules (one red, one green) and the text "Pill APP". Below the logo are two buttons: "Register" (red) and "Log in" (green).
- Login Screen:** Contains fields for "E-mail" and "Password", followed by a "Log in" button.
- Register Screen:** Contains fields for "Name", "E-mail", "Password", and a "Register" button.
- Schedule Screen:** Shows a weekly calendar from Thursday to Tuesday. It displays a schedule for Saturday, November 12, 2022, at 8:34 a.m. under the heading "Morning". The schedule includes:
 - 8:00 Ibuprom, 400mg (2 tablets)
 - 8:30 Victoza, 6 mg/ml (1 injection)
 - Noon: Optrex Intensive (2 drops)
 - 1:30 Ibuprom, 400mg (2 tablets)

Version 4.0

The wireframe for Version 4.0 consists of the following screens:

- Home Screen:** Features a logo with two overlapping capsules (one red, one green) and the text "Pill APP". Below the logo are two buttons: "Register" (red) and "Log in" (green).
- Login Screen:** Contains fields for "E-mail" and "Password", followed by a "Log in" button.
- Register Screen:** Contains fields for "Name", "E-mail", "Password", and a "Register" button.
- Schedule Screen:** Shows a weekly calendar from Thursday to Tuesday. It displays a schedule for Saturday, November 12, 2022, at 8:34 a.m. under the heading "Morning". The schedule includes:
 - 8:00 Ibuprom, 400mg (2 tablets)
 - 8:30 Victoza, 6 mg/ml (1 injection)
 - Noon: Optrex Intensive (2 drops)
 - 1:30 Ibuprom, 400mg (2 tablets)

Version 5.0

The wireframe illustrates the user interface for Version 5.0 of the Pill APP. It includes:

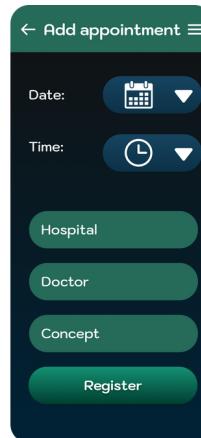
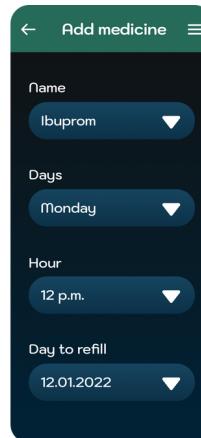
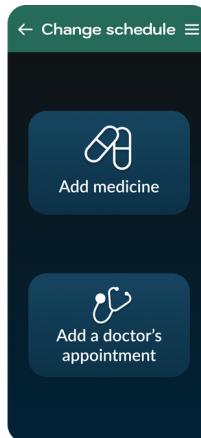
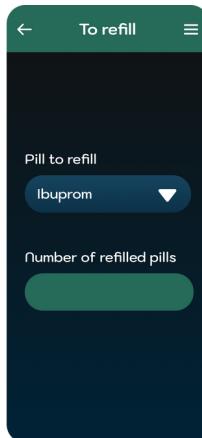
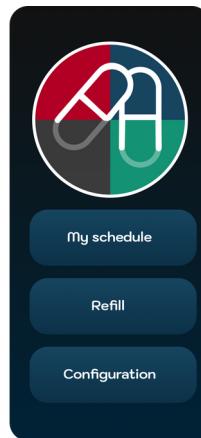
- Login Screen:** Features a logo with two overlapping capsules (red, grey, and green), the text "Pill APP", and two buttons: "Register" (red) and "Log in" (green).
- My schedule:** Displays a weekly calendar from Wednesday to Tuesday. It shows the date as "Today is 12 November 2022" and the time as "8:34 a.m.". It lists morning and noon scheduled medications.
- To refill:** Shows a dropdown menu set to "Ibuprom" and a field for "Number of refilled pills".
- Change schedule:** Contains two buttons: "Add medicine" and "Add a doctor's appointment".
- Add medicine:** A form with fields for "Name" (set to "Ibuprom"), "Days" (set to "Monday"), "Hour" (set to "12 p.m."), and "Day to refill" (set to "12.01.2022").
- Add appointment:** A form with fields for "Date" (calendar icon), "Time" (clock icon), "Hospital", "Doctor", "Concept", and a "Register" button.

