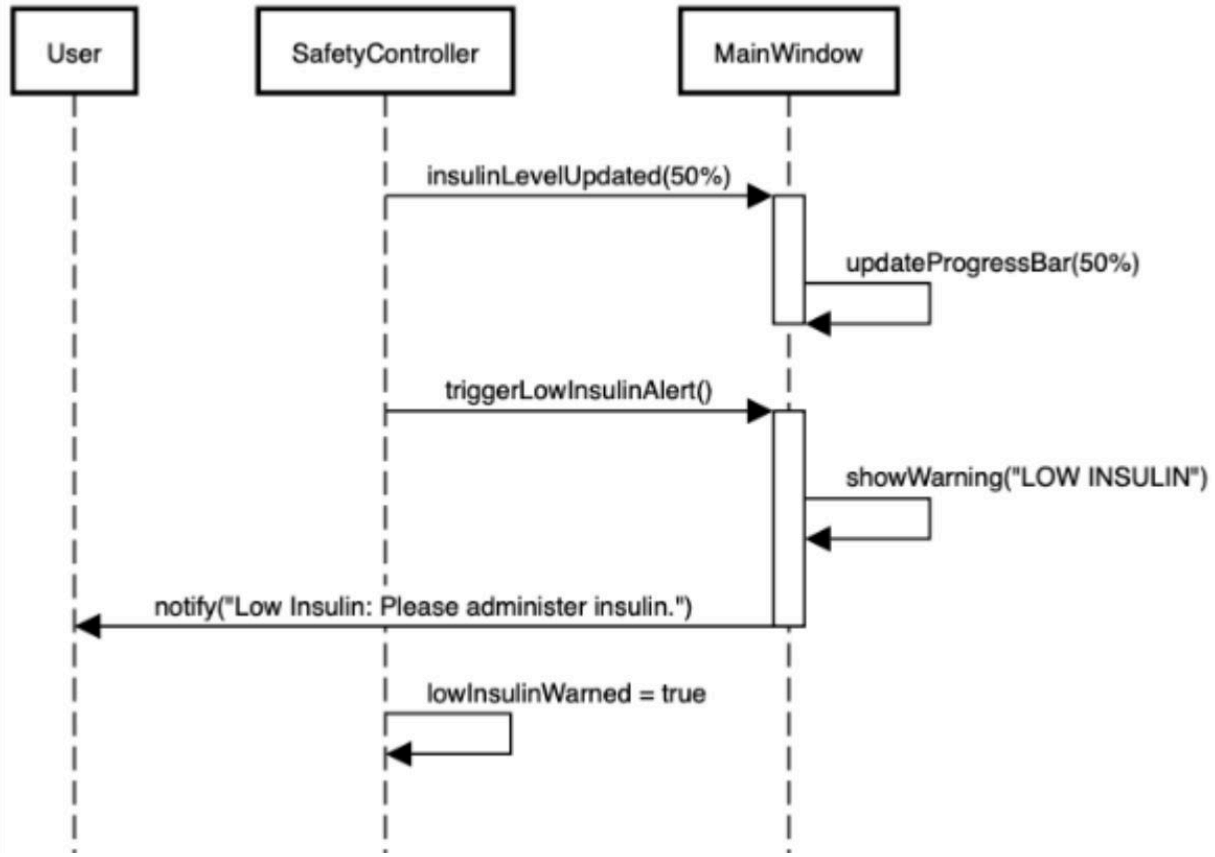
