HCI Project Report Sprint 3

Team 2

Remind & Record

Interactive Reminder System to Remind and Track Actions through Notifications

Research Questions:

Can a single notification help users remember their day-to-day activities and improve daily task completion?

Is the information of the actual actions of the users recorded?

Problem statement:

A single notification from reminder system applications can be ignored by the user and the task might not be accomplished. Reminding applications do not take any input from the user about task completion. With the lack of a proper reminder mechanism, users may lose motivation and may not track their progress. Individuals who intend to learn new things over a period of time, find it difficult to track the differences between their planned activities and actual actions. Recording the history of the user activities helps users to design and analyze their self-development strategies.

Motivation:

- Most people require continuous motivation to reach their set goals. Involved in their daily chores they might forget their scheduled tasks or miss the deadlines.
- People with busy schedules ignore their health habits so they need a reminder to achieve their health-related goals.
- Elderly people may lack the cognitive abilities to remember their daily medication. Women require a reminder of the menstrual cycle to monitor their reproductive health.
- Students enrolled in multiple courses may not remember all the deadlines of the assignments.
- Individuals who are interested in learning new things can face difficulty in maintaining constant commitment.

- Single notifications are mostly ignored and there is a need for an application that can interact with the user and query about their activities and keep track of them. This can help users maintain consistent behavior and boost self-motivation.

Literature Survey:

Reminder structures play a critical position in several domains, including personal assignment management and healthcare. They offer huge support in enhancing consistency, productiveness, and behavioral trade. The study explores the complex and diverse aspects of reminder systems.

Reminder System Applications:

Healthcare Applications: The papers discussed the application of reminder systems in healthcare, particularly focusing on medication among the elderly. The available systems, often incorporated voice-based alerts demonstrate a positive impact on commitment, reducing the likelihood of missed doses and enhancing overall patient care.

Task Trigger software emphasizes the importance of context-conscious reminders, displaying that place-based reminders can offer extra relevance and timely prompts than traditional time-based systems, thereby improving mission of completion costs and person engagement.

Academic Applications: Research on instructional demanding situations in higher schooling indicates how reminder structures can lessen the effect of overlooked assignments. It additionally shows that timely and contextually suitable reminders may have a major effect on pupil behavior and academic performance.

Effectiveness of reminder Systems:

General Effectiveness: Reminder structures successfully seize attention. They work through shifting attention and, under the right situations, prompting individuals to act, lowering the possibilities of forgetting and enhancing compliance with preferred behaviors.

User Engagement: Studies spotlight the assignment of preserving consumer engagement over time. Reminder structures want to strike a balance between being beneficial and becoming intrusive or annoying, as excessive reminders can lead to disengagement or annoyance.

Effective reminder structures require cautious attention of timing and personalization. The effectiveness of a reminder can significantly rely on its relevance and the consumer's capability to behave upon it in the intervening time it is obtained.

Notification Strategies for Enhanced User Engagement and Well-being:

Delivering notifications at regular intervals throughout the day, known as batching notifications, could enhance mental health and well-being.
A study examined students' possibilities among 3 kinds of reminder techniques namely reminder apps, email indicators, and bulletins on online platforms. It examines how powerful these tools are in helping students with their curriculum and in supporting them with previewing and reviewing their guides. For students, the usage of reminders helps them to be extra handy and on the spot regarding activities and obtaining direction statistics in comparison to e-mail.

A study shows that customized push notifications typically had greater success in promoting self-monitoring sports. However, for users who often interact with the app, notifications that offer insights proved to be extra motivating for self-monitoring. On the opposite hand, people who used the app much less regularly were less willing to respond to the notifications.

A dimensional notification in app layout refers to a notification system that categorizes notifications primarily based on one-of-a-kind dimensions or standards. This method allows for organizing notifications, making them extra intuitive and person-pleasant. Typically, the 2 dimensions might be based totally on various factors like urgency and sort, or class and importance.

The studies observed that notifications are usually considered brief and are frequently deferred to the same day. Incorporating interactive elements into notifications, including links, redirections, activities for responses, or required acknowledgments will increase personal engagement and the chance of notifications being attended.

The integration of reminders into digital structures, mainly in Health apps, shows a fashion closer to using notifications to promote more healthy behaviors and assist users in attaining their health

goals. However, there is a gap between advocated practices and real implementation, indicating room for improvement in how those reminders are designed and deployed.

Proposed methodology:

Create an application that allows users to set reminders for their day-to-day activities. While setting reminders, users will have the option to set the number of reminders and frequency of reminders. The application will send notifications according to the preferences of the user for a particular task. In Our approach, multiple notifications will be sent to remind the user about the added task, and the information of task accomplishment is collected through notifications from the user. From the task accomplishment information users can track the progress of their goals.

By setting timely reminders for certain periods of time, users can learn a new habit without losing consistency and motivation. Multiple reminders with periodic gaps can help the user to stay informed about their predefined goals. The input from the user helps users to track their task completions and information about the missed activities of their designed routine. By Querying the user about their task completion, the user can analyze the gap between their designed activities and the performed actions.

This application acts as a personal assistant to continuously remind the users about their goals and provide support to enhance their self-motivation. By looking at the progress of their tasks, users can have an idea about the history of their activities and can analyze the areas of improvement.

Sprint 2:

Data Collection:

In the development of our application, our approach has been primarily based on the data from existing research and studies within the relevant field. This research and relevant work have offered good insights for application development. By using this knowledge, we have crafted a foundation

for our application, ensuring that it aligns with previous research work and our approach to improve the user engagement with reminder systems.

We haven't gathered any information directly from the people who will use our app. Instead, we focused on building the app using knowledge and findings from earlier studies and research.

Further Data collection process will be done in future sprints which involves collecting feedback about user experience and behavior while interacting with the application.
This project is mainly focused on studying user interaction and engagement with the reminder systems. So, for this sprint, firstly we have started the implementation of the mobile application and later we will be collecting feedback from the users about the user interaction and experience while using our app.

Design:

We considered developing a mobile app that allows users to engage and set various reminders or notifications tailored to their tasks. Users have the flexibility to schedule either multiple notifications or a single one, depending on the task's significance. Additionally, we empower users to configure a post-task completion question to track their progress effectively. The input provided by the user to the questions help us to track user activities.

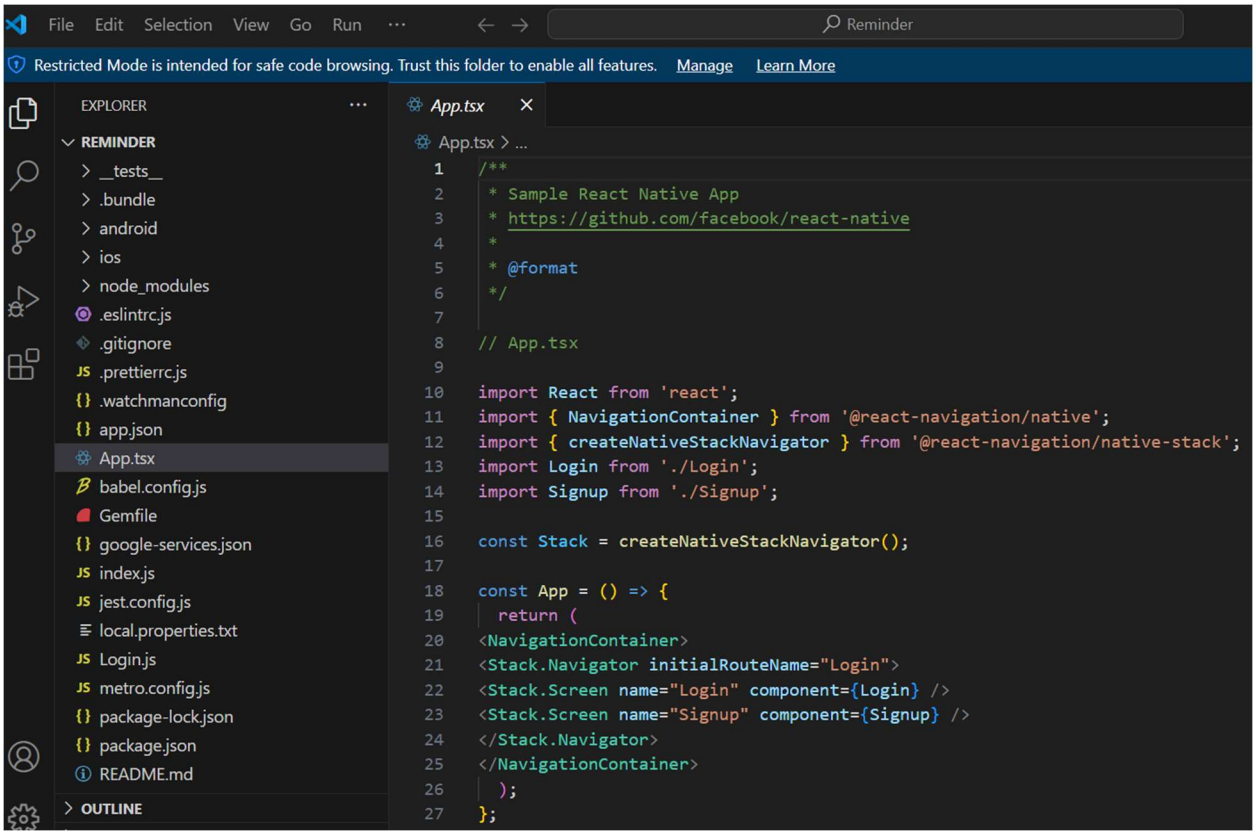
Implementation:

For implementation of the mobile application, we have used React Native framework and Visual Studio Code as IDE because it's widely recognized for its efficiency and effectiveness. We have connected Physical mobile device to run our application.

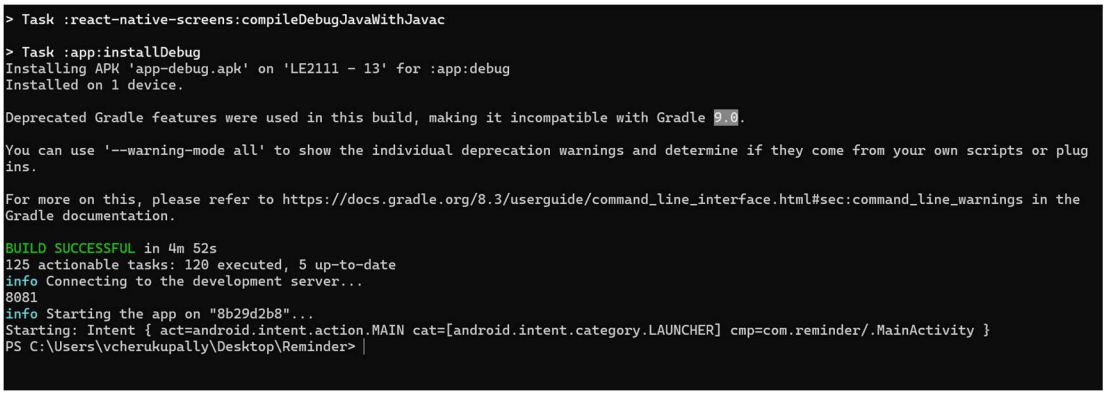
So far, we've completed the initial steps by creating the Signup and Login pages. These pages are crucial because they are the first point of interaction for users with our application. We've also successfully connected these pages to a database. This connection is essential for storing user information securely and ensuring that the login process is safe and reliable. The database stores user credentials securely and manages the authentication process.

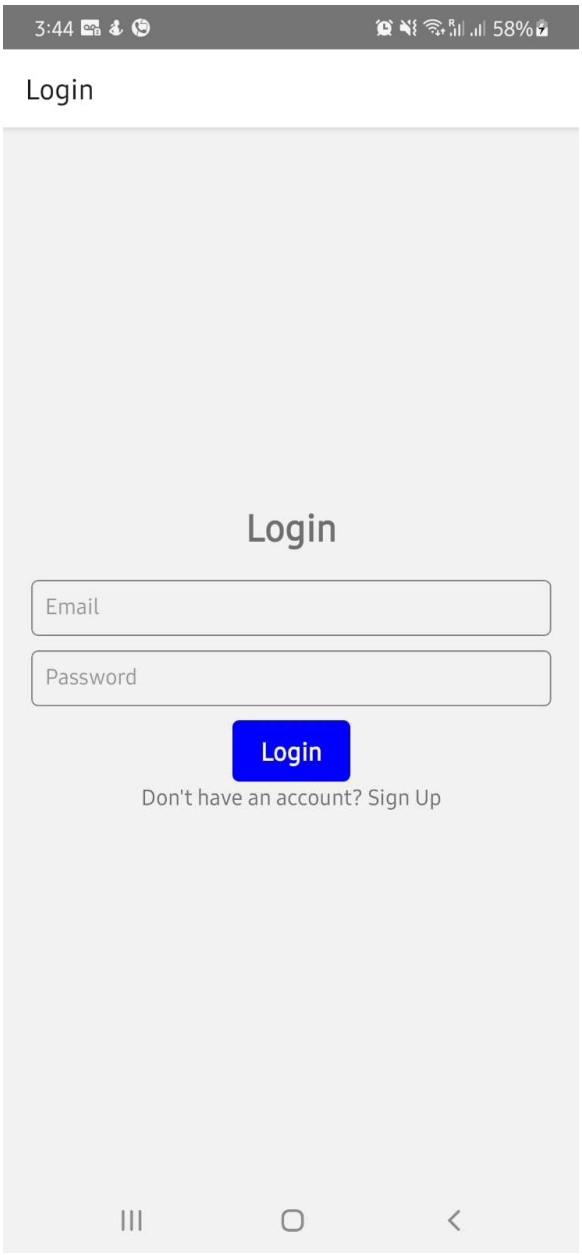
Find the related screenshots of our implementation below:

React- native project folder:

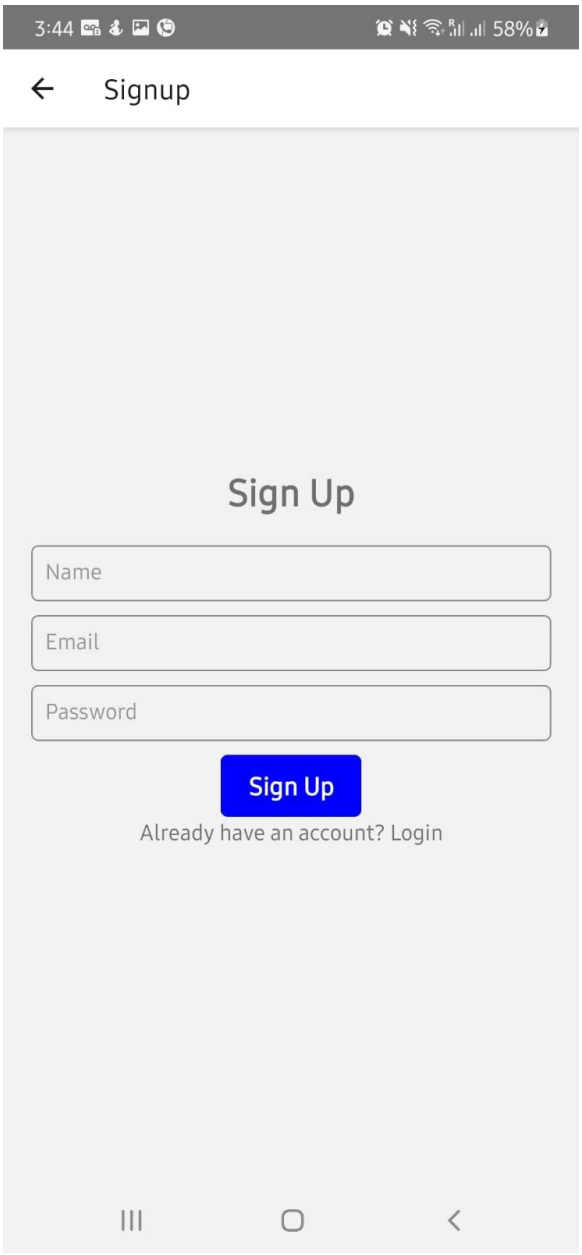


App build Success



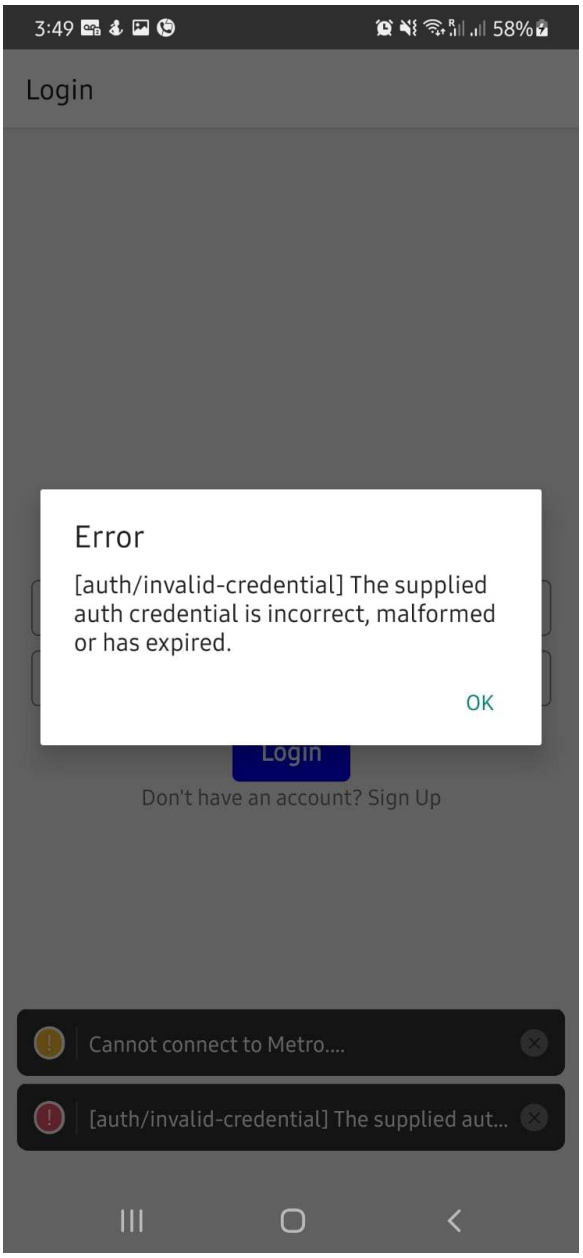


Login page

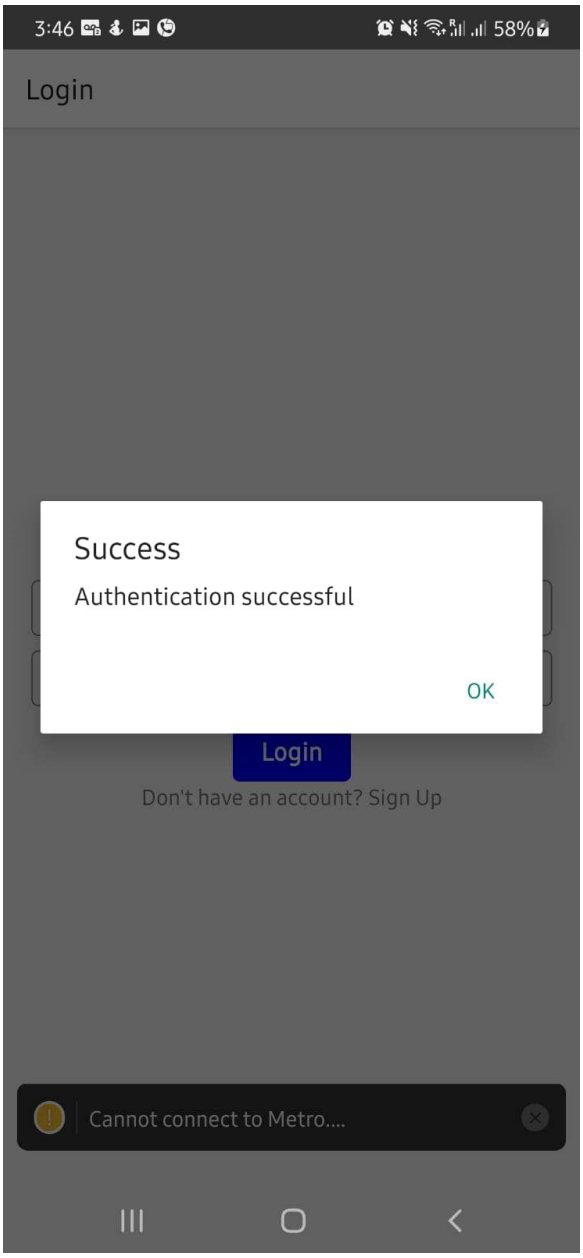


Signup Page

The Signup page is used to sign in to the application for the first time and Login page is used for logging to the application.



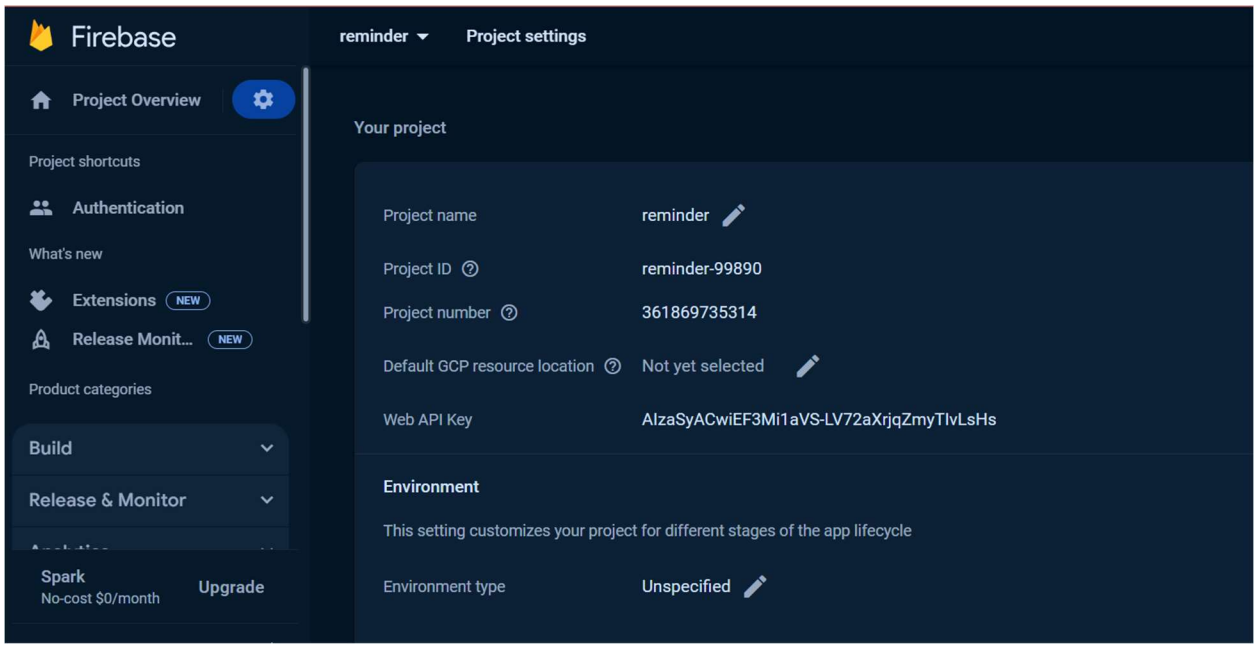
Authentication error.



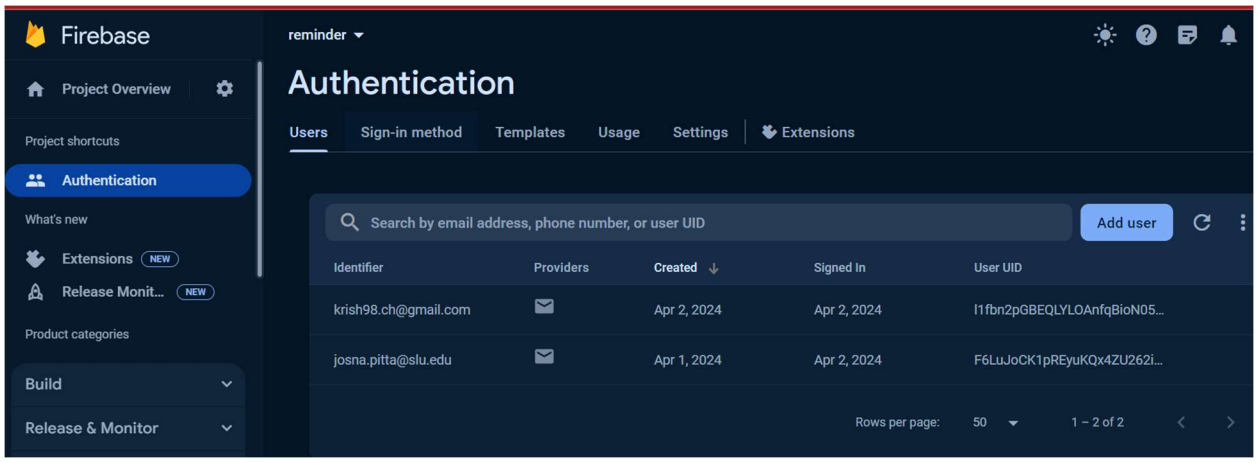
Successful Login.

If the email address is not in proper format or password is not strong, we will get an error, if the details are valid Login will be successful.

In our application development process, we strategically opted to integrate Firebase as our backend solution for managing database operations. Firebase offers a robust set of features that perfectly align with our project's requirements, including real-time database capabilities, user authentication, and cloud storage.



Firebase configuration.



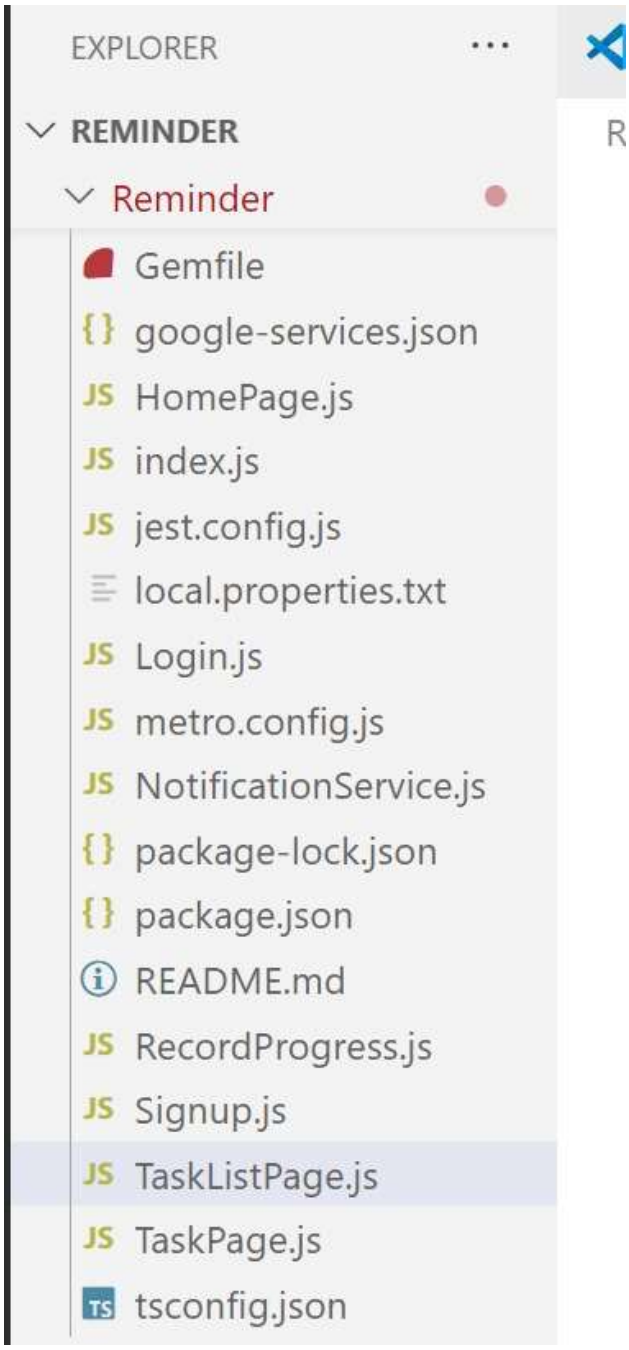
Sample user credentials.

As part of our ongoing development roadmap, we have identified the implementation of two critical features for the upcoming sprint: task addition and reminder setup pages. These additions represent significant enhancements to our application's functionality and will further streamline the user experience.

By implementing these pages in the upcoming sprint, we aim to address key user needs and enhance the overall functionality of our application which improves user interaction with our application. These additions align closely with our goal of providing users with a seamless and efficient task management solution. Furthermore, we anticipate that these features will significantly improve user engagement and satisfaction.

