

An Elevator System – Requirements Document

Thai Son Hoang

ECS, University of Southampton, Southampton, U.K.
{t.s.hoang}@ecs.soton.ac.uk

This document presents the requirements for an elevator system as shown in Figure 1.

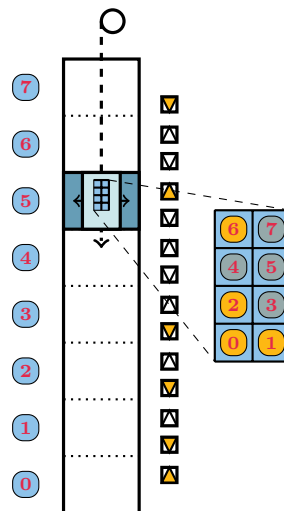


Fig. 1. An Elevator System

The system manages an elevator with a single cabin that moves up and down in a building with a fixed number of floors.

REQ 1	The system manages an elevator that moves up and down
-------	---

REQ 2	There are a fixed number of floors
-------	------------------------------------

At any point, the cabin has a moving direction, which is either going up or going down.

REQ 3	The elevator is either going up or going down
-------	---

The elevator is driven by a motor. The cabin moves up when the motor is winding and moves down when the motor is unwinding. The cabin stops at a floor when the motor stops. (We will ignore the details that the cabin can be between floors)

REQ 4	The elevator is driven by a motor which can be either <i>WINDING</i> , <i>UNWINDING</i> , or <i>STOPPED</i> .
-------	---

REQ 5	If not at the top floor, the cabin moves up one floor if the motor is <i>WINDING</i>
-------	--

REQ 6	If not at the bottom floor, the cabin moves down one floor if the motor is <i>UNWINDING</i>
-------	---

The cabin has a door which can be *OPEN*, *HALF*, or *CLOSED*. To protect the elevator's users, the cabin door must be closed while the elevator is moving. (We omit other details of the system such as the cabin door motor, the doors on each floor and their motors.)

REQ 7	The cabin has a door which can be <i>OPEN</i> , <i>HALF</i> , or <i>CLOSED</i> .
-------	--

SAF 8	While the cabin is moving, its door must be closed.
-------	---

The users indicate their requests by pressing different buttons. On each floor except the top one, there is an *up* button to request the elevator to go up from the current floor. Similarly, on each floor except the bottom one, there is a *down* button to request the elevator to go down from the current floor. Once inside the cabin, the user presses the button corresponding to the floor to which the user wants to go.

REQ 9	On each floor except the top one, there is an “up” button.
-------	--

REQ 10	On each floor except the bottom one, there is a “down” button.
--------	--

REQ 11	Inside the cabin, there are floor buttons, one for each floor.
--------	--

The elevator can only stop at a floor and open its door if there are *some requests to serve* at that floor. The requests are cleared once the door is fully open. The elevator can leave a floor (to go up or down) only if there are no requests to serve at that floor. If there are no requests, the elevator should stay stationary at a floor with the door closed. An elevator can only change direction, if there are no requests to serve in its direction, but there are other requests in the opposite direction.

REQ 12	The cabin stops at a particular floor and open the door if there is a request to serve at that particular floor.
--------	--

REQ 13	The requests at one floor are cleared once the door is fully open.
--------	--

REQ 14	The elevator should not move to leave a floor if there are requests to serve at that floor
--------	--

REQ 15	The elevator should stay stationary at a floor when there are no requests
--------	---

REQ 16	The elevator can only change direction if it has no requests in the same direction, but has some requests in the opposite direction
--------	---