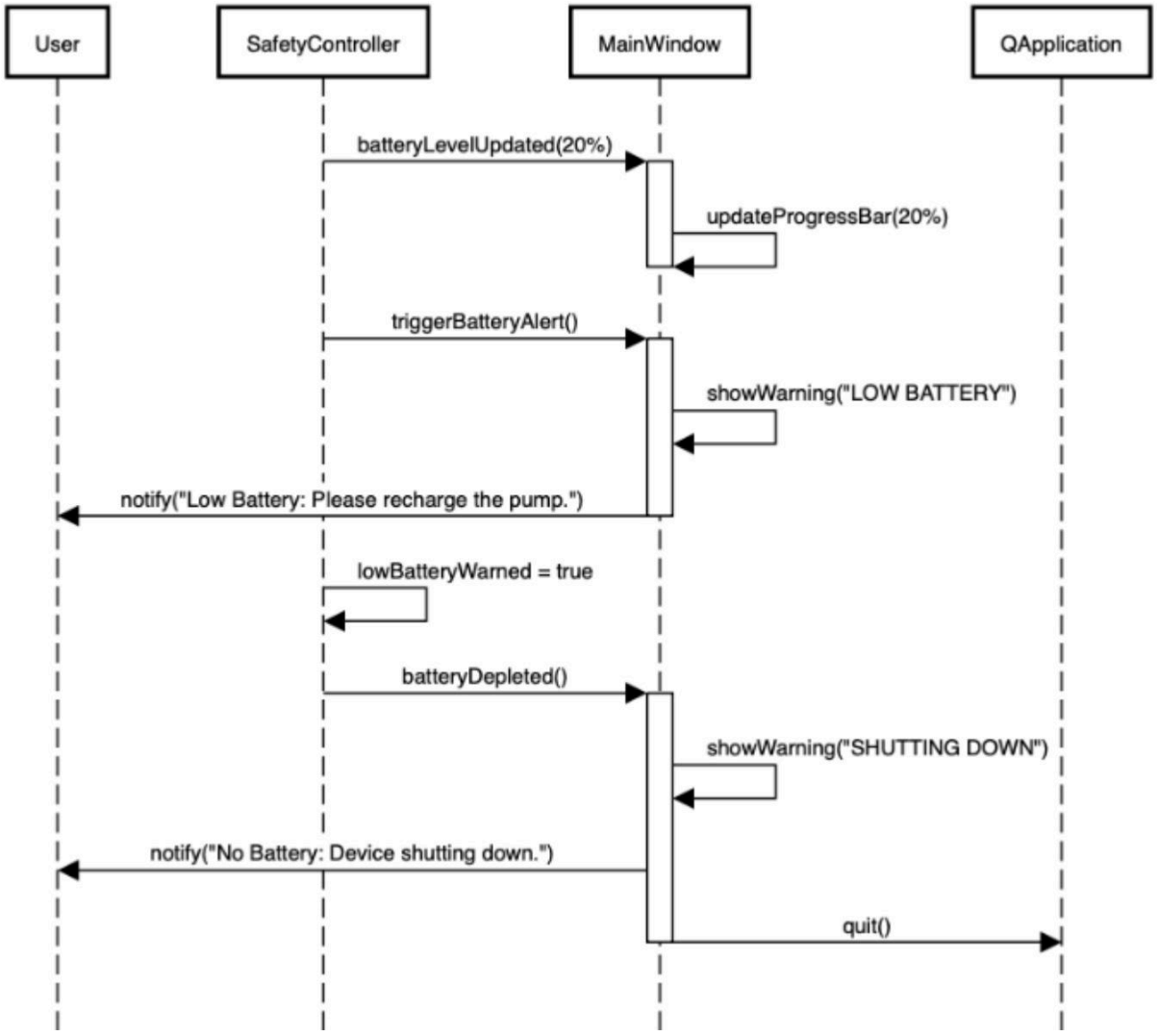
Safety Scenario #1

