

# README

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## HeartPi

**Course:** CS3307

**Team:** Team 40

**Team Members:**

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## Project Description

Our HeartPi is a C++-based simulation project developed by Team 40 for the CS3307 course at Western University. The project simulates heart health monitoring by generating random sensor-like data (heart rate, blood pressure, cholesterol, ECG) based on user input collected via a family history and lifestyle survey. The application uses Qt and Qt Charts to provide an interactive GUI that displays the simulated data, logs output values, and sends email notifications when abnormal readings are detected. Although originally designed for Raspberry Pi hardware integration, HeartPi has evolved into a fully software-based simulation.

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## Features

- **Family History Survey:**  
Users complete an interactive survey detailing age, gender, sleep habits, exercise frequency, diet type, family disease history, and smoking status.
- **Random Data Generation:**  
A `RandomNumberGenerator` class simulates realistic heart-related values (heart rate, systolic and diastolic blood pressure, cholesterol, ECG) based on the survey results.
- **Risk Assessment:**  
The `Calculations` class computes a risk score using survey inputs and categorizes the user's heart health as low, moderate, or high risk.
- **GUI Display:**  
The application features a Qt-based GUI with multiple screens:
  - **Main Menu:** Animated background and navigation buttons.

- **Survey Screen & Survey Form:** Collect user data.
    - **Heart Health Screen:** Displays a live heart rate graph and risk assessment using Qt Charts.
    - **Results Screen:** Shows previously logged data.
    - **Tips for User:** Offers health advice based on the risk level.
  - **Data Logging:**  
Sensor outputs are recorded into a CSV file for historical review.
  - **Notification System:**  
An integrated **EmailSender** class can send email alerts (via Gmail's SMTP) to notify caregivers if abnormal values are detected.
  - **Doxygen Documentation:**  
The source codes (files) was documented using Doxygen-style comments. Documentation can be generated to review class details and method descriptions for each of the classes.
  - **Project Management & Version Control:**  
Tasks and user stories were managed via Jira, and the source codes (files) was maintained/shared using github.
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## Prerequisites

### For macOS Users and Window Users

Make sure you have the following installed before running the HeartPi program application:

- Xcode (For MacOS)
- Visual Studio or Visual Studio Code (Install Visual Studio 2019 (or later) with C++ development tools, or Visual Studio Code with the appropriate toolchain (MinGW or MSVC))
- Qt Framework (Download and install Qt (version 5 or 6) from the Qt website. Make sure to add the Qt bin folder (which contains qmake) to your PATH)
- C++ Compiler (Use the MSVC compiler (if using Visual Studio) or configure MinGW with Visual Studio Code)