Version 6.0

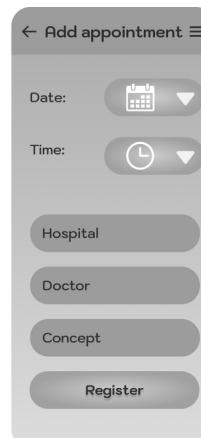
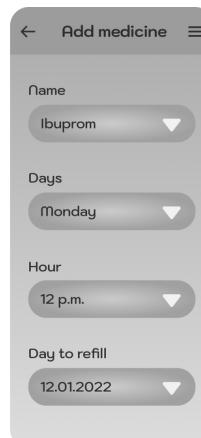
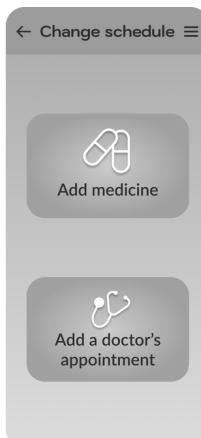
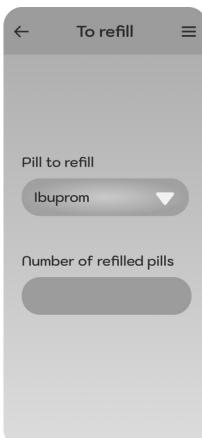
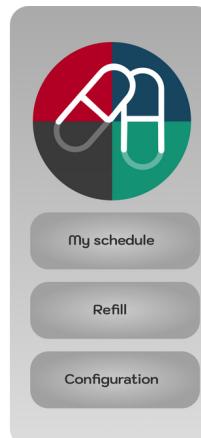
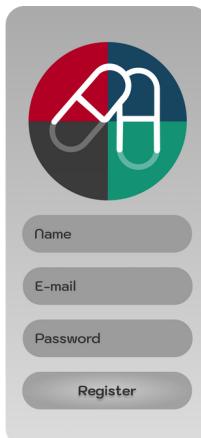
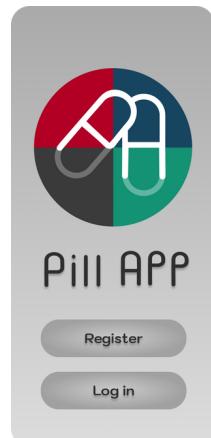
The wireframe illustrates the user interface for Version 6.0 of the Pill APP, featuring a dark mode design. It includes the same screens as Version 5.0:

- Login Screen:** Identical to Version 5.0, with a logo, "Pill APP" text, and "Register" (red) and "Log in" (green) buttons.
- My schedule:** Identical to Version 5.0, showing the weekly calendar, today's date, time, and scheduled medications.
- To refill:** Identical to Version 5.0, showing a dropdown menu for "Ibuprom" and a pill count input field.
- Change schedule:** Identical to Version 5.0, containing "Add medicine" and "Add a doctor's appointment" buttons.
- Add medicine:** Identical to Version 5.0, showing a form with "Name" (Ibuprom), "Days" (Monday), "Hour" (12 p.m.), and "Day to refill" (12.01.2022).
- Add appointment:** Identical to Version 5.0, showing fields for "Date" (calendar), "Time" (clock), "Hospital", "Doctor", "Concept", and a "Register" button.

Version 7.0



Version 8.0



Version 9.0



Logo designs were created to complement the visual identification of the application.



It turned out that for most users the colors were too intense. They complained about too much red. Green and properly contrasted shades of gray turned out to be the preferred color theme.

The new, final design looks like this:



7. Technologies



8. Conclusions

Working on the application from the IT side turned out to be an interesting challenge for me. Starting from scratch, I had to deal with many very difficult tasks. While programming, I watched countless tutorials and learned from many sites. In most cases, the tutorials were not up to date and I had to find out on my own how to solve the problem in the newer version of Android Studio. There were times when I had to throw away many hours of work because I found myself at a dead end from which I couldn't get out. It was easier to start over than to find the source of the mistakes. I managed to connect android studio with Firebase and explore the topic of User Authentication. I also managed to implement CRUD on a real-time database... But without "U". In the future, however, I intend to further develop this application and make it work as I expect.

Sources

- [1] <https://www.iqvia.com/insights/the-iqvia-institute/reports/the-global-use-of-medicines-2022>
- [2] <https://www.singlecare.com/blog/news/prescription-drug-statistics/>
- [3] <https://humanitiesandhealth.wordpress.com/2011/04/18/pharmacopoeia-or-how-many-pills-do-we-take-in-a-lifetime-a-wellcome-trust-exhibition-at-the-british-museum/>
- [4] <https://www.grandviewresearch.com/industry-analysis/personalized-medicine-market>
- [5] <https://www.kff.org/health-reform/issue-brief/data-note-prescription-drugs-and-older-adults/>