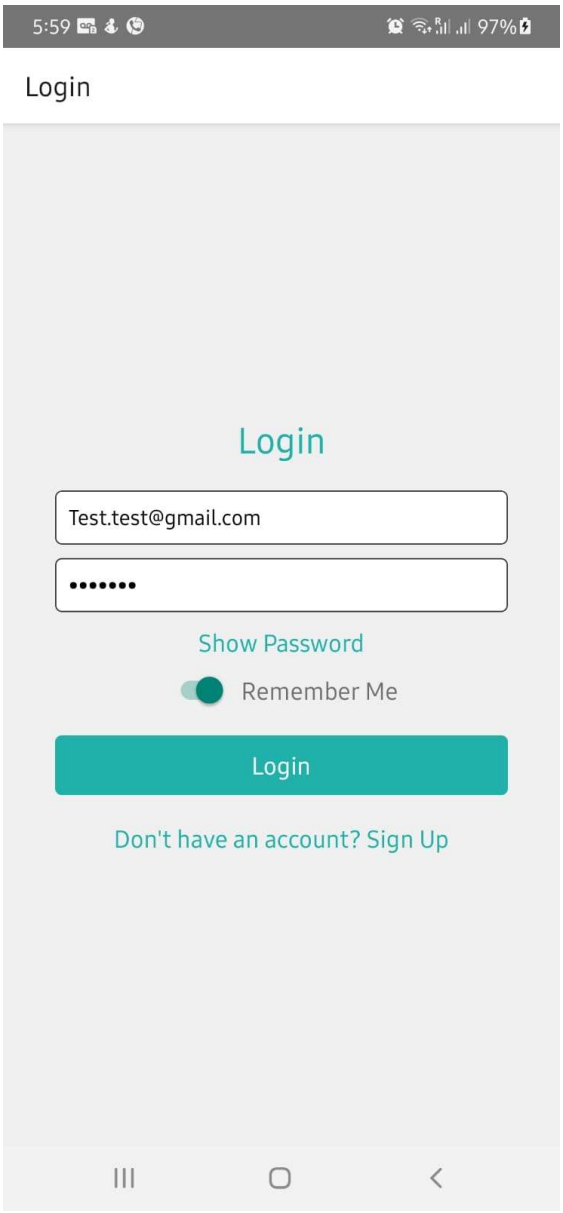
Sprint 3:

In this Sprint we have built the mobile application with all the required pages for the user to login, add the tasks, set the timings and frequency of the notifications and the option to record the completion of the task, view the progress.



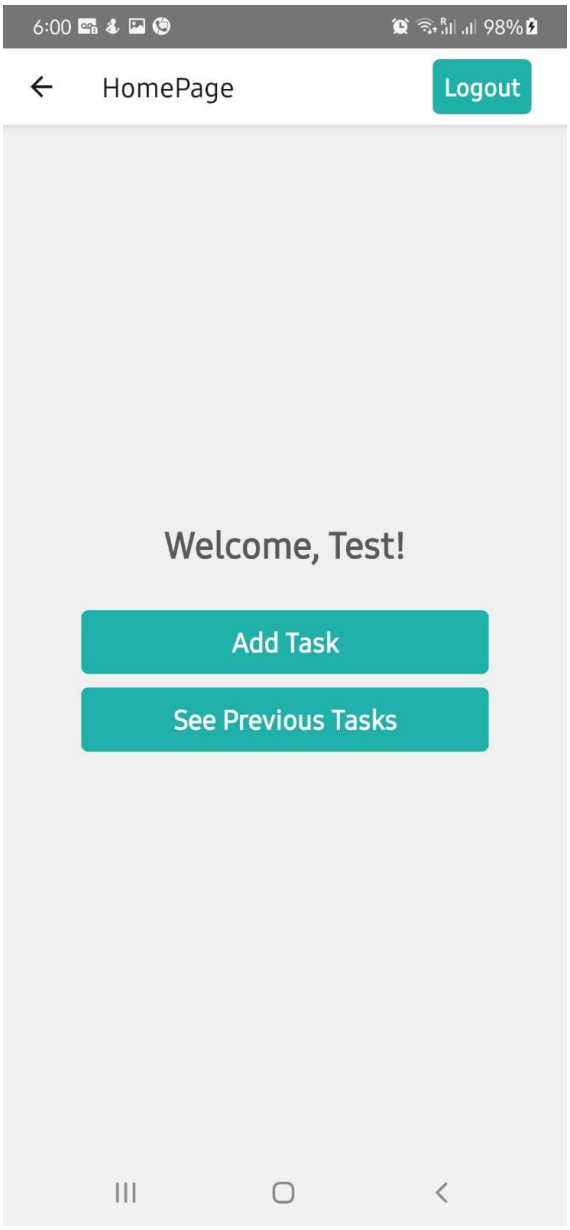
Folder structure in Visual Studio Code.

The users can login to the page with the registered credentials. The login details of the users are stored in the firebase and used for authentication.



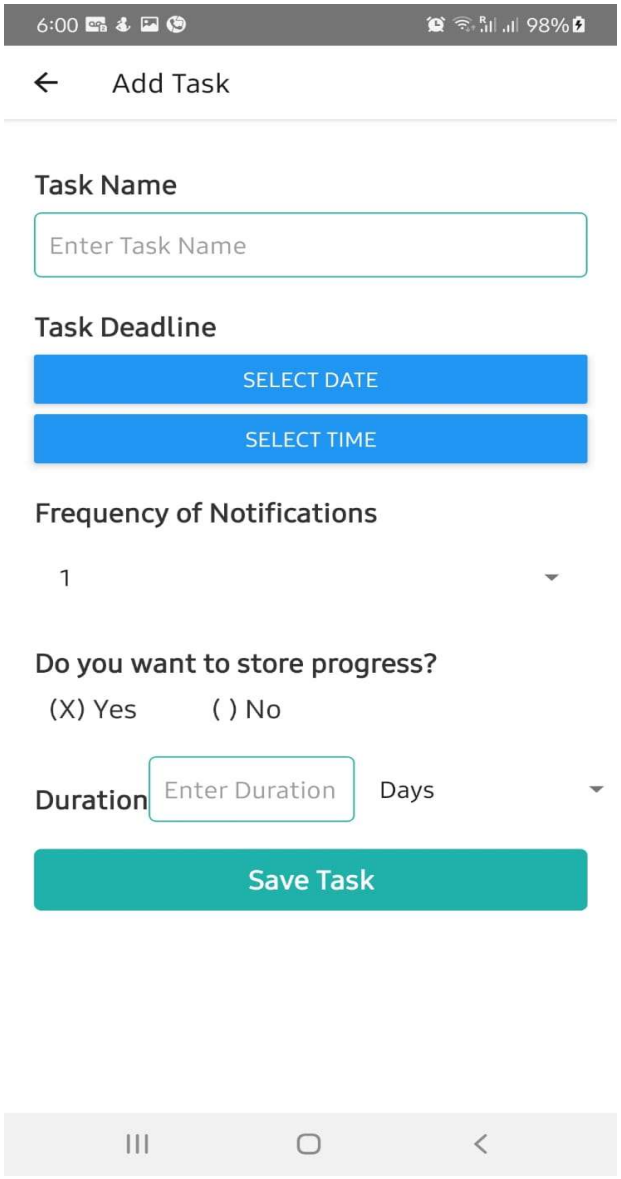
Login Page

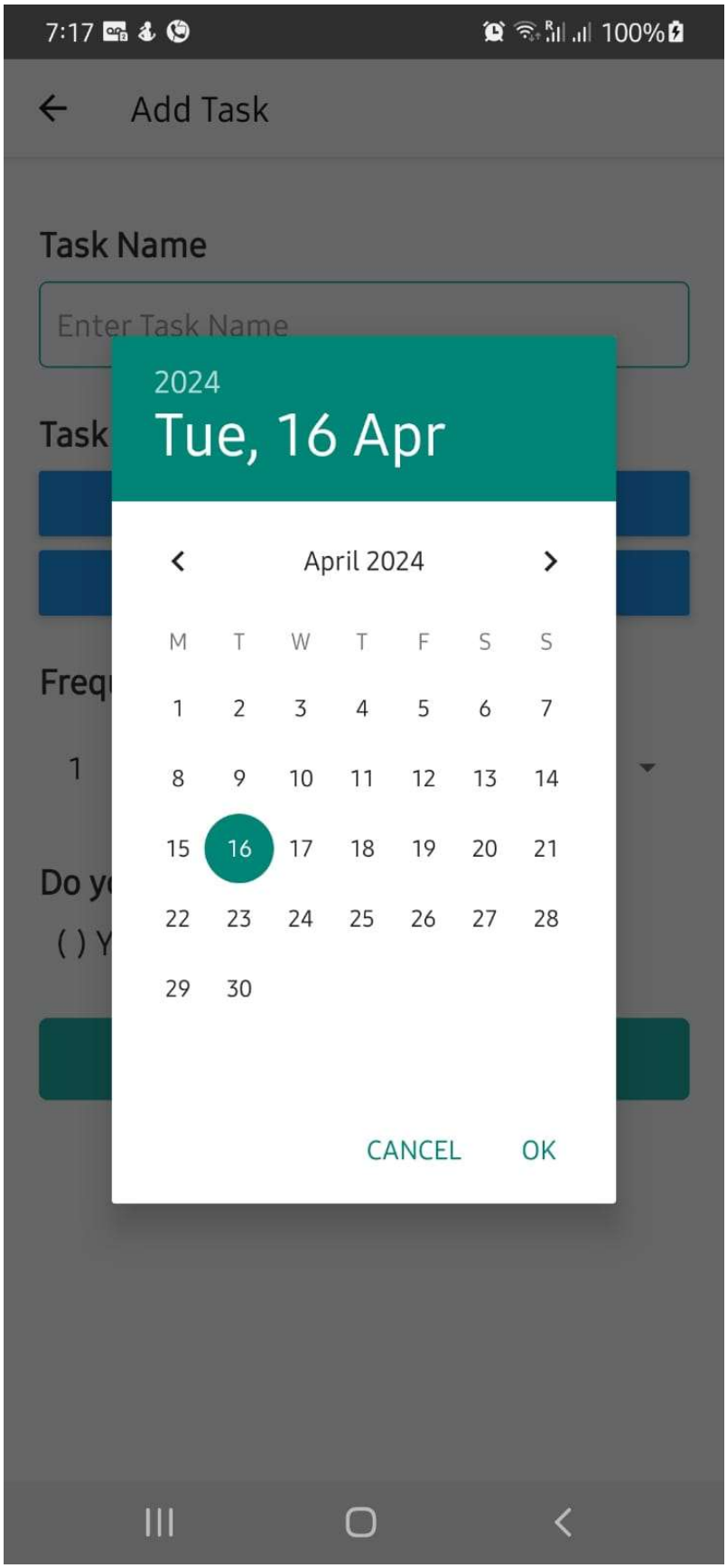
In the home page we have buttons to navigate to view the previous tasks, to add new task and logout from the application.

