Mobile Architectures

Practical Work – Android - Kotlin – 2025/2026

The project aims at the development of an Android application, named **SafetYSec**, with the purpose of guaranteeing the **protection and safety** of its users. These users, due to their age and/or clinical condition, may require monitoring or supervision by other user(s).

I – User Profiles and Association

The application should present two user profiles:

- **"Monitors"** (responsible and/or caregivers) – capable of defining, implementing, and monitoring rules.
- **"Protected"** – application users who can associate themselves with the Monitor(s) and grant permission for the application of the proposed monitoring options, within a specific timeframe.

Key association rules:

- A **Monitor** can monitor several **Protected** individuals.
- A **Protected** individual can authorize monitoring by several **Monitors**.
- A user can simultaneously have both profiles associated: **Protected** and **Monitor**.
- A user can **never** act as a Monitor for themselves.
- A **one-time password** mechanism must be used for the association between **Protected** and **Monitor**.

The application must allow for the **management of each user** (registration, data change, association/cancellation of a connection to a Monitor / Protected), as well as implement **access recovery** mechanisms. A **multifactor authentication** solution must be implemented.

II – Monitoring Rules and Authorization

- The **Monitor** can create/change **protection and safety rules** (and define their parameters).
- These rules can be authorized by the **Protected** individual (selecting individually which ones they intend to allow).

Rules to be monitored:

Rule	Description	Parameters
Fall	Detection of user fall to the ground	-
Accident	Detection of road accidents (sudden deceleration)	-
Geofencing	The user is outside an area. This option can be used in an aggregated manner, defining several areas	GPS coordinates and radius
Speed control	Detection of excessive speed based on a predefined limit value	Maximum speed
Prolonged inactivity	No movement detected for a period of time	Duration in minutes
Panic button	Allows the Protected individual to autonomously trigger an alarm	-

The **Protected** individual can create/change the moments when they authorize the verification of the rules created by the Monitor, creating **temporal windows** (e.g., by days of the week and/or by start/end time).

III – Alert Management

When an alert situation is generated:

1. The **Protected** individual will be **notified**.
2. The Protected individual will have **10 seconds to act** and prevent the notification from being sent to the Monitor(s).
3. The **cancellation** depends on the introduction of a **code defined by the Protected** individual. This code can be changed in their profile at any time.

In an alert situation, the **Monitor** must be notified of the occurrence:

- Receiving in their application the indication of the **event type, date, time, Protected individual's identification, and their GPS location**.
- Immediately, the **Protected** individual's application starts a **30-second video recording**. This video is sent as a supplement to the alert to the **Monitor**.

IV – Profile Functionalities

Protected User

- Can consult the **history of past alerts**.
- Has access to consult and modify:
    - Temporal observation windows.
    - List of authorized Monitor(s).
    - Active rule(s) with each Monitor, which can be **revoked**.
- Has access in their profile to functions for changing **personal data, password, or alert notification cancellation code**.
- Also has the functionality to **associate/cancel a Monitor**.

Monitor User

- Will have a **dashboard** to consult:
    - Recent alerts.
    - Current status of the Protected individual(s).
    - Statistical data.
- Has access to consult and modify the **rule(s) associated with each of their Protected individuals**.
- Can change their **data and password** in their profile.
- Also has the functionality to **associate/cancel a Protected individual**.

V – Development Notes

- The application development must be done using Jetpack Compose.
- All information should be stored using services that facilitate its sharing among users. The use of Firebase is recommended.
- The application must default to the English language. It must support an additional language (Portuguese or another), depending on the device's configuration.
- The application must be capable of running in Portrait or Landscape orientation without compromising its functionality, presentation quality, or the elements to be processed.
- A user interface should be outlined that facilitates navigation between its contents. It should contain icons/top bars/floating buttons that are dynamic depending on the context.
- The implementation of accessibility mechanisms must be promoted.
- The application's internal organization, code quality, and robustness will be important elements in the evaluation.

6 – Submission Details

- Work Execution: Groups of up to 3 elements.
- Delivery Date: 23:59 on 2026.01.04 (5% will be deducted for each hour of delay).
- Defense: The defense is mandatory and will take place on January 5 and 6 (in a slot to be scheduled on Nónio).
- Delivery Format:
    - A single file in ZIP format via Nónio.
    - File name example (for 3 students): AMOV2526.<student_nr1>.<student_nr2>.<student_nr3>.zip.
    - Files in other formats will be subject to a penalty of up to 5% in the final grade.
- The ZIP file must include:
    - All the code (project folders) with all essential resources for compilation and execution.
    - The following directories must be previously removed from the Android Studio projects: <proj>/.gradle and <proj>/app/build.
    - Failure to remove the mentioned files leads to a penalty of up to 5% in the final grade.
    - Technical report (PDF), where, among other relevant data, you should indicate the technical solutions adopted in the development, clarify the implemented and functional implementation options, and identify opportunities for improvement in the application.