The following sequence diagram demonstrates when the simulation experiences low insulin. The SafetyController sends an update to the MainWindow with the updated insulin level. This then updates the progress bar on the interface. It then triggers a low insulin alert, which causes the system to show a warning and notify the user to take action. After that, a flag is set to make sure the alert doesn't keep repeating until the insulin level changes again.



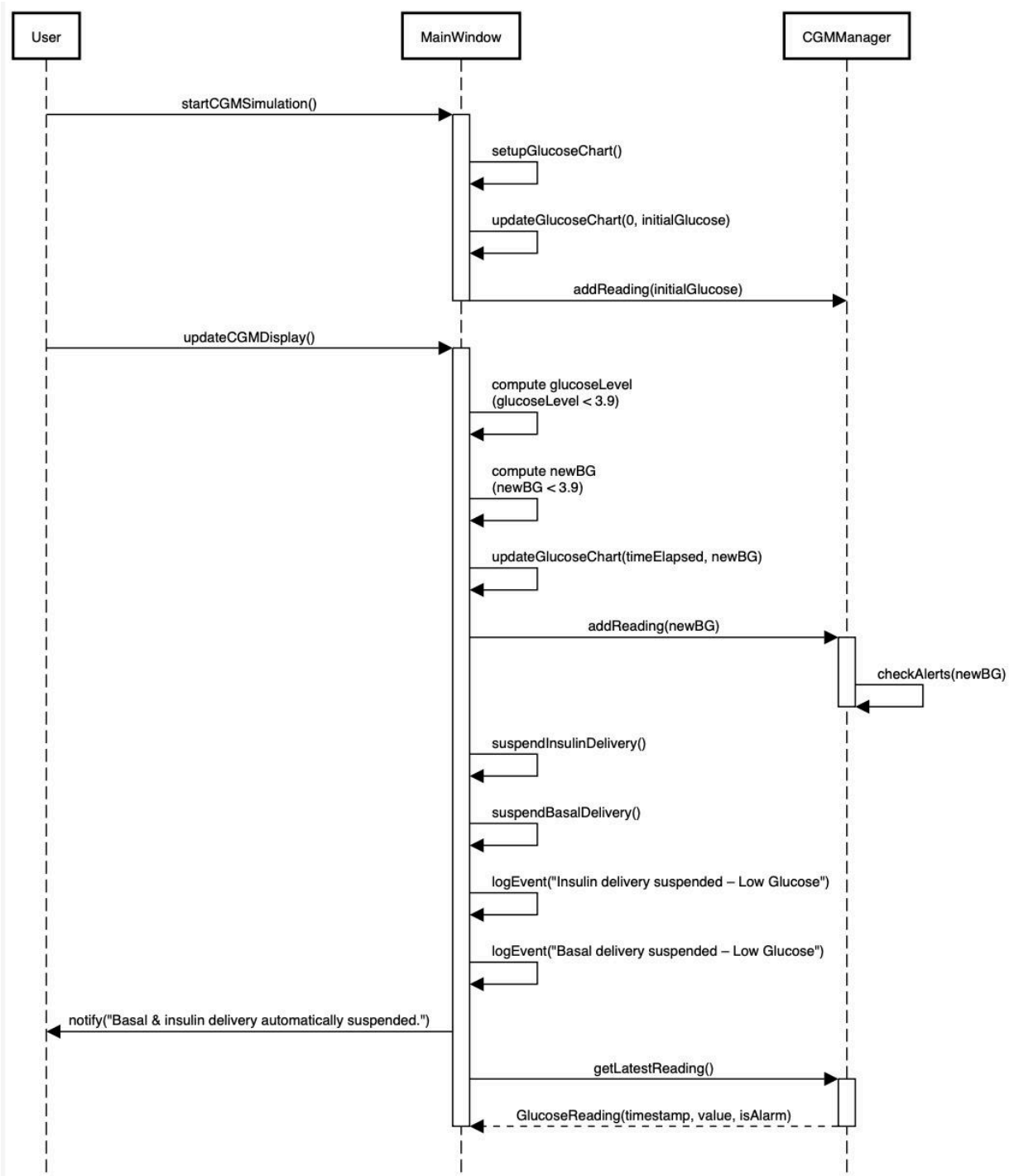
Safety Scenario #2

The following sequence diagram demonstrates when the simulation experiences low battery. The SafetyController updates the MainWindow with the updated battery level. It tells the progress bar to reflect 20%. It then triggers a low battery alert, which causes the MainWindow to display a warning and notify the user to recharge the device. A flag is then set to avoid sending repeated warnings. If the battery continues decreasing and reaches 0%, the system shows a shutdown warning. An notification is sent to the user that the device is turning off, and then the simulation automatically exits the application.