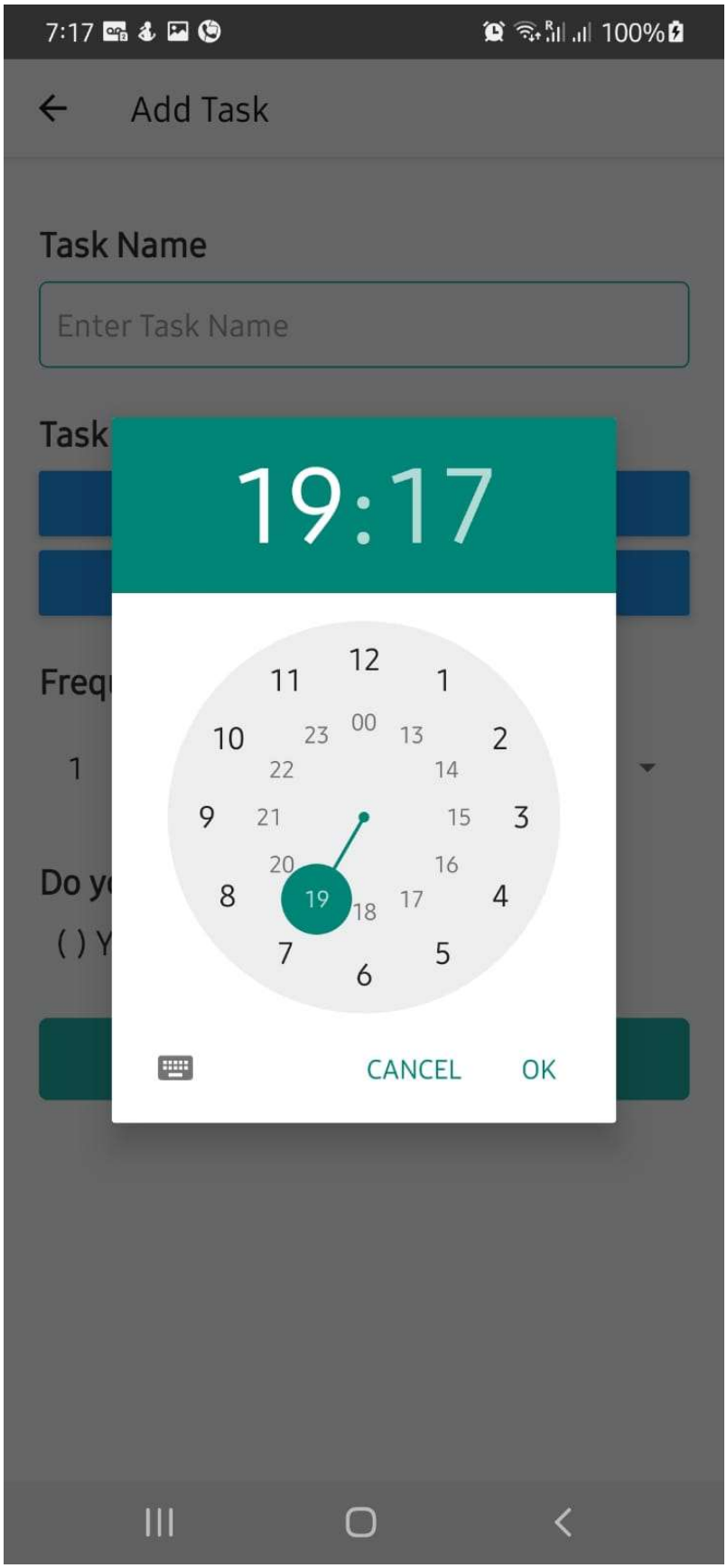


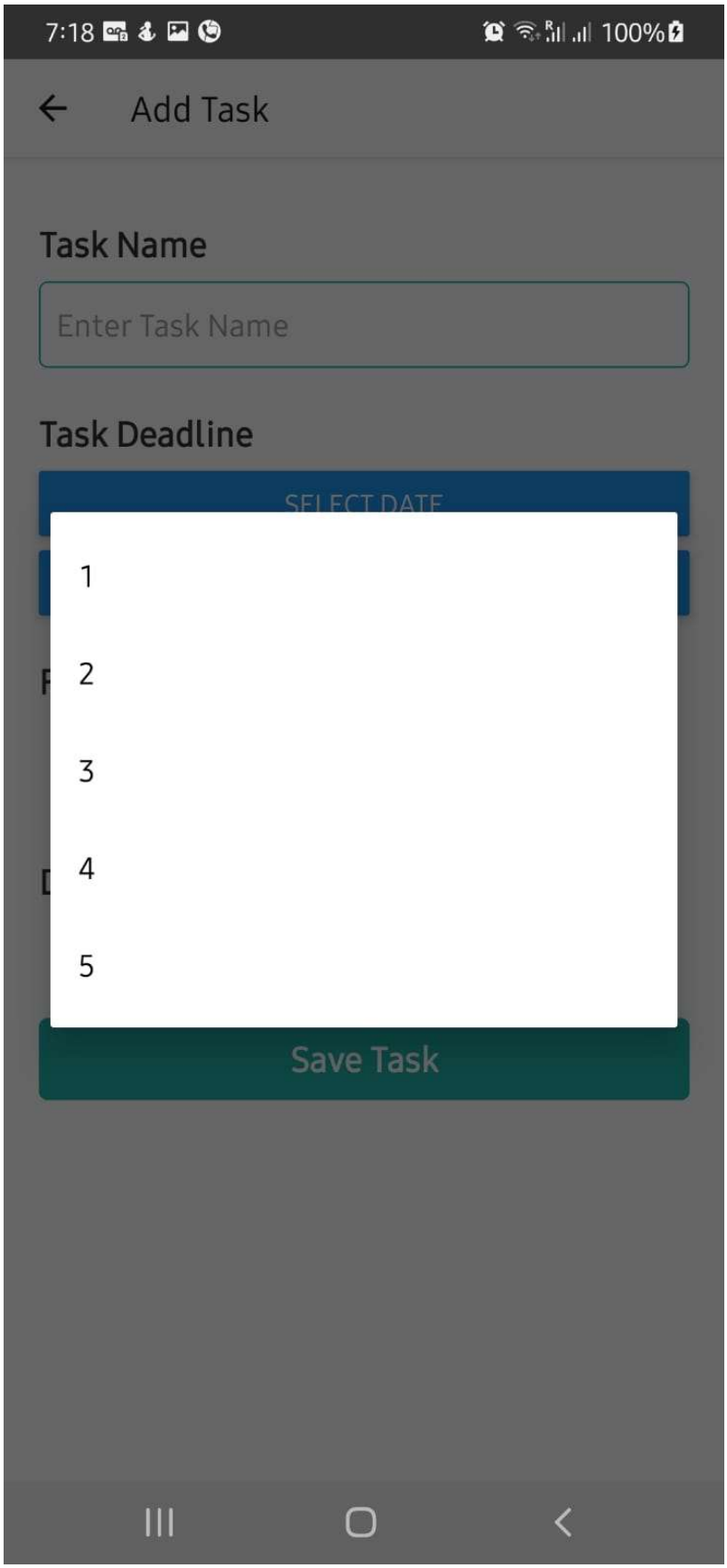
Home page

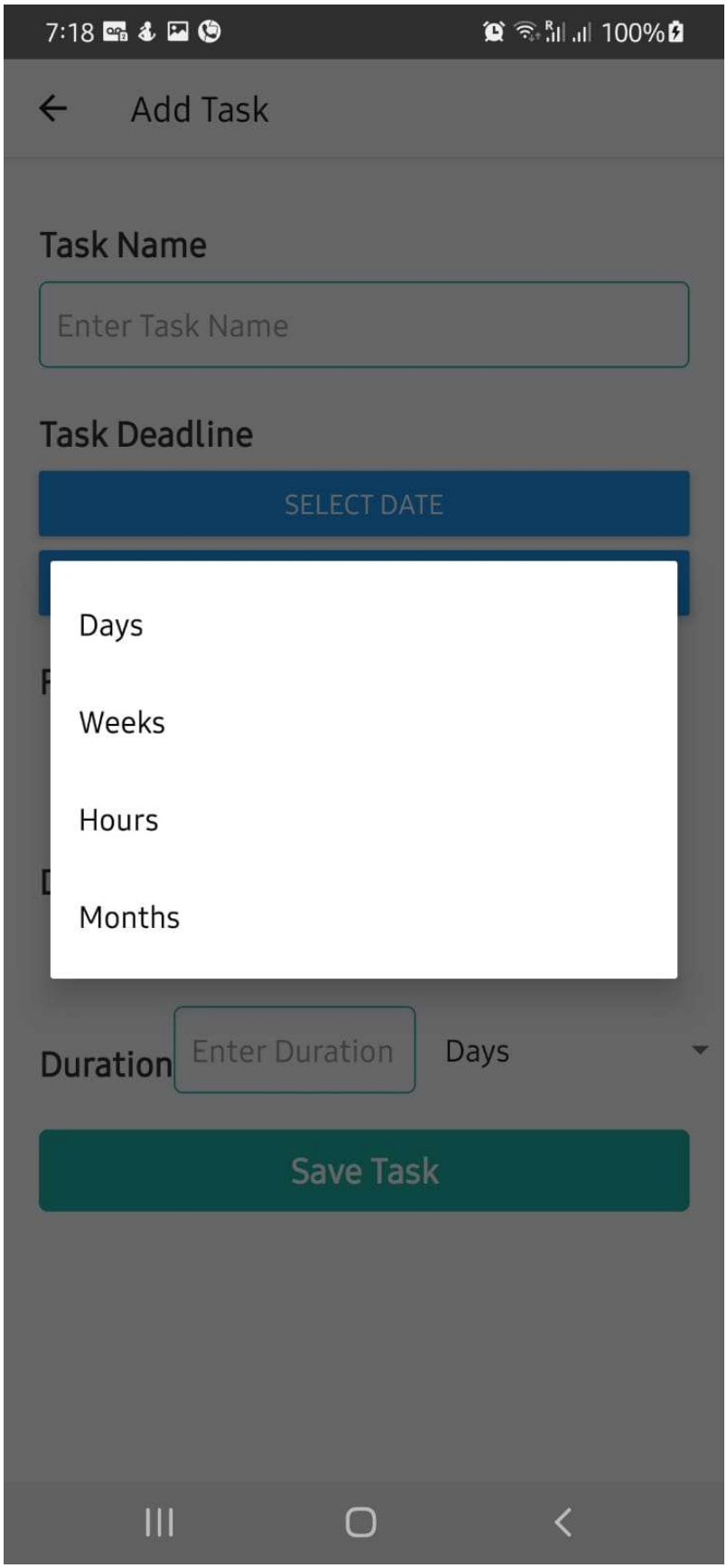
Add Task page has the task name, date and time fields to set the deadline for the task, Frequency of the notifications or number of reminders required before the dealine. If the user want to store the progress, it provides the flexibility to set the reminder for number of days, or hours based on the type of the task.



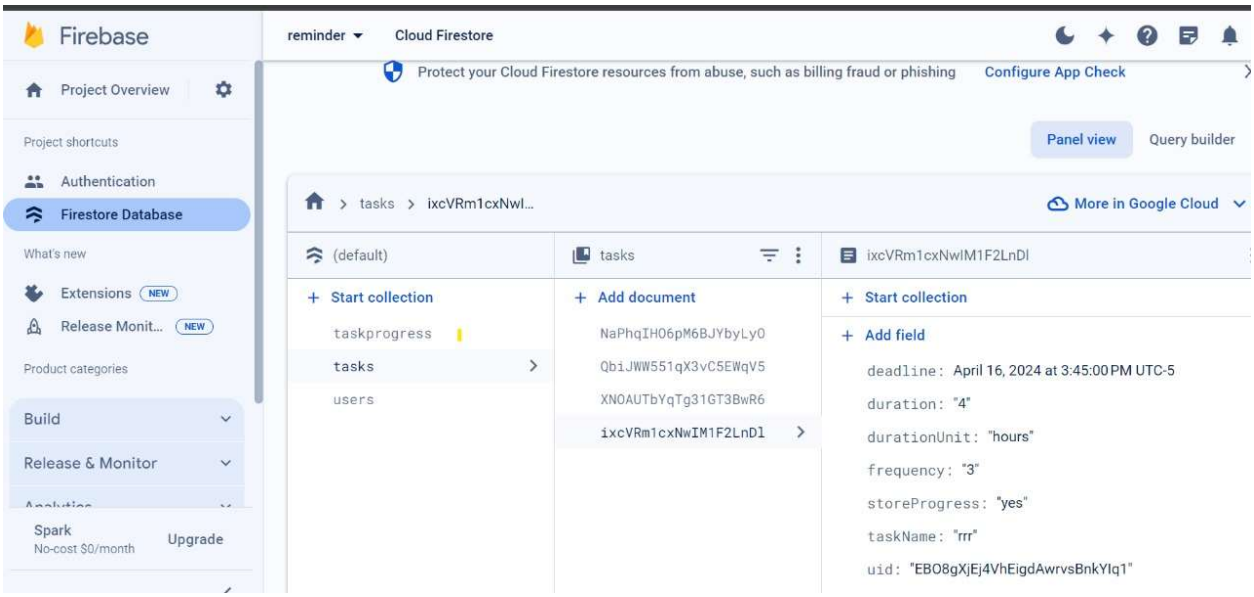

7:17
100%
Add Task
Task Name
Enter Task Name
Task
Freq
1
Do y
( ) Y
2024
Tue, 16 Apr
April 2024
M T W T F S S
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28
29 30
CANCEL
OK


7:17
100%
Add Task
Task Name
Enter Task Name
Task
Freq
1
Do y
( ) Y
19:17
12
1
2
3
4
5
6
7
8
9
10
11
00
13
14
15
16
17
18
19
20
21
22
23
CANCEL
OK


7:18
100%
Add Task
Task Name
Enter Task Name
Task Deadline
SELECT DATE
1
2
3
4
5
Save Task

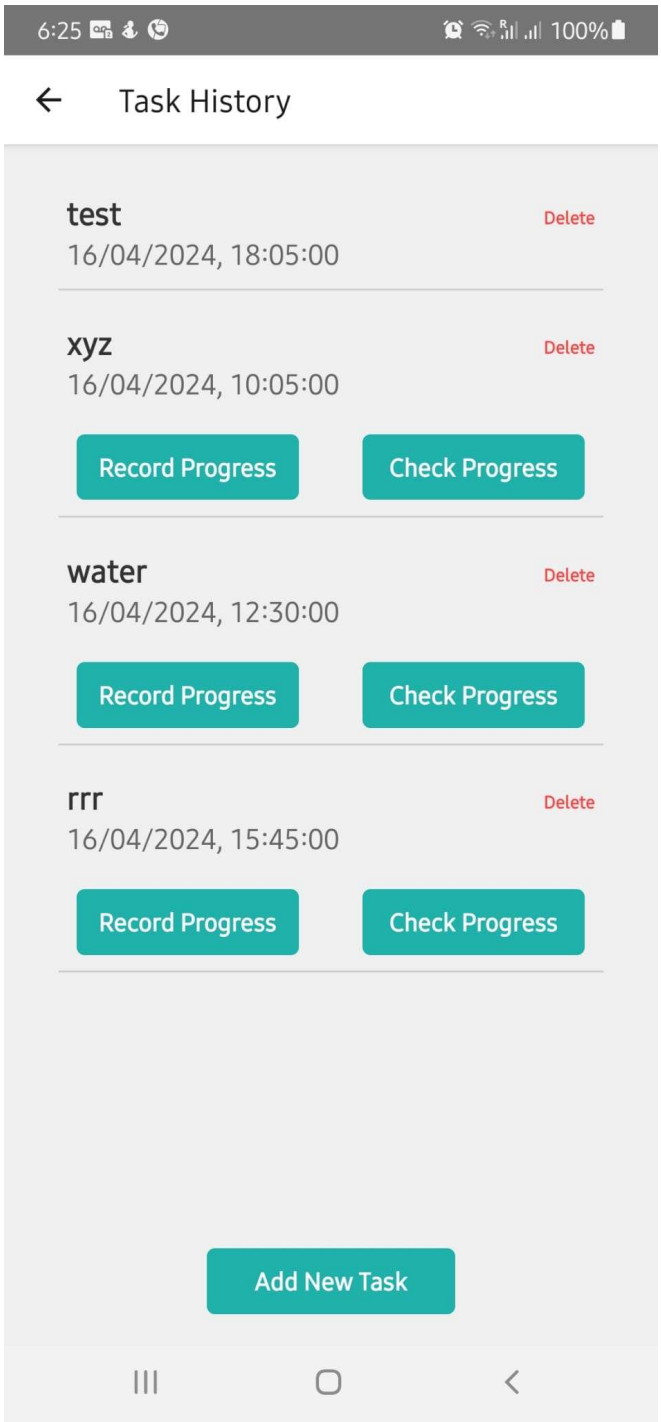

7:18
100%
Add Task
Task Name
Enter Task Name
Task Deadline
SELECT DATE
Days
Weeks
Hours
Months
Duration
Enter Duration
Days
Save Task

The tasks are stored in the firebase to show in the previous tasks page and to trigger the notifications.



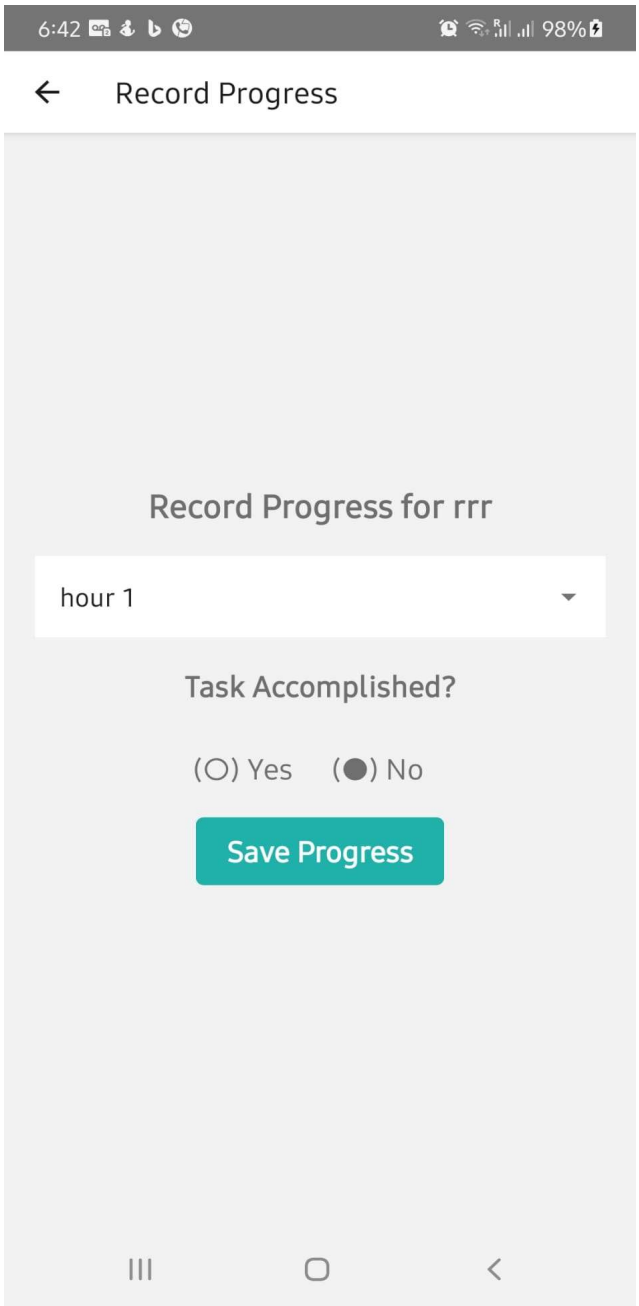
Firebase Database

In the previous tasks page, we can see all the tasks that are scheduled and completed previously. In this page we can select a particular task that user initially created to record progress and check the progress.

