Parking Assist System: Phase 1
Version 1

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1 Statement

Parking assist systems are used in motor vehicles to alert drivers of obstacles while reversing. They are a hard real-time embedded system because missing a deadline may lead to catastrophic failure, a collision. Functionally, the system shall produce 1 audible beep per second while 101-150 cm away from an obstacle, 2 audible beeps per second while 51-100 cm away from an obstacle, and continuous buzzing while 1-50 cm away from an obstacle. As aforementioned, the system is hard real-time; therefore, the end-to-end response time, between the ultrasonic sensor and the buzzer, shall be no more than 50 ms, and the sampling rate of the ultrasonic sensor shall be no less than 40 Hz.
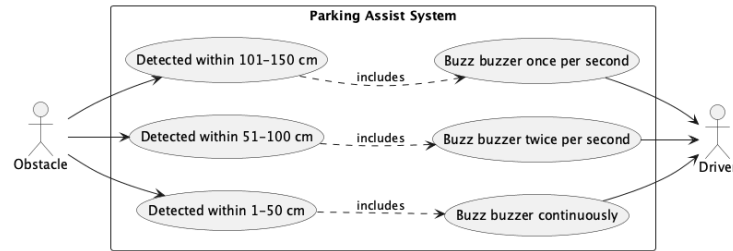
2 Use Cases

Figure 1: Use case diagram of a parking assist system

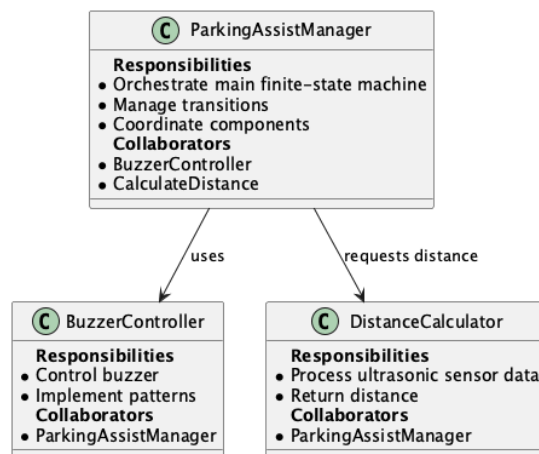# 3 Classes, Responsibilities, and Collaborators

Figure 2: CRC cards for a parking assist system

4 Sequence and Structure
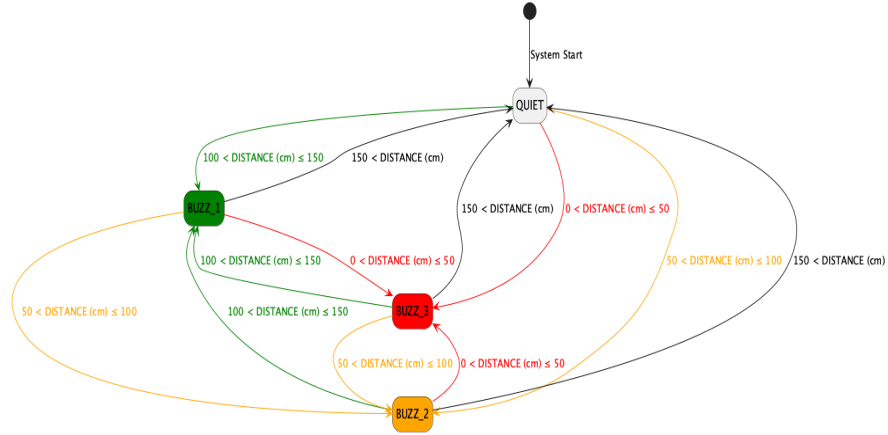
4.1 Process Flow

Figure 3: Finite-state machine diagram, or flowchart, of a parking assist system
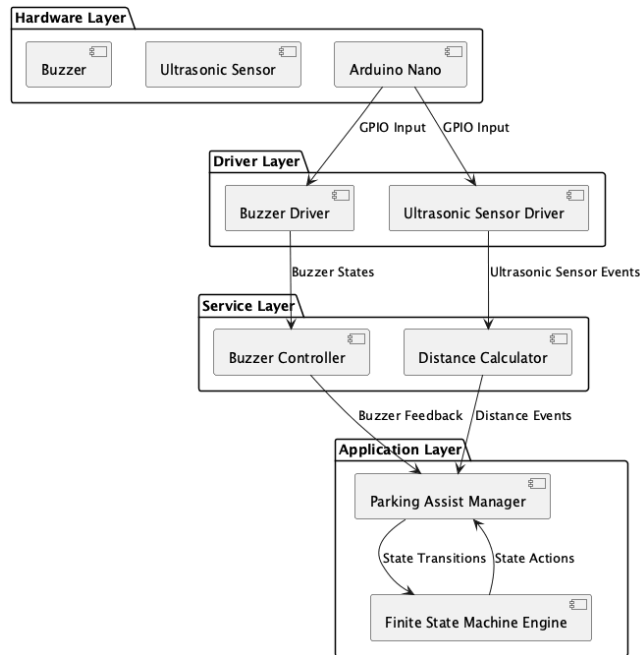
4.2 Architecture

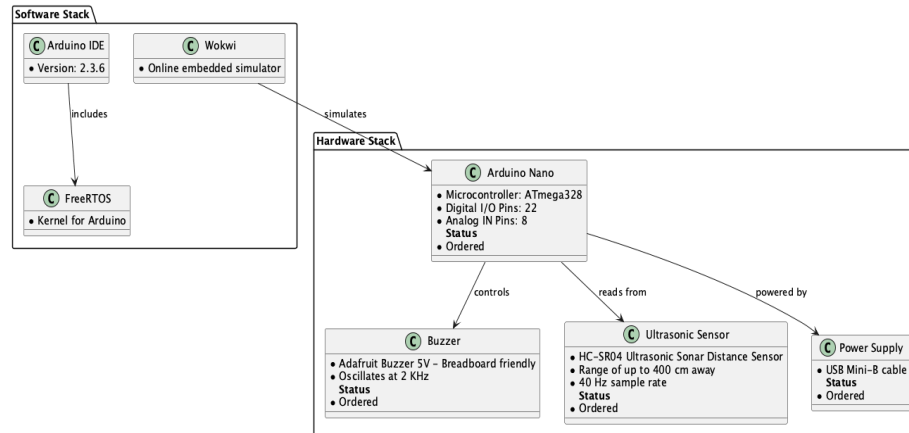Figure 4: Architectural block diagram of a parking assist system

5   Components

Figure 5: Component list of a parking assist system