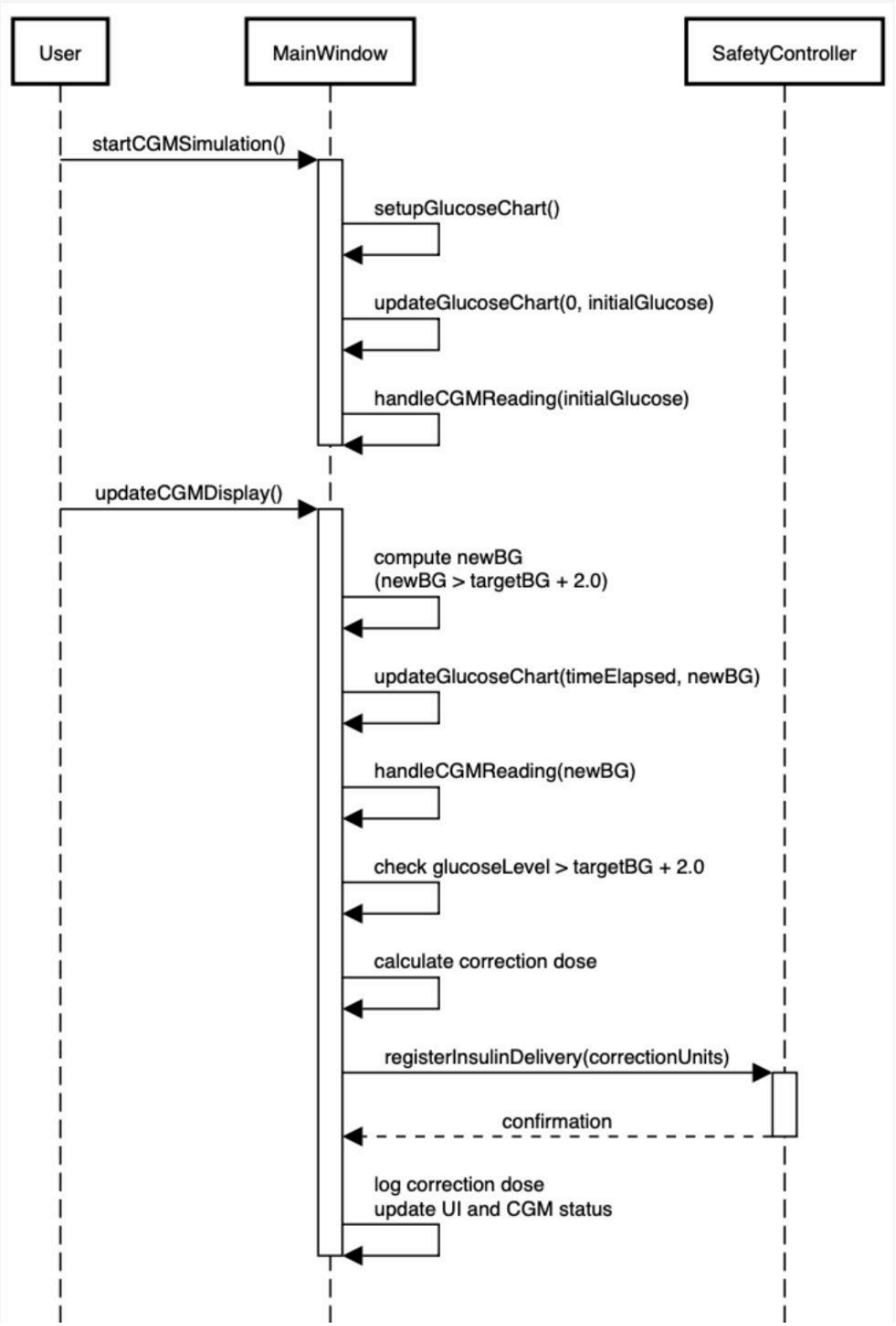
Safety Scenario #3

The following sequence diagram demonstrates when the simulation experiences low glucose. The MainWindow sends the new glucose reading to the CGMManager, which checks if it falls below the threshold. If the glucose level is less than 3.9 mmol/L, the MainWindow suspends both insulin and basal delivery to prevent. It logs these events and notifies the user that both deliveries have been automatically suspended. The latest reading is then retrieved from CGMManager and used to update the UI.