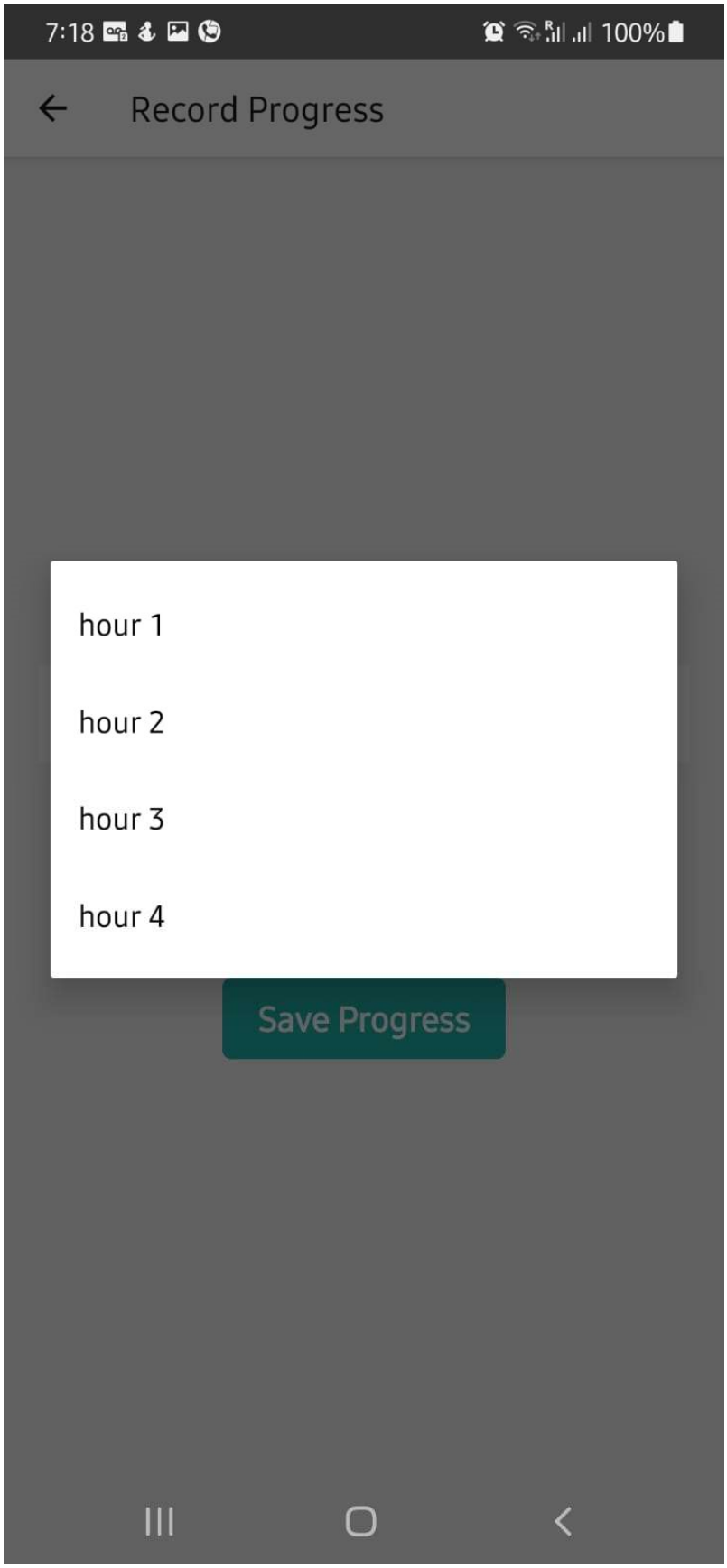


Task History

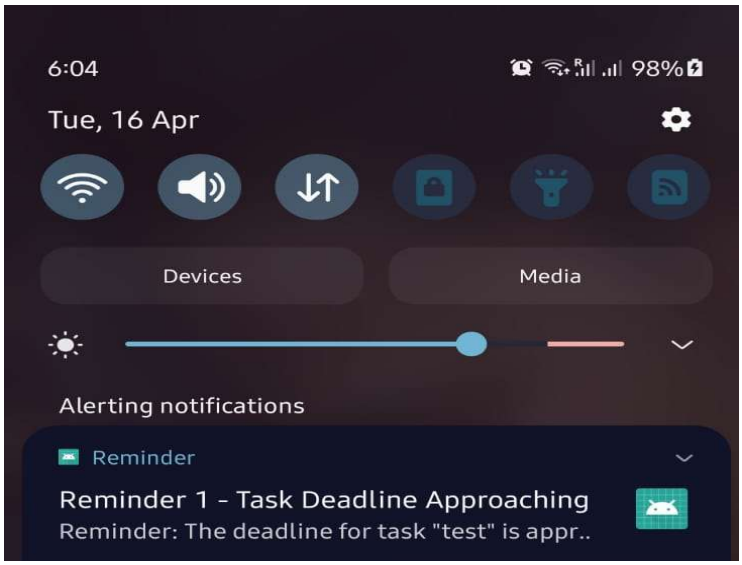
In the Record Progress page user can save the progress for specific day, hour, month or week, whether they have completed the task or not.

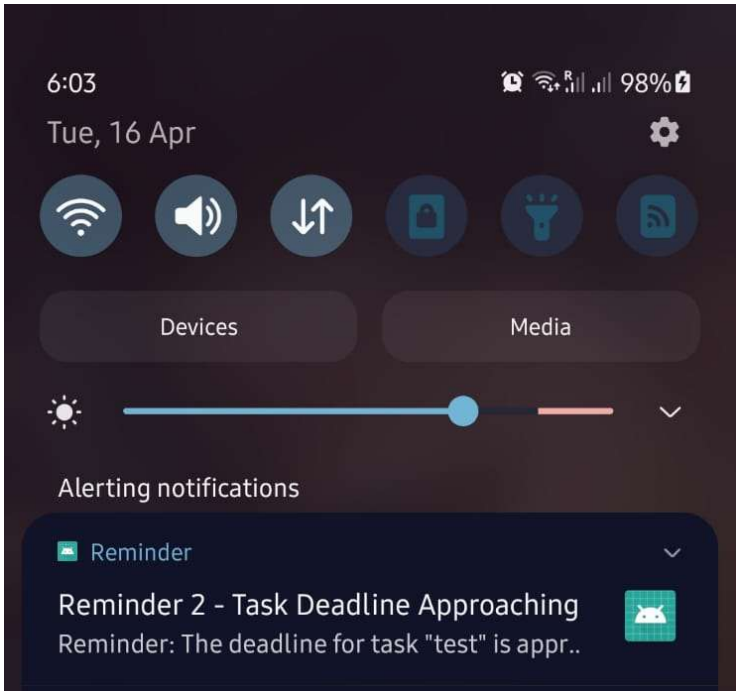


Record Progress

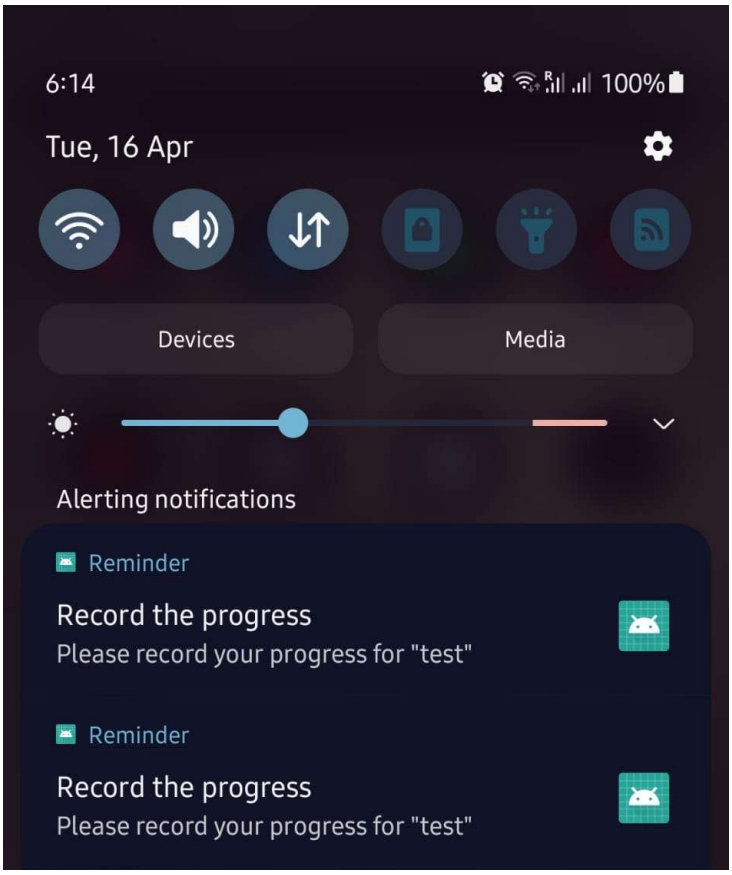

7:18
100%
Record Progress
hour 1
hour 2
hour 3
hour 4
Save Progress

The notifications are sent to the user before the task based on the set frequency.



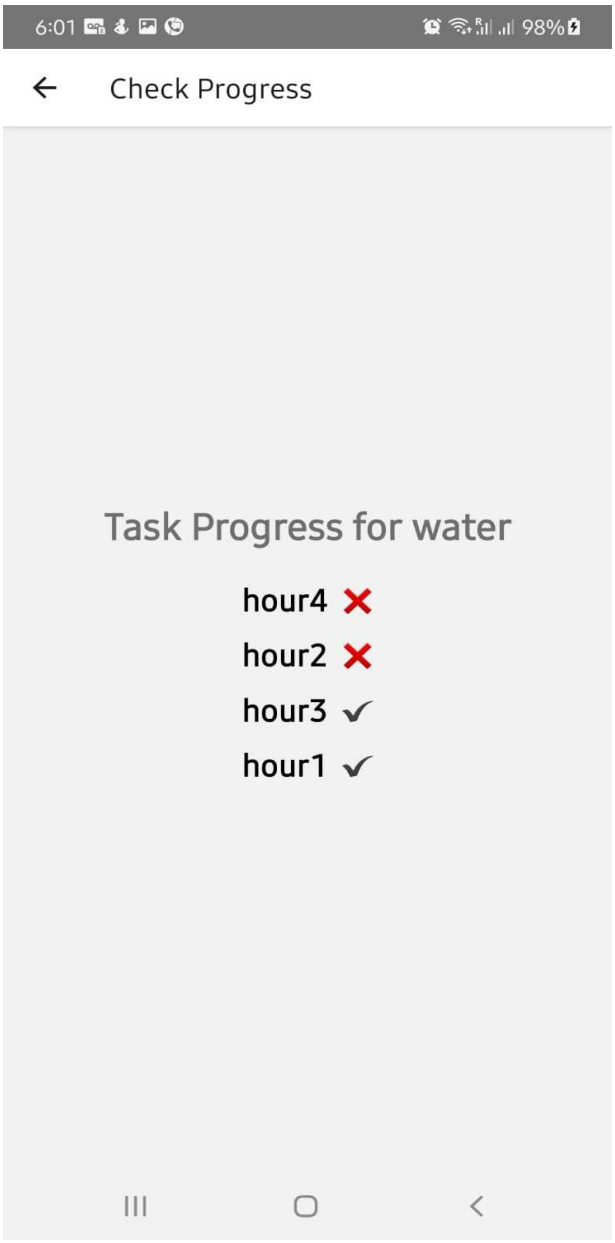


And multiple notifications are sent to the user after the deadline to remind the user to record progress.



Reminder to Record Progress

Users can check the progress by navigating to check progress page.



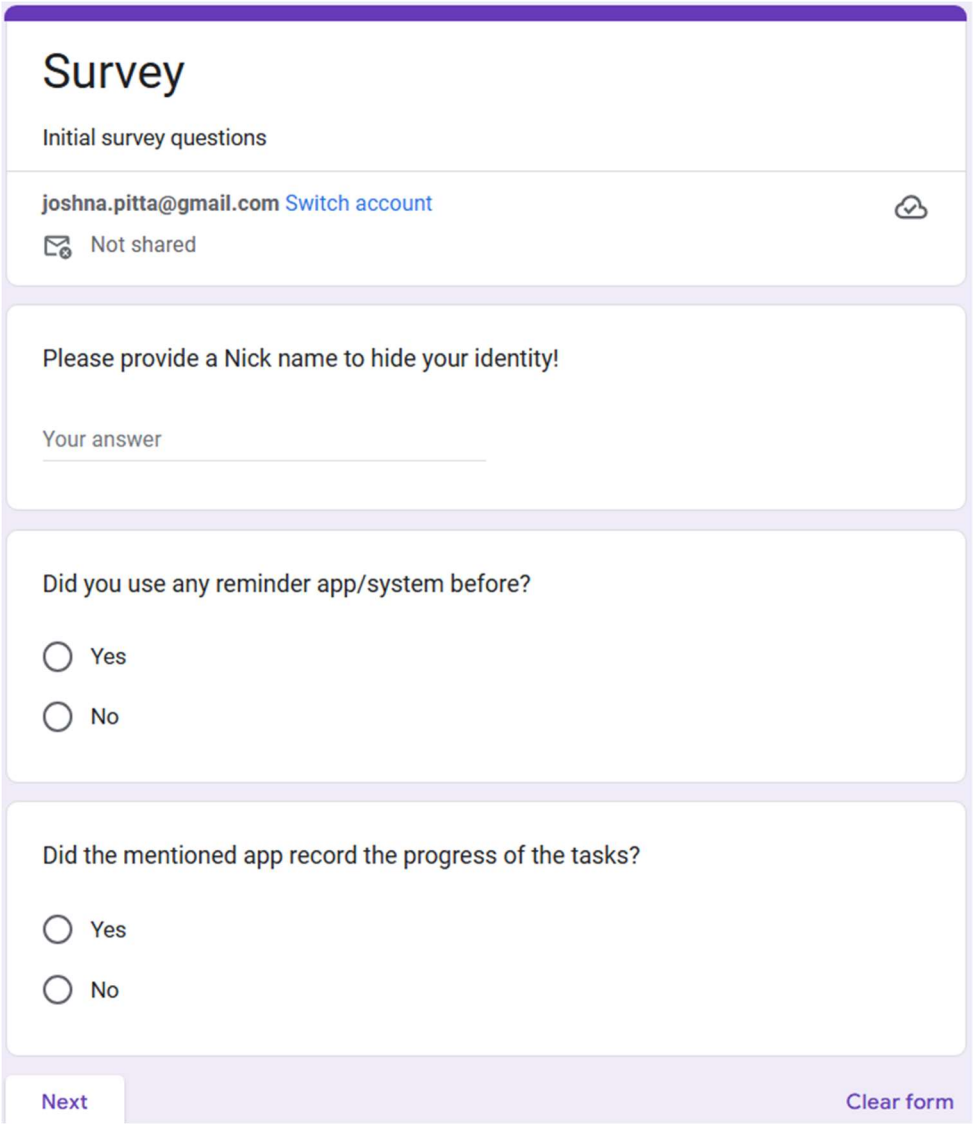
Check Progress Page

Sprint 4:

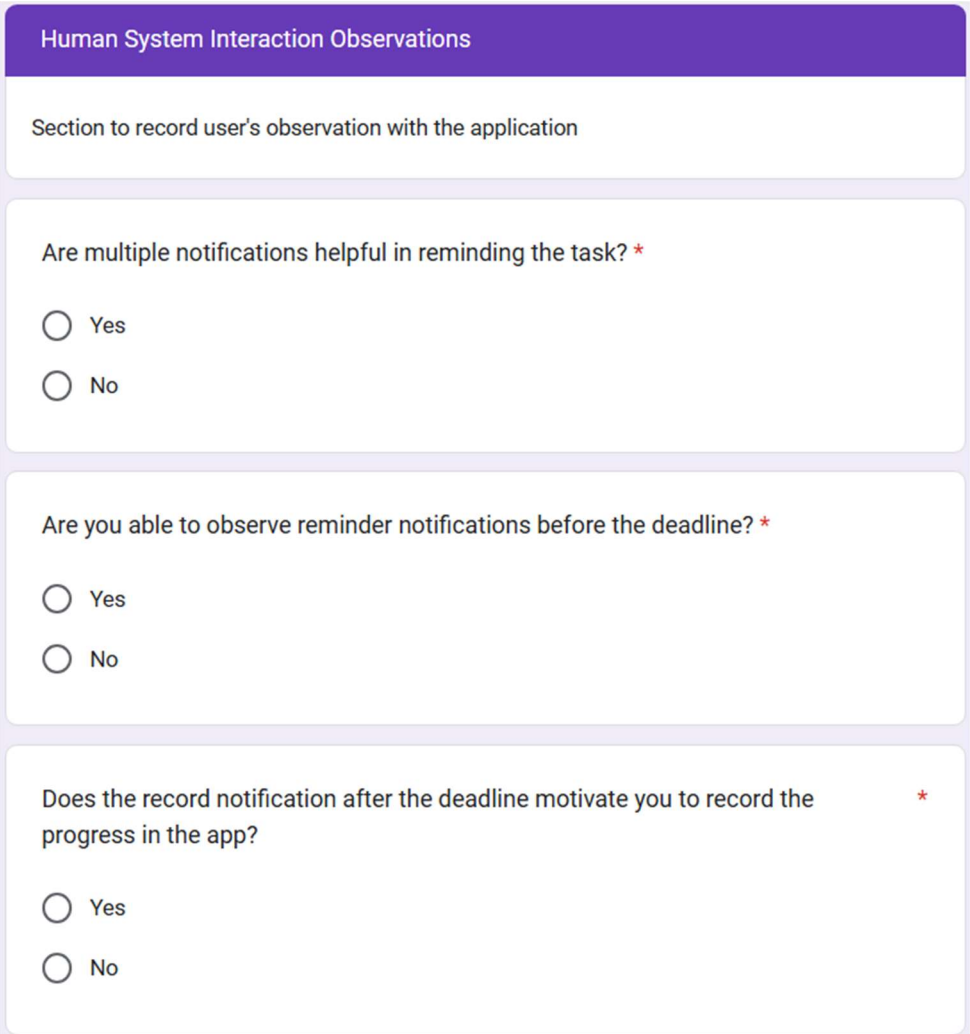
Feedback Survey

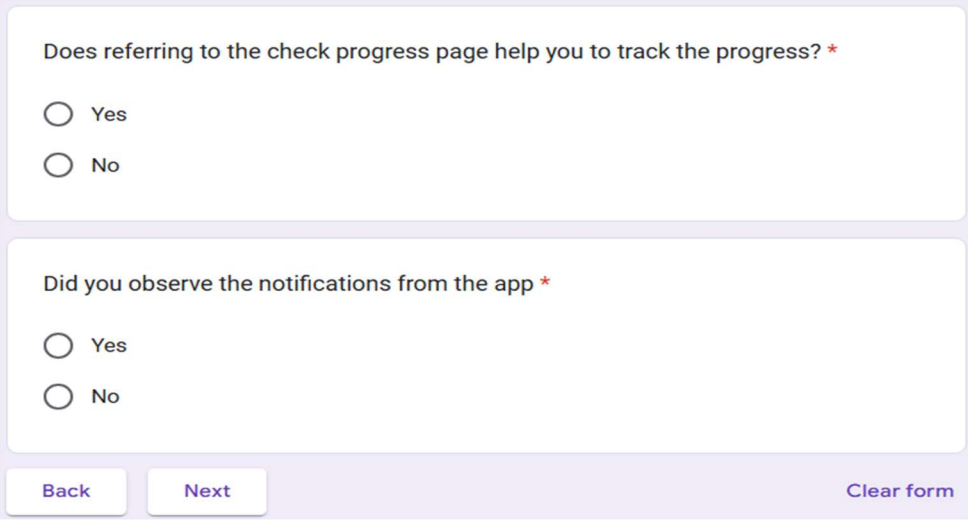
We have created a Google form with three sections to collect data about the user's observations, experience, and feedback about our application.

Section 1- Survey: This section contains questions that are used to collect data from the user about their previous experience with the reminder apps.

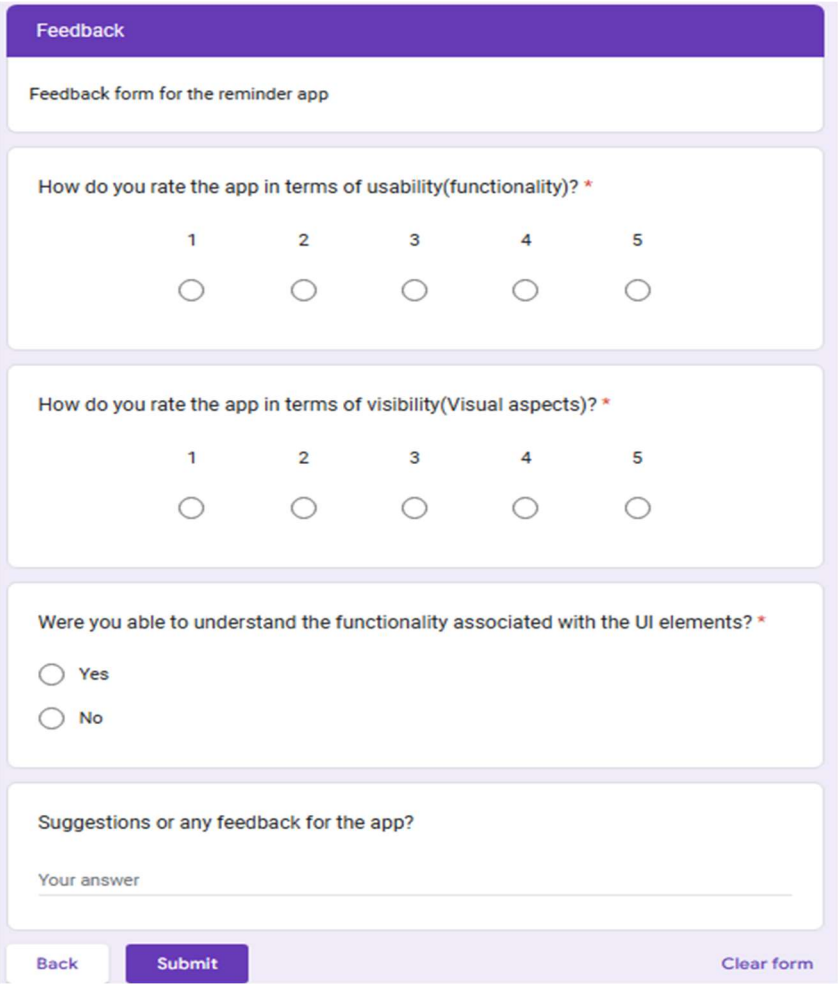


Section 2 - Human System Interaction Observations: This section collects the data from the user about their experience while interacting with our reminder application. This section concentrates on collecting data about the observations made by the user and the response of the user to our new interactive system.





Section 3 – Feedback: It collects the feedback of our App in terms of usability and visibility and additional suggestions or feedback from the user. The data collected in this section can be used to improve the application by adding some additional features to improve the user experience further.

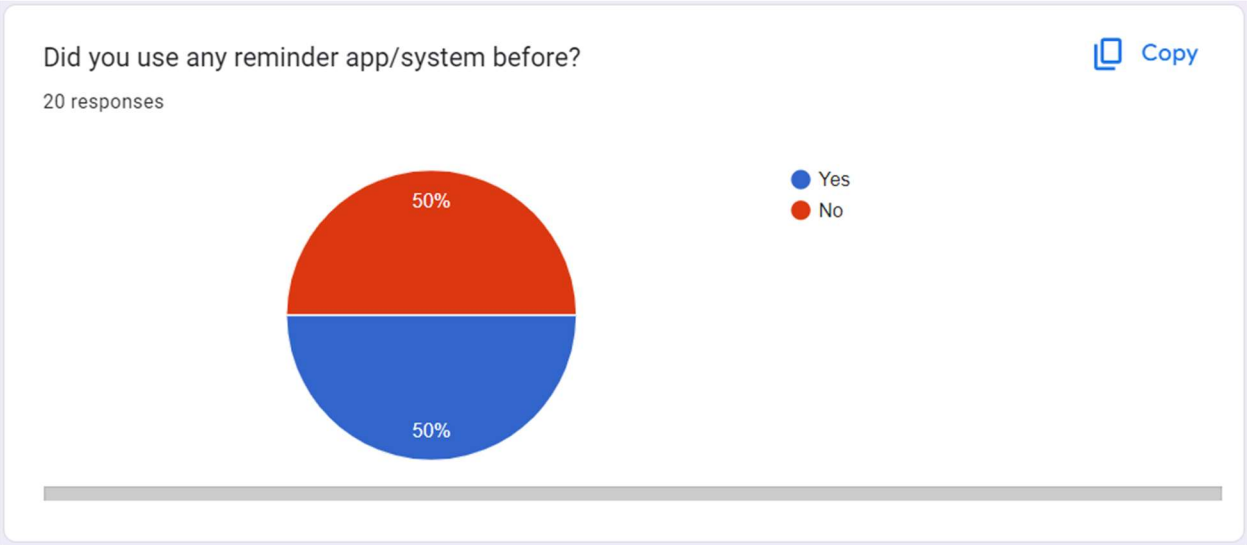


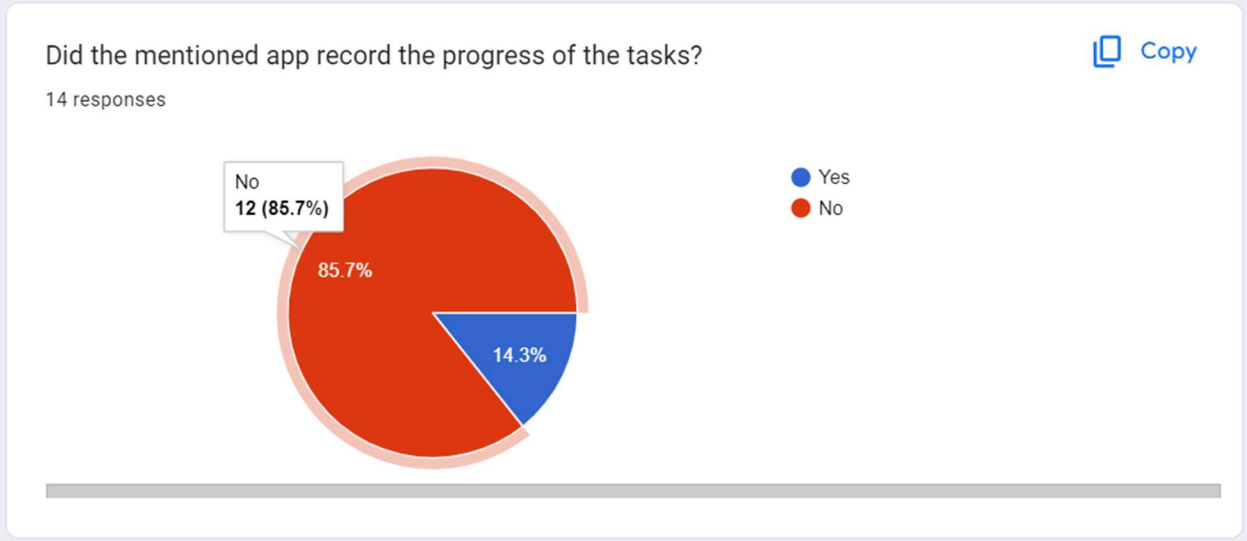
Analysis of Responses along with Results:

Section 1:

We have collected feedback for our application from 20 participants and provided them with an option to hide their identity by using a nickname option in the form. From the initial survey, we observed half of the participants had used some kind of reminder app previously but most of the participants had not found an option to record or track the progress of their tasks or goals. From this survey, we have understood that our Reminder system can be helpful to both remind and track the progress of their long-term and short-term goals.

