Use Case 1

Name: Prepare simulation

Primary Actor: Administrator

Stakeholders:

Administrator - Needs to specify events that happen during the simulation

Elevator Company and Building Owner - Wants to ensure the elevators can handle real world situations

Precondition: The simulation is fully functional with a GUI that the administrator can use

Success Guarantee: Events are prepared and the simulation is ready to run

Main Success Scenario:

1. The administrator presses a button on the GUI to prepare a simulation
2. The administrator inputs the number of floors and elevators in the building
3. The administrator selects a number of passengers
4. The administrator selects the behaviour for each passenger
5. The administrator selects safety events and determines when they will occur
6. The administrator saves this simulation into the system

Extensions:

1a. The GUI/program is unresponsive

2a. Incorrect number or floors/elevator is provided

6a. Program fails to save the simulation

Use Case 2

Name: Run simulation

Primary Actor: Administrator

Stakeholders:

Administrator - Needs to run the simulation to test the elevator

Elevator Company and Building Owner - Wants to ensure the elevators can handle real world situations

Precondition: The program is working and the simulation has events prepared and is ready to run

Success Guarantee: All events in the simulation run until paused or stopped and any issues with the elevators can be identified.

Main Success Scenario:

1. The administrator presses a button on the GUI to run the simulation
2. The administrator selects a simulation to run
3. The simulation runs the next event in the specified order
4. The simulation logs passenger actions and system response to the consol
5. The simulation keeps an update of the current step, location of each elevator, the state of each elevator and active safety conditions, which it displays to the administrator
6. The simulation logs the events so that points of failure or unexpected behaviour can be identified
7. Steps 3-6 are repeated until all steps are completed or the simulation is stopped or paused.

Extensions:

1a. The GUI/program is unresponsive

2a. The administrator does not select the correct simulation

2b. There is an issue with the saved simulation (eg. the save is corrupted)

3a. The simulation is unable to run the event

3b. The simulation runs an incorrect event

Use Case 3

Name: Simulate Change Floor
Primary Actor: Simulation program
Stakeholders:
Simulation program - Needs to simulate the events specified by the administrator
Elevator Company and Building Owner - Wants to ensure the elevators can handle real world situations
Precondition: The simulation is running properly and the next event in queue is a change floors event
Success Guarantee: The simulation accurately reflects the elevator's real-world behaviour (success or fail)
Main Success Scenario:

1. Elevator is informed of event and operates as if a user pressed the button
   The button lights up to indicate the request has been received
2. Elevator takes the most efficient path to handle simulated users that are both trying to enter and exit the elevator
   a. The display informs the user of the elevator's current floor
3. Elevator reaches the simulated user
   a. Button light turns off
   b. Bell is rung to notify user of arrival
   c. Elevator door opens for a fixed amount of time
4. Elevator receives event as if a user pressed button to select desired floor
   a. Button lights up to indicate that the elevator will travel to that floor
   b. Elevator door closes
5. Elevator takes most efficient path to handle simulated users that are both trying to enter and exit the elevator
   a. The users on the inside are kept informed of the elevator's current floor by the display
6. Elevator arrives at specified floor
   a. Button light turns off
   b. Bell is rung to notify user of arrival
   c. Elevator door opens for a fixed amount of time as if a user needed to leave
7. Elevator door closes and continues the simulation

Extensions:
1a. The elevator does not receive an event from the simulator

Use Case 4

Name: Simulate Help Request
Primary Actor: Simulation program
Stakeholders:
Simulation program - Needs to simulate the events specified by the administrator
Elevator Company and Building Owner - Wants to ensure the elevators can handle real world situations
Precondition: The simulation is running properly and the next event in the queue is a call for help.
Success Guarantee: The simulation accurately reflects the elevator's real-world behaviour (success or fail)
Main Success Scenario:

1. The elevator receives a call for help event
2. The elevator sends a help signal

3. Within 5 seconds, the building safety service answers and verifies they can communicate with the inside of the elevator
    a. After 5 seconds, a 911 call is placed to test robustness of system (should be intended)
4. Connection is closed and the elevator proceeds to the next event

Extensions:
1a. The elevator does not receive an event from the simulator

Use Case 5
Name: Simulate Door Hold Scenario
Primary Actor: Simulation program
Stakeholders:
Simulation program - Needs to simulate the events specified by the administrator
Elevator Company and Building Owner - Wants to ensure the elevators can handle real world situations
Precondition: The simulation is running properly and the next event in the queue is a call for help.
Success Guarantee: The simulation accurately reflects the elevator's real-world behaviour (success or fail)
Main Success Scenario:

1. Elevator receives a door hold event
2. The door is stopped from closing and opens again
3. Repeat step 2 until the signal to stop is given. If the door is obstructed multiple times in succession a warning message will play

Extensions:
1a. The elevator does not receive an event from the simulator

Use Case 6
Name: Simulate Signal Fire Scenario
Primary Actor: Simulation program
Stakeholders:
Simulation program - Needs to simulate the events specified by the administrator
Elevator Company and Building Owner - Wants to ensure the elevators can handle real world situations
Precondition: The simulation is running properly and the next event in the queue is a signal fire event.
Success Guarantee: The simulation accurately reflects the elevator's real-world behaviour (success or fail)
Main Success Scenario:

1. Elevator receives a fire alarm signal from the simulator
2. The elevator moves to a safe floor and the door opens

Extensions:
1a. The elevator does not receive an event from the simulator

Use Case 7
Name: Simulate Overload
Primary Actor: Simulation program
Stakeholders:
Simulation program - Needs to simulate the events specified by the administrator
Elevator Company and Building Owner - Wants to ensure the elevators can handle real world situations
Precondition: The simulation is running properly and the next event in the queue is an overload event.

Main Success Scenario:

1. Elevator receives overload signal from the simulator
2. The elevator plays a message to request that the load is reduced
3. Repeat step 3 until the overload signal is no longer given.

Extensions:

1a. The elevator does not receive an event from the simulator

Use Case 8

Name: Simulate Power Outage

Primary Actor: Simulation program

Stakeholders:

Simulation program - Needs to simulate the events specified by the administrator

Elevator Company and Building Owner - Wants to ensure the elevators can handle real world situations

Precondition: The simulation is running properly and the next event in the queue is a power out event.

Main Success Scenario:

1. Elevator receives a power out signal from the simulator
2. The elevator plays a message informing users of the outage
3. The elevator moves to a safe floor using backup power and allows the users to leave

Extensions:

1a. The elevator does not receive an event from the simulator