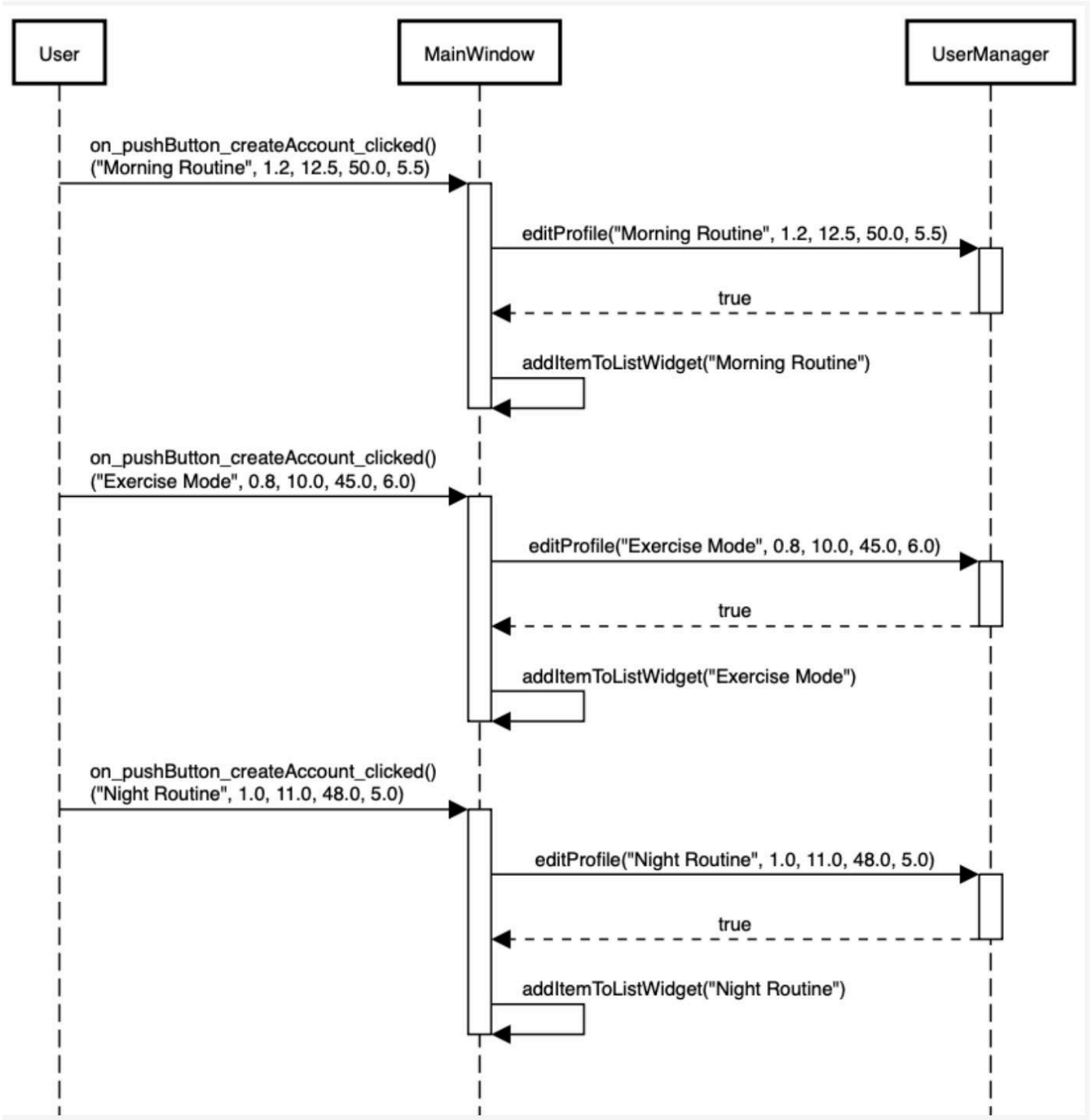
Safety Scenario #4

The following sequence diagram demonstrates when the simulation experiences high glucose. The user initiates the simulation, and the MainWindow sets up the glucose chart and processes the initial reading. As glucose readings are updated, the system finds a value above the target threshold. It calculates a correction dose and automatically registers insulin delivery to bring the glucose level down and within the target range. The correction is logged, and the UI is updated.



Normal Scenario #1

The following sequence diagram demonstrates the creation of three different user profiles: Morning Routine, Exercise Mode, and Night Routine. The user creates a profile by entering profile details and clicking the create account button. The MainWindow sends the profile data to the UserManager to be saved. The profile is then successfully created and added to the account list. This allows the user to select it for future use.



Normal Scenario #2

The following sequence diagram demonstrates the manual bolus delivery within the insulin pump. The user initiates the bolus request and retrieves the updated CGM readings and profile settings. The BolusManager proceeds to calculate and deliver the bolus. Lastly, the IOB is updated, and the SafetyController updates the battery level based on the usage time.