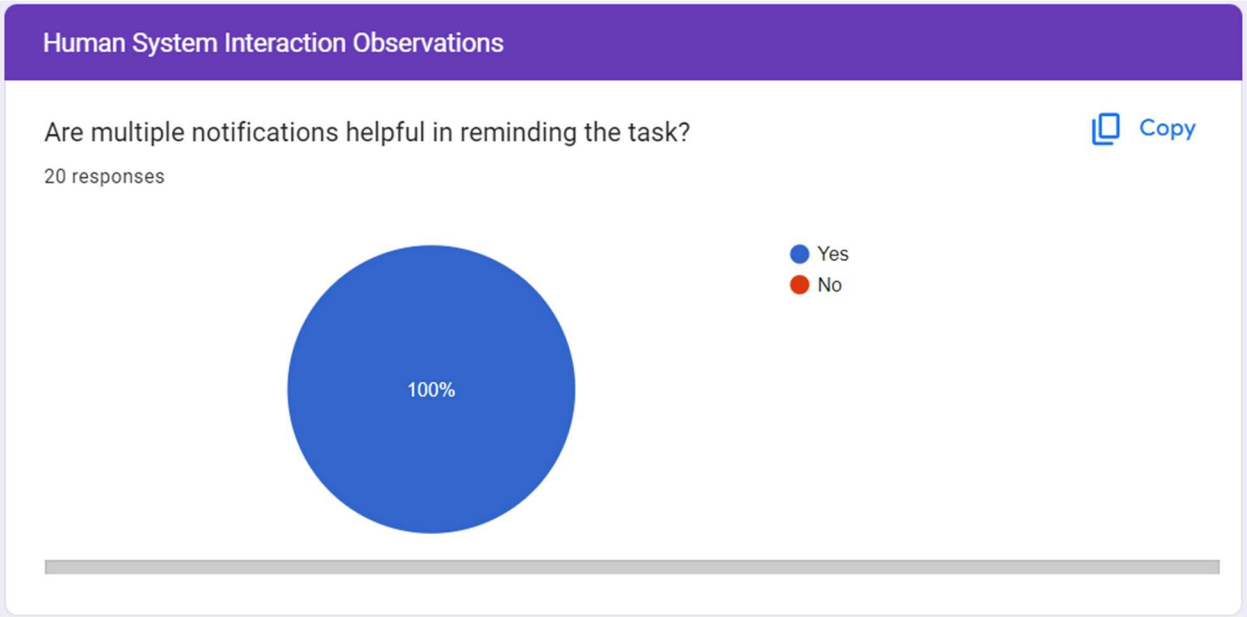
Please find the supporting graphs for the above analysis:



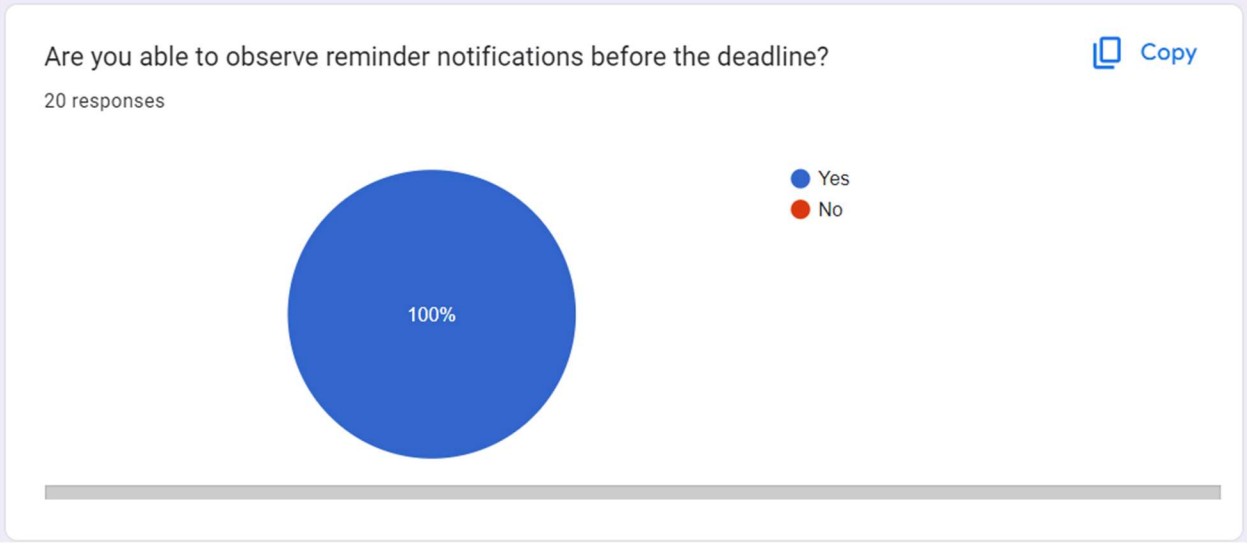


Section 2:

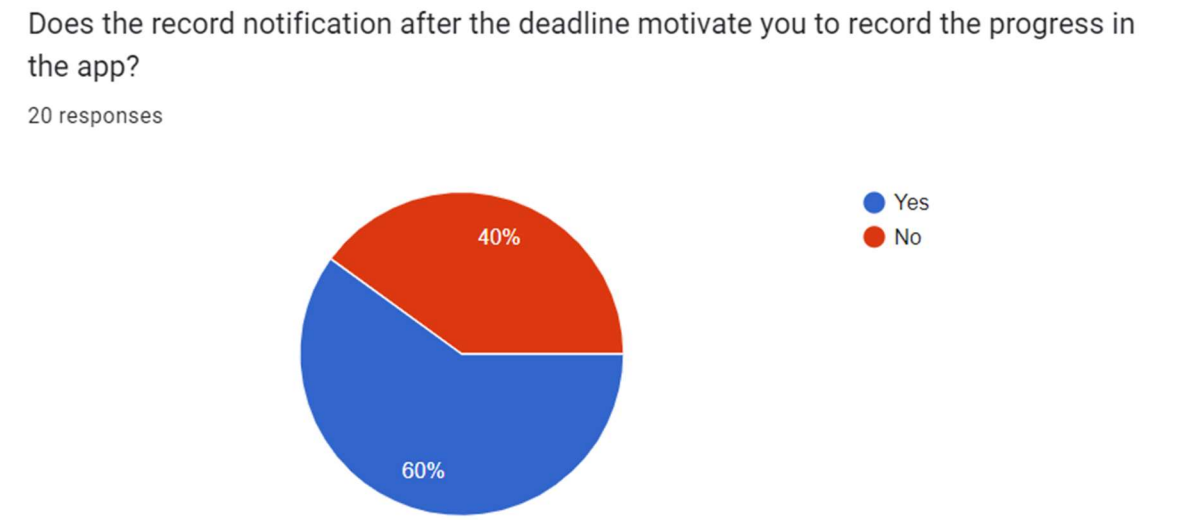
The response data from this section helped to understand that multiple notifications to remind users about a task were effective in reminding the user about the task and their deadline. All participants of the survey found the idea of multiple notifications beneficial in reminding about their task deadline effectively.



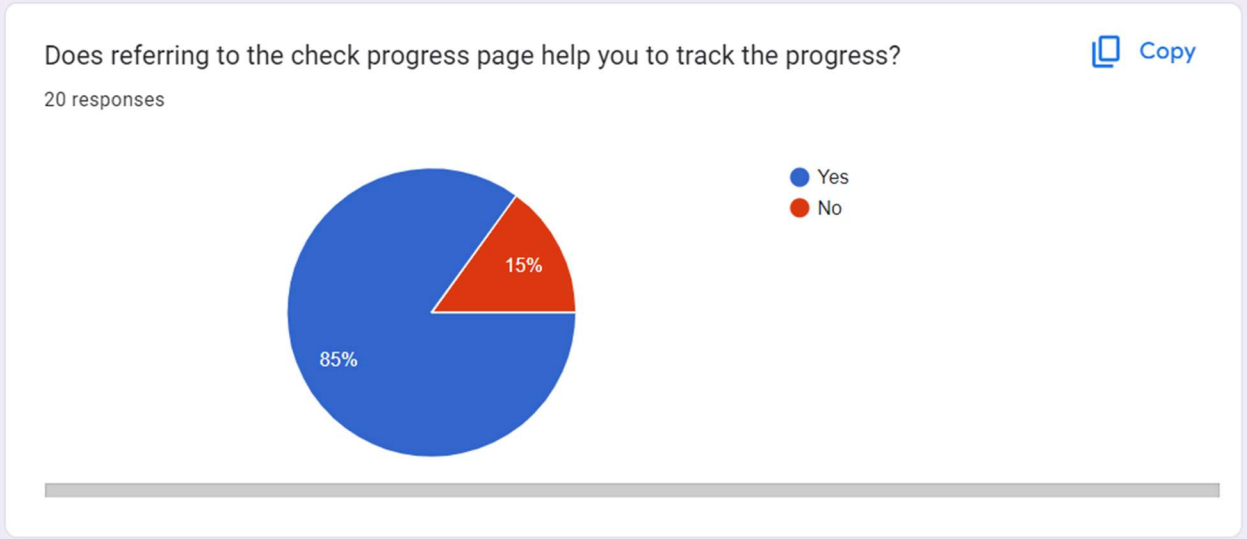
Most of the participants of the survey were able to observe the notifications of the app before the deadline. From these results, we have concluded that the use of notifications is an effective way of interacting with the user, even when the users are not actively engaged with the system or application.



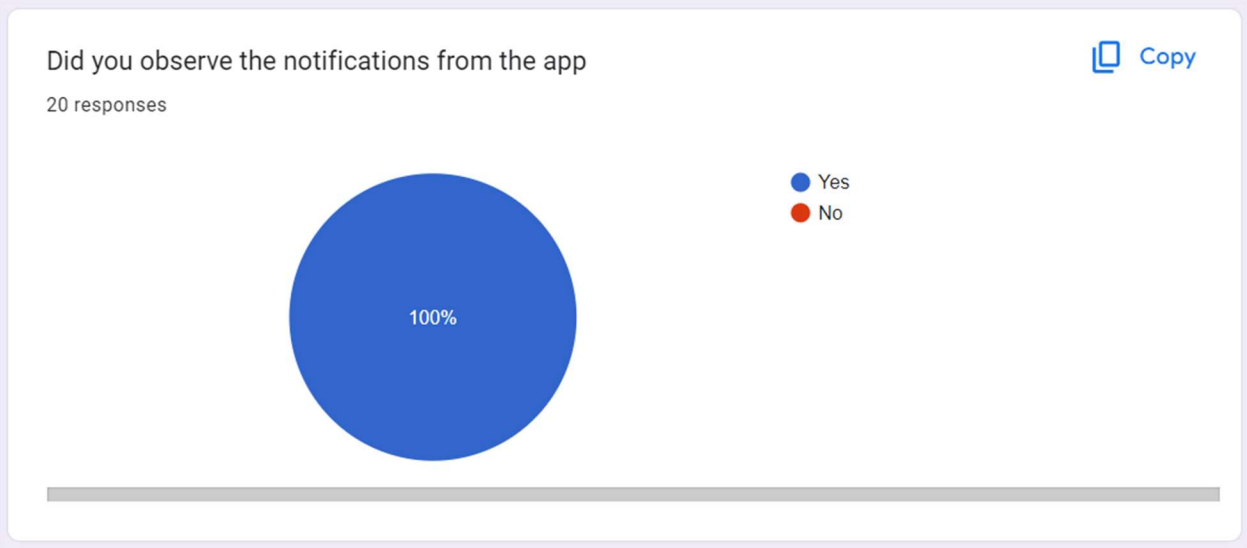
The notification is sent to the user after the deadline to record the progress of the task. This notification is designed to remind the user to enter information about their task accomplishment in the app. This information is used to track the progress of the task. From the collected responses, the user 40% of participants are not motivated to enter the information about the task completion with the help of a notification.



The majority of participants felt that the check progress page was useful for tracking their goals and viewing the history of their task accomplishments. From this, we can understand that users require a system that can help them display the history of their actions.

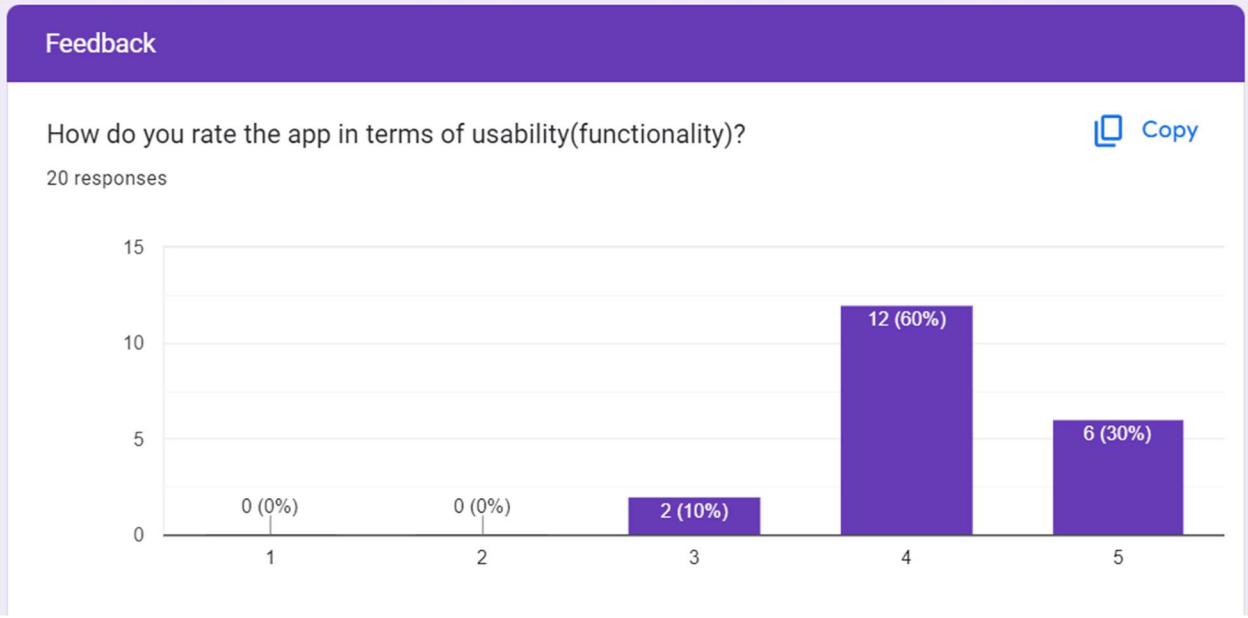


All the users were successfully able to observe all the notifications from the application and act accordingly.

