

Traceability Matrix

ID	Requirement	Related Use Case	Fulfilled by	Test	Description	Implemented by	Tested by
1	Power ON/OFF with secure PIN entry	UC1	main.cpp	PumpSimulatorMainWidget::onPowerToggled()	User sets PIN on first power-on; verifies PIN on subsequent power-ons; powers off to hide UI. UI locks access until the correct PIN is entered; state preserved.	Shirley Huang	- Whole Group
2	Home screen with pump status and CGM graph	UC2	homescreenwidget.cpp, cgmsensor.cpp	HomeScreenWidget constructor + updateStatus()	Successful login → Navigate to Home screen. Confirm CGM graph, insulin level, battery, and IOB are visible. CGM graph updates using QTimer and Chart widget; status pulled from model.	Shirley Huang, Gloria Li	- Whole Group
3	Create, update, and delete personal insulin profiles	UC3	homescreenwidget.cpp	ProfileManager, onCreateProfile, onEditProfile	Users can create/update/delete profiles with basal, carb ratio, etc.	Shirley Huang, Gloria Li	- Whole Group
4	Manual bolus administration based on user input or CGM	UC4	bolusmanager.cpp, boluscalculationdialog.cpp	BolusCalculationDialog, BolusManager::computeFinalBolus()	User enters carbs/BG manually or uses CGM; bolus is calculated using formula.	Niket Rathod	- Whole Group
5	Extended bolus delivery over time	UC5	extendedbolusdialog.cpp, bolusmanager.cpp	BolusManager::computeExtendedBolus(), QTimer loop	Splits dose into immediate and extended parts, logs each tick over duration.	Niket Rathod	- Whole Group
6	Start/Stop/Resume Basal Insulin with ControlIQ adjustments	UC6	basalmanager.cpp, controliq.cpp, cgmsensor.cpp	BasalManager::startBasalDelivery()	Delivers basal insulin at profile rate; adjusts rate via ControlIQ; pauses if CGM < 3.9.	Gloria Li	- Whole Group
7	View insulin delivery history (bolus, basal, errors)	UC7	datamanager.cpp	DataManager, addLog(), updateHistory()	Each event is logged with a timestamp; viewable from the History screen.	Niket Rathod	- Whole Group
8	Display real-time graphed glucose data	UC8	homescreenwidget.cpp	HomeScreenWidget::updateGraph()	Shows glucose history and predictions using Qt Charts.	Alex Bon	- Whole Group
9	Handle pump errors (low battery, CGM disconnect, occlusion)	UC9	insulinpump.cpp, battery.cpp, basalmanager.cpp	BasalManager, error buttons in HomeScreenWidget	Alerts user and halts delivery if sensor disconnect or occlusion is detected.	Niket Rathod, Gloria Li	- Whole Group
10	Adjust insulin delivery using ControlIQ	UC10	controliq.cpp, basalmanager.cpp	ControlIQ::adjustDelivery(), used in BasalManager	Dynamically changes basal rate depending on CGM value.	Alex Bon	- Whole Group
11	Navigate between	UC11	navigationmanager.	NavigationManager::navigate	Controlled via QStackedWidget; user can	Shirley Huang	- Whole Group

	screens (Home, Options, History, Bolus)		cpp	To()	move between all views.		
12	Battery charging	UC12	chargingdisplaydialog.cpp, battery.cpp	onCharge(), ChargingDisplayDialog::onTimeout()	Simulates real-time charging; updates battery and UI status.	Alex Bon	- Whole Group