

Team Project: Developing and testing a simulation of RaDoTech health monitoring device¹

(Draft)

Due Fri Dec 6th

Team work submitted individually on Brightspace as a tar or zip file named teamX.tar or teamX.zip, where X is your team number. **Mandatory demos will be individual starting on Monday Dec 9th.** The scheduling details will be announced the week before and the project review-demo times will be arranged between you and your assigned TA. The implementation and testing are to be in C++ using the Qt framework on the course VM (COMP3004-F24). **You are required to use GitHub:** make sure your repository is private and that you provide access to your assigned TA. You are encouraged to check your progress on a weekly basis with myself and the TAs. **Do not wait until the last minute.**

Deliverables (5 parts)

- **Use cases**
- **Design documentation** – structure and behavior
 - UML Class diagram
 - UML Sequence diagrams for scenarios covering normal and safety operation, to be determined
 - UML State machine diagrams
 - For any control entities
 - Textual explanation of your design decisions
- **Implementation**
 - Source code of your Qt C++ project that builds and runs on the course VM (COMP3004-F24.ova found at <https://carleton.ca/scs/tech-support/virtual-machines/>)
 - Execution of tests based on the above scenarios
- **Video:** record a video of running your simulation through the above specified scenarios
- **Requirements traceability matrix**

Objectives

- Analyze requirements based on provided material and develop use case(s).
- Develop a software architecture that supports data collection, processing, and visualization.
- Test your implementation.
- Relate the modeling, design, implementation and testing through a Requirements Traceability Matrix.

¹ This project has been specified with help of Igor Radonjić.

Project Overview

This project involves designing and implementing a simulation of a health monitoring device called RaDoTech. RaDoTech uses Japanese Ryodoraku technology to measure electrical output from various points on the body, providing insights into the functional health of the user. Your program should simulate use of the device similar to the following

“Here’s How to Perform Your First Scan With RaDoTech”

https://www.youtube.com/watch?v=Hpl_sljE0HI

Project Requirements

1. Functional Requirements:

- **User Management:** Create, update, and delete user profiles. Each device should support multiple profiles (up to five).
- **Data Collection:** Interface with RaDoTech hardware to collect health data.
- **Data Processing:** Process raw data using algorithms based on Ryodoraku technology to generate health metrics.
- **Data Visualization:** Display health metrics in an easy-to-understand, visual format within the application.
- **Recommendations:** Provide a place-holder for specialists’ recommendation.
- **Historical Data:** Store and allow users to access historical health data for trend analysis.

2. Non-Functional Requirements:

- **Battery power:** charge depletion, low power indication, and graceful shutdown.
- **Scalability:** Ensure the system can handle a growing number of users and data points.
- **Usability:** Ensure the application is intuitive and user-friendly.

RaDoTech background

RaDoTech is a personal health monitoring device that uses Japanese Ryodoraku technology to measure the electrical output from various points on the body. This technology, developed over 60 years ago, enables the device to create a snapshot of the body’s functional health by sending ultra-low electrical currents through 24 specific points on the body and measuring the returned signals. This process helps evaluate the performance of vital organs and overall body function in just a few minutes.

The device is non-invasive, quick, and easy to use at home, offering an alternative to more traditional and often more cumbersome medical tests like blood work or CAT scans. Data collected by RaDoTech is processed using sophisticated algorithms, and results are accessible via a mobile app or web portal. The app provides detailed insights into each organ's performance, identifies potential issues, and offers suggestions for improving health ([RaDoTech](#)). More on the science behind it can be found here:

<https://radotech.com/en-ca/pages/science-page>.