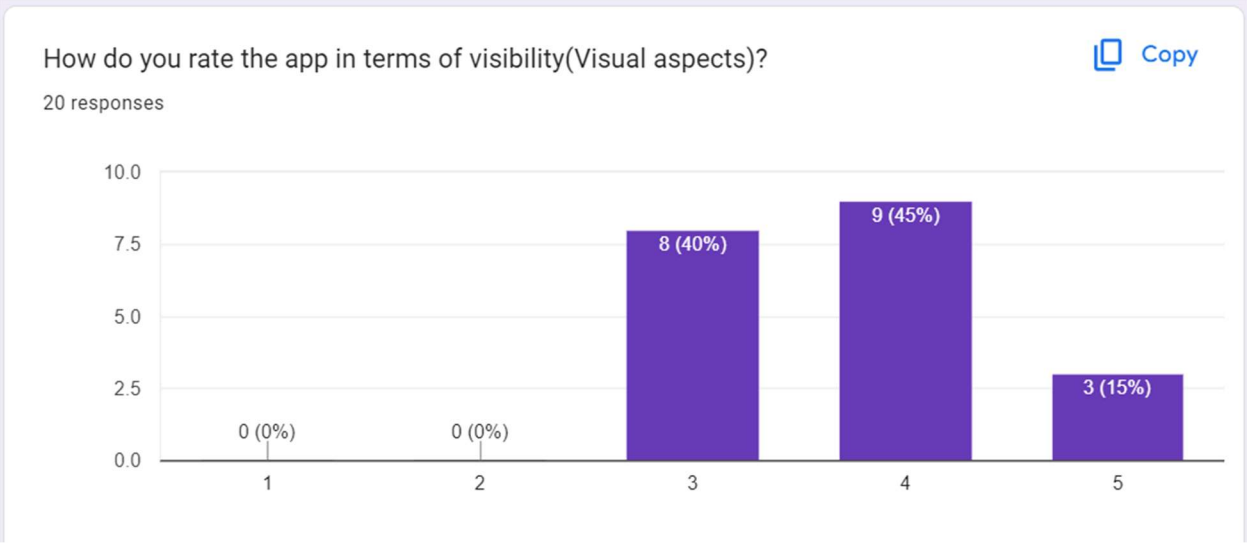


Section 3:

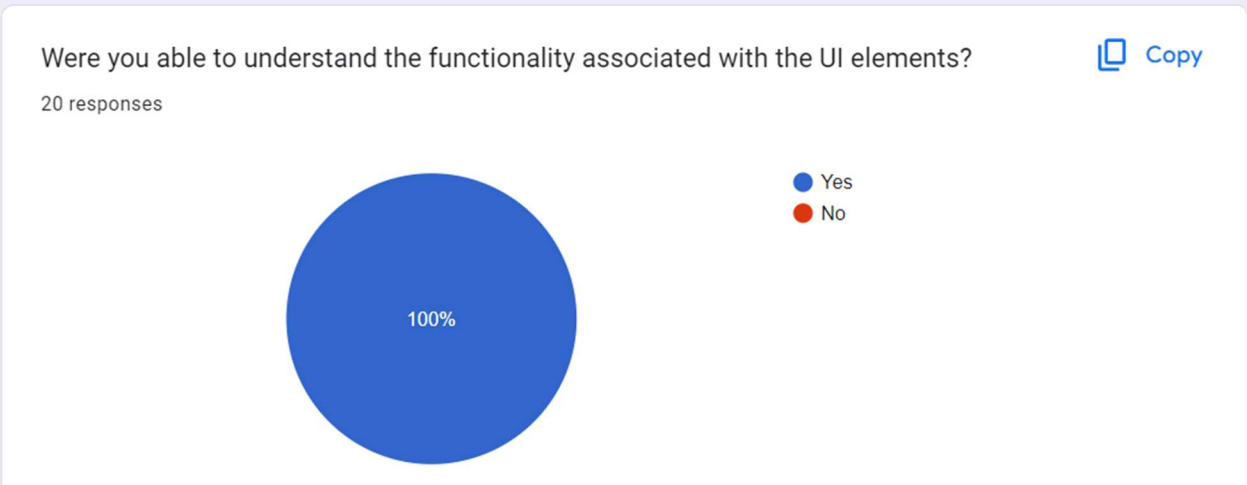
Most of the users were happy with the functionality and usability of the application. They were able to understand and use the application to set tasks, and multiple reminders, and to track the progress and view the progress. By this, we can understand that most of the designed features were working according to the user's expectations.



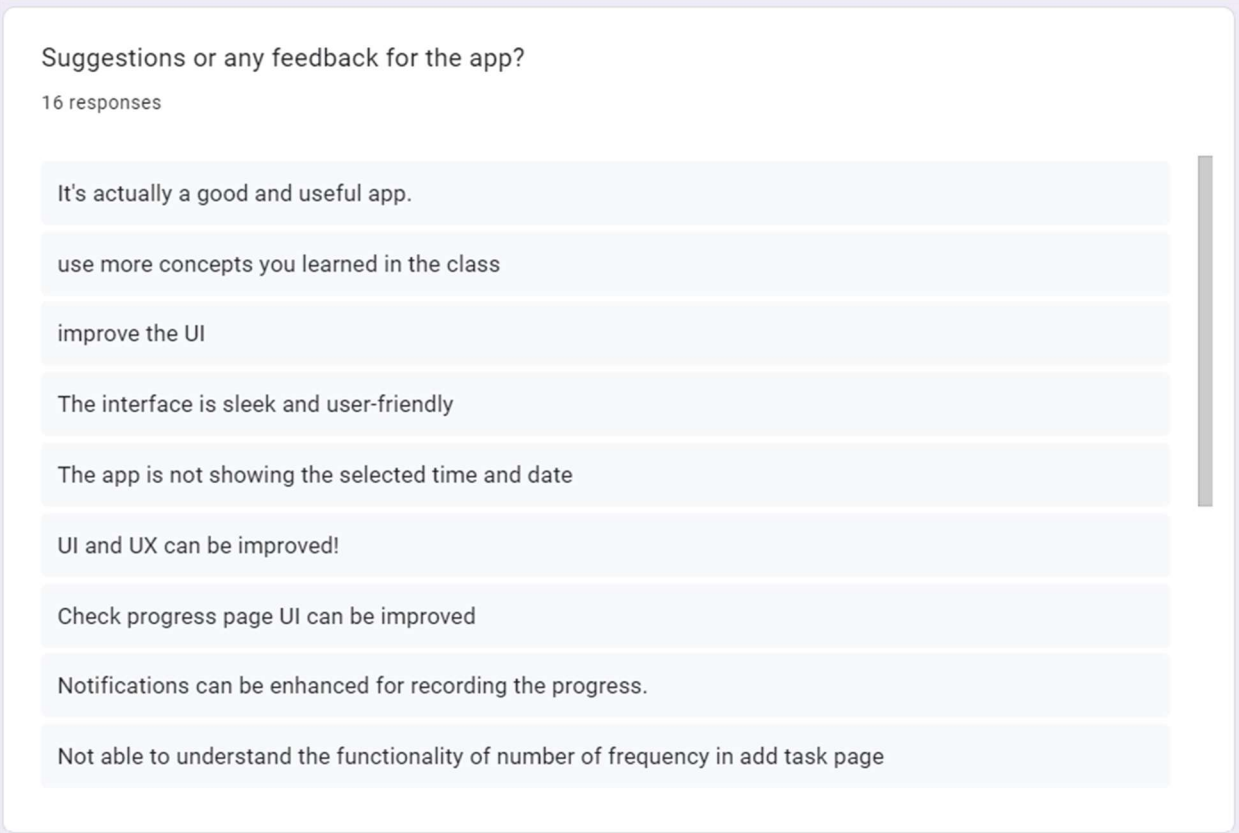
We have collected feedback from the users about the visual aspects of the application. From the graph below we can observe that the visibility and UI are moderate which gives scope for the area of improvement.

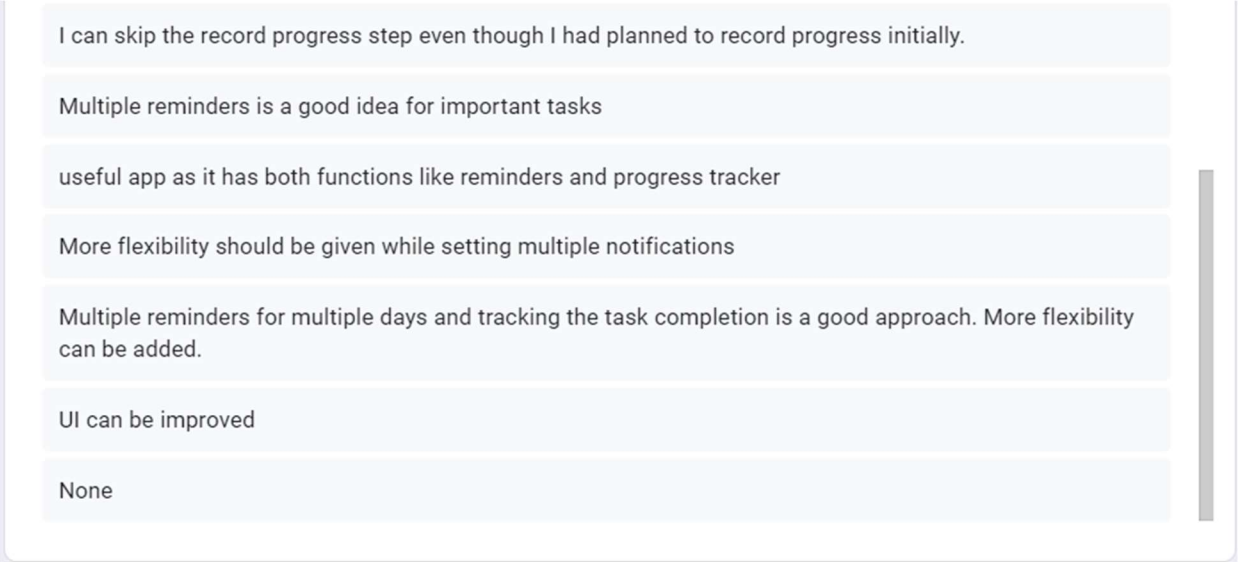


All the participants were able to understand the functionality associated with all the UI elements in the application which shows the mapping of UI elements with the corresponding functionality was good.



From the received suggestions and feedback, we have found information about the areas of improvement and additional features users require to enhance their experience with our application.





Discussion:

A mobile application is developed to continuously interact with the user to remind them about their daily tasks and goals. The application provides an option to set the number of notifications to

be sent as reminders before the task deadline which helps them to continuously remind about the set goals. For long-term goals, there is an additional option to store information about task completion and view the history of task completion.

With the help of this application, we want to improve the user's experience with the reminder apps by providing an option for multiple notifications to remind users about their important deadlines. The application also provides an opportunity for the user to check their previous record of task completions which helps them to analyze the performance and measure the consistency in the actions of their long-term goals.

Contribution to the HCI Community:

From the survey results, we can observe most of the existing reminder apps do not provide the functionality of recording the continuous track of their actions. Notifications act as an effective way of interacting with the user when the user is not actively working with the application. The participants of the survey found multiple notifications helpful and were able to able to observe all the notifications from the application.

The users found the option of recording the progress for the mentioned goal and checking the progress of their actions helpful in tracking their development. From the results, users were not actively motivated to record the progress after the record progress notification. By analyzing all the responses from the participants, we have observed that notifications act as a great tool to remind the user about a particular task but were not effective in motivating the user to open the application to perform specific actions or provide data.

Future Enhancements:

The existing UI of the application can be improved to enhance the user experience. The check progress page can be improved further to show analysis graphs, interactive visualizations of the user's actions, and provide some motivational quotes that keep them motivated. The notification to record the progress can be more engaging so that users can record their progress conveniently. Notifications that can take input from the user can be more helpful so that the user can enter the data of task completion within the notification without opening the app.

Conclusion:

In conclusion, our mobile application offers tailored features for enhanced productivity and goal attainment through customizable notifications and progress tracking, we have addressed common limitations observed in existing platforms. While feedback underscores progress recording, motivating sustained user engagement remains a challenge. Future improvements will refine the interface, integrate data visualization, and enhance notification prompts to further empower users in achieving their objectives efficiently.

References:

Motz, B. A., Mallon, M. G., & Quick, J. D. (2021). Automated educative nudges to reduce missed assignments in college. *IEEE Transactions on Learning Technologies.*

Fitz, N., Kushlev, K., Jagannathan, R., Lewis, T., Paliwal, D., & Ariely, D. (2019). Batching smartphone notifications can improve well-being. Computers in Human Behavior.

Santoso, K. Y., Abidin, T., & Wiyono, S. (2022). Mobile-based assignment reminder application for students and lecturers. *JOMLAI: Journal of Machine Learning and Artificial Intelligence.*

Lai, C.-H., Jong, B.-S., Hsia, Y.-T., & Lin, T.-W. (2020). Using reminder tools to increase learning motivation: A comparison of mobile devices, email, and e-learning platforms. *International Journal of Interactive Mobile Technologies (iJIM).*

Bidargaddi, N., Pituch, T., Maaijeb, H., Short, C., & Strecher, V. (2018). Predicting which type of push notification content motivates users to engage in a self-monitoring app. Preventive Medicine Reports.

Lin, T.-C., Su, Y.-S., Yang, E. H., Chen, Y. H., Lee, H.-P., & Chang, Y.-J. (2021). "Put it on the Top I'll Read it Later": Investigating Users' Desired Display Order for Smartphone Notifications. In CHI Conference on Human Factors in Computing Systems (CHI '21), May 8–13, 2021, Yokohama, Japan. ACM, New York, NY, USA.

Wang, S., Sporrel, K., van Hoof, H., Simons, M., de Boer, R. D. D., Ettema, D., Nibbeling, N., Deutekom, M., & Kröse, B. (2021). Reinforcement Learning to Send Reminders at Right Moments in Smartphone Exercise Application: A Feasibility Study. International Journal of Environmental Research and Public Health.

Gravert, C. (in press). Reminders as a Tool for Behavior Change. In N. Mazar & D. Soman (Eds.), Behavioral Science in the Wild. Toronto, Canada: University of Toronto Press.

Weber, D., Voit, A., Auda, J., & Schneegass, S. (2018). Snooze! Investigating the User-Defined Deferral of Mobile Notifications. In MobileHCI'18: Proceedings of the 20th International Conference on Human-Computer Interaction with Mobile Devices and Services, September 3–6, 2018, Barcelona, Spain.

Woodward, J., Chen, Y.-P., Jurczyk, K., Ross, K. M., Anthony, L., & Ruiz, J. (2021). A Survey of Notification Designs in Commercial mHealth Apps. In CHI Conference on Human Factors in Computing Systems Extended Abstracts (CHI '21 Extended Abstracts), May 8–13, 2021, Yokohama, Japan. ACM, New York, NY, USA.

Patil, P., Sawant, K., Desai, S., Shinde, A., & Bhelande, M. (2018). Task Trigger: Reminder Application based on Location. International Research Journal of Engineering and Technology.

Turner, L. D., Allen, S. M., & Whitaker, R. M. (2019). The influence of concurrent mobile notifications on individual responses. International Journal of Human-Computer Studies.

Baric, V., Andreassen, M., Öhman, A., & Hemmingsson, H. (2019). Using an interactive digital calendar with mobile phone reminders by senior people - a focus group study. BMC Geriatrics.

Mehala, M., & Viji Gripsy, J. (2020). Voice-based medicine reminder alert application for elder people. International Journal of Recent Technology and Engineering (IJRTE).