

Traceability Matrix

ECS - ("ElevatorControlSystem")

ID	Requirement	Related Use Case	Implemented by	Tested by
1	A building is serviced by M elevators (also called cars).	N/A	ECS	To change amount of elevators, change "MAX_ELEVATORS" to desired M elevators.
2	On each of the N floors is a pair of buttons marked "up" and "down".	Use Case 1	ECS	To change amount of floors, change "MAX_FLOORS" to desired N floors.
3	When a button is pressed it illuminates, and remains illuminated, until an elevator arrives to transport the customers who, at this floor, have requested an elevator going in a certain direction.	Use Case 1	MainWindow, ECS, Button (ElevatorButton or FloorButton), Passenger, Floor, Elevator, mainWindow.ui	Press a floor button in the GUI and observe the console.
4	When the elevator arrives, it rings a bell, opens its doors (the elevator and floor doors) for a fixed time (10 seconds)	Use Case 1	Elevator, Audio System, ECS, Passenger, Floor	When an elevator arrives to a floor for a passenger, observe the console.

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	allowing people to exit or board, rings the bell again, closes its doors and proceeds to another floor.			
5	Once on-board passengers select one or more destination floors using a panel of buttons; there is one button for every floor.	Use Case 1	Passenger, ElevatorButton, Elevator	Observe the GUI. The GUI has a dedicated section to the Passenger's view. For every button, a connect must be made in MainWindow and a new function dedicated to that button must also be made. The same way that I did for the other elevator floor buttons.
6	The elevator has a display which shows passengers the current floor of the elevator.	Use Case 1	Display System, Passengers, Floor	Observe the GUI. There is a dedicated section to showing all info on the selected Elevator, including its current display.
7	There is also a pair of buttons on the elevator control panel marked "open door" and "close door".	Use Case 1	ElevatorButton	Observe the GUI. In the elevator panel, the two buttons will be present.
8	These buttons can be used by a passenger to override the	Use Case 1	ElevatorButton, MainWindow, mainWindow.ui, Elevator, ECS	When door timer is counting down, press open door to reset timer. When door is closing,

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	default timing of the doors.			before it is closed, press the open door to open the door. When door is open and timer is counting down, close door button will start closing it.
9	The door will remain open beyond its default period if the "open door" button is held depressed; the doors can be closed prematurely by pressing the "door close" button.	Use Case 1	ElevatorButton, ECS, Button	When door timer is counting down, press open door to reset timer. When door is closing, before it is closed, press the open door to open the door. When door is open and timer is counting down, close door button will start closing it.
10	Inside the elevator there is also a help button linked to building safety service.	Use Case 1	ElevatorButton, ECS, MainWindow, mainWindow.ui, Building Safety, Services	Observe the GUI, help button is present in the elevator panel. Press the button when passenger is present.
11	Each elevator has a sensor that notifies it when it arrives at a floor.	N/A	ECS	Observe the console. When new floor is reached, it is printed in console.
12	The elevator control system should ensure that the group of	N/A	ECS, Elevator	Test by running through simulations and different scenarios.

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	elevators services all (floor and on-board) requests expeditiously.			
13	Each elevator has a display and an audio system	N/A	Elevator, Audio System, Display System	Observe the GUI. There is a dedicated section to the Elevator's maintenance that shows the display. When emergencies occur or doors open, audio system will ring.
14	The display shows the current floor number and warning messages that are synced with audio warnings	N/A	Display System, Floor, Audio System, ECS, Elevator	Observe the GUI. There is a dedicated section to the Elevator's maintenance that shows the display. When emergencies occur or doors open, audio system will ring.
15	The control system receives a "Help" alarm signal from an elevator indicating that the "Help" button has been pressed.	Use Case 2	MainWindow, mainWindow.ui, ElevatorButton, ECS	Press the help button when passenger is in the Elevator
16	If the light sensor is interrupted when the door is closing, the	Use Case 3	MainWindow, mainWindow.ui, ECS, Elevator	Observe the GUI. The elevator panel section has a button to simulate a person

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	control system stops the door from closing and opens it.			going through the light sensor.
17	The control system receives a "Fire" alarm signal from the building and commands all elevators to move to a safe floor.	Use Case 4	MainWindow, mainWindow.ui, ECS, Elevator	Observer the GUI. There is a fire button in the Building Testing section.
18	An audio and text message are presented to passengers informing them of an emergency and asking them to disembark once the safe floor is reached.	Use Case 4	Audio System, Display System, Elevator, ECS, Passenger	Observe the GUI. Elevator display will update and show the disembark instructions. Status will also update to show emergency. Observe the console. The console will show alarms and elevator movement.
19	The control system receives an "Overload" alarm signal from an elevator if the sensors indicate that the passenger or cargo load exceeds the	Use Case 5	ECS, Elevator, Passenger, AudioSystem, DisplaySystem	To change max weight of elevators, change "OVERLOAD_WEIGHT" in defs.h to desired max weight for each elevator. Observe the console. It will show when a passenger joins and leaves the elevator due to the overload.

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	carrying capacity.			Observe the GUI. Elevator section will show the current weight, the max weight, and display the warning.
20	The elevator does not move and an audio and a text messages are presented to passengers asking for the load to be reduced before attempting to move again.	Use Case 5	ECS, Elevator, Passenger, AudioSystem, DisplaySystem	Observe the console. It will show when a passenger joins and leaves the elevator due to the overload. Observe the GUI. Elevator section will show the current weight, the max weight, and display the warning.
21	The control system receives a "Power Out" alarm signal.	Use Case 6	MainWindow, mainWindow.ui, ECS	Observe the GUI. There is a power button in the Building Testing section. Press the button to test.
22	An audio and a text messages are presented to passengers informing them of the power outage.	Use Case 6	ECS, Elevator, Audio System, Display System, Passengers	Observe the GUI. The elevator section will show the display of individual elevators. Observe the console. The console will show alarm.
23	Each elevator is then moved to a safe floor and passengers are asked to disembark via audio and text messages.	Use Case 6	ECS, Elevator, Audio System, Display System, Passengers	Observe the console. Updates to the elevators movement will be printed and alarm will be printed. Observe the GUI. Elevator display will show emergency

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				prompt and status will show emergency state.
24	The battery backup power is sufficient to do all of this.	N/A	N/A	