Università della Svizzera italiana

Faculty of Informatics

Lecture Mobile and Wearable Computing, fall term 2025
Android Programming Project (APP) – Project description

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Instructions

- Please answer the questions reported in the following two pages using the foreseen text boxes.
- Do not change the format, font size or any other elements of this template.
- Be concise and precise.
- Do not exceed the given limit of maximal number of characters. The given limits are intended including white spaces (e.g., the sentence "*This is a nice sentence*" contains 23 characters).
- "The app" mentioned in the questions refers to the Android-based application that you develop in the context of the Mobile Computing class.
- Once compiled, please upload the document on iCorsi.
- The deadline for sending the document is Friday, November 7, 2025, 23:59 Lugano time.
- If you have questions: post your question(s) on the Teams instance of the MWC class or send an e-mail to leonardo.alchieri@usi.ch, ardian.selmonaj@usi.ch.

1. What is the name of your app?

MindBricks

2. Which problem does the app solve? (Max. 200 characters)

The app helps users stay focused and understand the study conditions that work best for them by reducing distractions and identifying when and where they are most productive.

3. How does your app solve this problem? (Max. 650 characters)

The app uses a Pomodoro timer to structure study sessions and collect environment signals such as noise (to infer whether the user is in a quiet or distracting place) and light conditions (some users focus better in darker settings). The app will model user's behavior by analyzing their typical study environments, usual study times, and whether they reach for the phone during sessions. Using this heuristic model, the app generates an effective study plan for the next day. Through gamification, users earn coins for each completed session to build and customize a virtual house, while ending a session early results in losing progress.

4. Why is this problem relevant? (Max. 300 characters)

People often study in distracting environments and don't know which factors help them focus best. Combined with constant phone interruptions and weak study routines, staying productive becomes difficult.

5. Do other apps exist to solve this (or a very similar) problem?

Yes [✓] No [ ]

6. If you answered *yes* to question 5, list the existing apps that are most related to yours and explain how these solutions differ from your own. If you answered *no* to question 5, explain why do you think nobody else has solved this problem before. (Max. 650 characters)

Apps like Forest and Focus To-Do offer Pomodoro timers and basic gamification, but they do not consider the user's environment and serve only as simple study trackers. Our app goes further by combining tracking with an AI-based study planner that learns from the user's habits and context. This allows us to provide personalized study recommendations instead of just tracking study sessions.

7. Which of the built-in sensors of your phone does the app make use of? (Max. 200 char.)

Microphone (for noise detection) and illuminance sensor (for light condition)

8. Which of the built-in actuators of your phone does the app make use of? (Max. 200 char.)

Sound notifications and vibration motor (to provide alerts, reminders and sound effects important for gamification)

9. Does your app store sensor data locally, remotely, or in both ways?

Locally [✓] Remotely [ ] Both [ ]

10. Motivate your answer to question 9 (i.e., explain why your app stores data and why it does so only locally/remotely or in both ways). (Max. 650 characters)

Noise, light conditions and behavioral data (e.g. user study/focus habits, questionnaire answers from the user) are sensitive, so storing and processing on-device is the safest option. The dataset is small enough to be processed entirely on-device, and the AI models we will use can be trained directly on the phone. This avoids security risks (data leakage, no centralized storage), works offline, and gives users full control over their data (removing the data removes all stored information). The downside is the lack of backups, which may cause data loss.

11. Which type of data visualization your app offers and why. If you answered *no* to question 11, explain why data visualization is not necessary for your app. (Max. 650 characters)

The app's main visualization is a 24-hour, color-coded timeline that recommends the best times to study and when to take breaks. These suggestions are based on the user's past patterns and typical daily context (e.g. quiet vs. noisy environments, light conditions, phone pick-ups). The app also shows focus trends over time, such as average focus duration per day of the week / per hour, along with a history of past sessions. These visualizations help users understand their habits and plan more productive study sessions.

12. Does your app perform any type of data processing on the collected sensor data?

Yes [✓] No [ ]

13. If you answered *yes* to question 13 explain which type of data processing your app performs on the collected data and why. If you answered *no* to question 13 explain why data processing is not necessary for your app. (Max. 650 characters)

The app processes environment signals such as ambient noise, location (categorical value, not raw GPS coordinates) and light conditions along with behavioral data like focus times (e.g. when user studies during the day, and the amount of time spent per session, number of phone pick-ups during session) and the responses collected from the post-session questionnaires used to estimate the user productivity score. Using this data, the app identifies patterns is the user's habits and generates the color-coded study timeline for the next day.

14. How do you evaluate whether your app performs correctly and achieves its goal (i.e., solves the problem described in question 2)? (Max. 650 characters)

We evaluate correctness by comparing the system's estimated average productivity score for the next day (estimated when generating the color-coded timeline) with the user's actual productivity score estimated from the post-session questionnaire. This feedback loop allows the model to adjust its predictions when the estimated score differs from the real productivity score, improving the accuracy of future timeline recommendations. Also, the visualizations we plan to implement could help us understand if the system works as intended.

