

# Traceability Matrix

ID	Requirement Description	Related Use Case	Design Elements (Fulfilled By)	Test	Implementation Elements (Description)
1	The system must allow the administrator to configure the number of floors, elevators, passengers, and safety events before starting the simulation.	Start Simulation (UC1)	BuildingSetup, SimulationControls, LogConsole, PassengerBehaviourSetup, SafetyEventSetup, MainWindow	Verify that the admin can configure parameters before simulation starts, and confirm settings are logged correctly.	BuildingSetup, PassengerBehaviourSetup, and SafetyEventSetup captures input. SimulationControls applies configurations and controls simulation. LogConsole displays all events. MainWindow provides the UI.
2	The system must allow passengers to request an elevator using the up and down buttons on each floor.	Request Elevator (UC2)	PassengerBehaviourSetup, PassengerAction, LogConsole	Enter the passenger ID, time step, floor, and click the Request Car button. Verify that the request is logged.	PassengerBehaviourSetup handles request actions, PassengerAction processes logic, LogConsole records all events.
3	The system must allow passengers to select a destination floor using buttons inside the elevator and display the current floor number.	Ride Elevator (UC3)	PassengerBehaviourSetup, PassengerAction, LogConsole, SimulationControls	Enter the passenger ID, time step, floor for the Request Car and Exit Car buttons. Verify that the log console displays elevator movement from floor to floor, elevator doors opening and closing, and passengers entering and exiting.	PassengerBehaviourSetup receives floor selection, PassengerAction processes logic, SimulationControls manages elevator movement, and LogConsole records all events.
4	The system must allow passengers to press the help button inside the elevator to initiate communication with building safety services. If no response is received within 5 seconds, a 911 emergency call is placed.	Signal Help Alarm (UC4)	SafetyEventSetup, SimulationControls, PassengerBehaviourSetup, PassengerAction, LogConsole	Either set a help alarm via SafetyEventSetup, or enter passenger ID, time step, floor for the Push Help button. Verify that the log console displays help alarm triggered and passenger receives assistance.	SafetyEventSetup and PassengerBehaviourSetup manage help requests. SimulationControls handles emergency logic. PassengerAction processes logic. LogConsole records all events.
5	The system must	Signal	SafetyEventSetup,	Enter the time step and	SafetyEventSetup

	detect obstacles in the door path using sensors. If an obstacle is detected, the doors will remain open. If this issue continues to occur, an audio and text warning is outputted.	Door Obstacles (UC5)	SimulationControls, LogConsole	click the Door Obstacle button. Verify that the log console displays that the doors remain open and warnings are issued until the obstacle is moved.	manages door obstacle events, SimulationControls prevents closure and issues warnings, LogConsole records all events.
6	Upon receiving a fire alarm signal from the building, the control system must move the affected elevators to a safe floor. Audio and text warning messages are presented to the passengers.	Signal Fire Alarm (UC6)	SafetyEventSetup, SimulationControls, LogConsole	Enter the time step and click the Fire Alarm button. Verify that the system has issued warnings and the elevator has moved to a safe floor with the log console.	SafetyEventSetup manages fire alarm events, SimulationControls moves elevators and issues warnings, LogConsole records all events.
7	The system must detect if the elevator load exceeds the carrying capacity. If so, it prevents the elevator from moving, keeps the doors open and outputs an audio and text warning for passengers to reduce the load.	Signal Overload Alarm (UC7)	SafetyEventSetup, SimulationControls, LogConsole	Enter the time step and click the Overload Alarm button. Verify that the system has issued warnings and the elevator doors remained open and stationary until the load was moved via the log console.	SafetyEventSetup manages overload alarm events, SimulationControls controls elevators and issues warnings, LogConsole records all events.
8	Upon receiving a power out alarm, the system must inform passengers via audio and text messages. Each elevator is moved to a safe floor and passengers are informed to disembark.	Signal Power Out Alarm (UC8)	SafetyEventSetup, SimulationControls, LogConsole	Enter the time step and click the Power Out Alarm Button. Verify that the system has issued warnings and that all elevators have reached a safe floor. Verify that passengers have evacuated via the log console.	SafetyEventSetup manages power out alarm events, SimulationControls controls the elevators and issues warnings, LogConsole records all events.