15. Which permissions does your app require to be granted by the user? (Max. 200 characters)

Microphone, Illuminance sensor, Notifications

16. Does the app raise any ethical issues?

Yes [✓] No [ ]

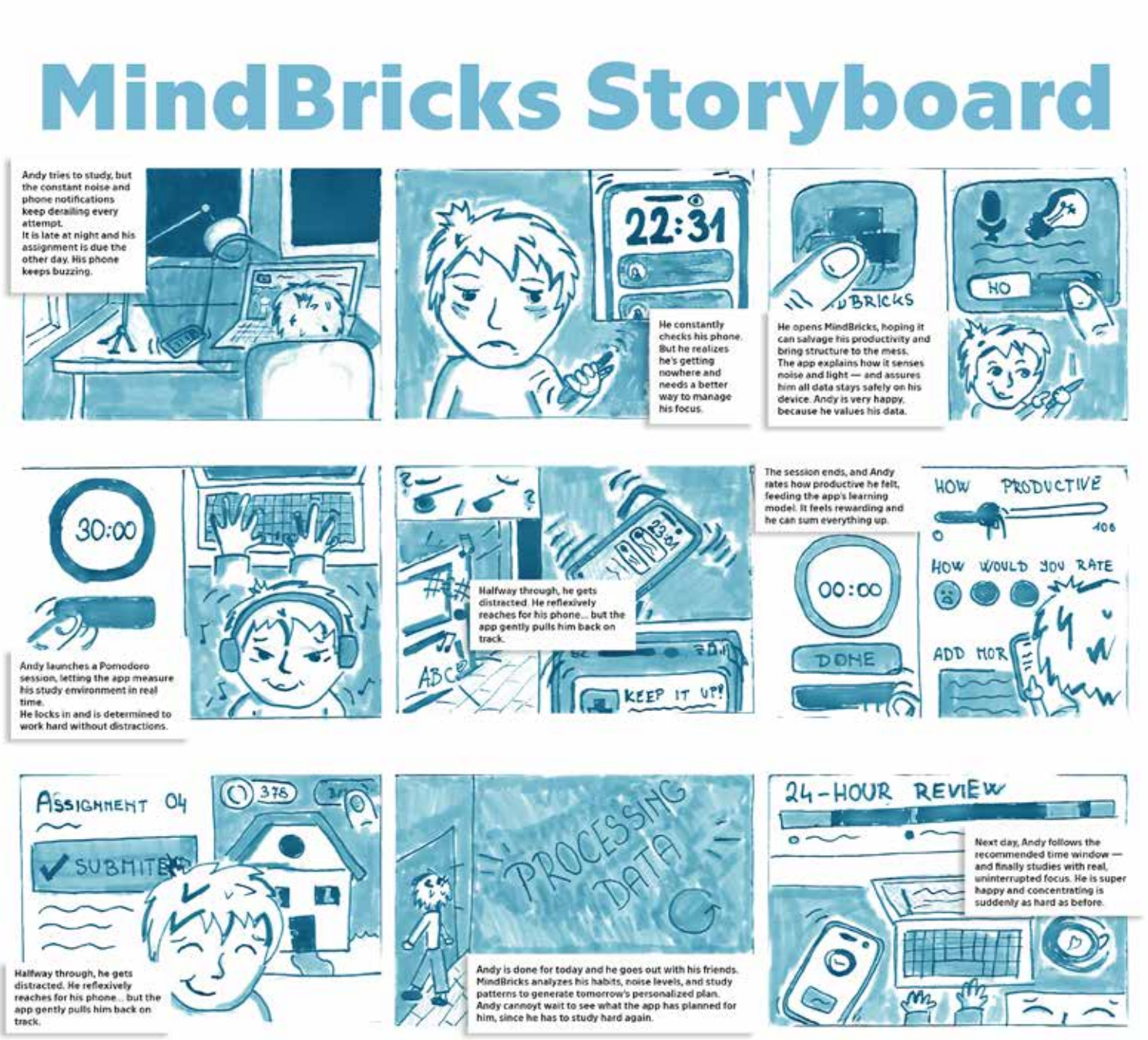
17. Motivate your answer to question 16 (Max. 300 char.)

The app uses sensitive data and requires background microphone access. For these reasons, users must clearly understand what is collected, why, and where this data is stored. Users must know that the data is stored and processed on-device, and that can be removed at any time.

18. Which are the main challenges that you expect to encounter in order to build your app? (Max. 300 characters)

Gathering quality data & understanding users, building a scalable, accurate model with smooth integration, and designing gamification that motivates without frustrating, all while keeping the app engaging and maintainable.

19. Add a sketch for your app storyboard



20. Provide description for your app storyboard

The storyboard illustrates how a student interacts with MindBricks to increase his productivity and studying efficiency.

The story follows a student who struggles to work in a noisy, distracting environment. By opening MindBricks, the user begins a guided study session powered by a Pomodoro timer and on-device sensors. Throughout the session, the app detects distractions, tracks noise and light levels, and gently intervenes when the student reaches for their phone. After completing the session, the user provides quick feedback that helps the app refine its understanding of their productivity.

As the day ends, MindBricks processes both environmental signals and behavioral data locally on the device to generate a personalized, color-coded study timeline for the next day. The final scene shows the student using these recommendations to study in an optimal setting, demonstrating how the app helps users understand their ideal study conditions and maintain consistent focus.

The storyboard highlights the full journey: the initial problem, the interaction flow, the sensing and modeling, the gamified rewards, and ultimately the user achieving a more productive study routine.