



SOFTWARE SPECIFICATIONS

Elevator System

Group 16

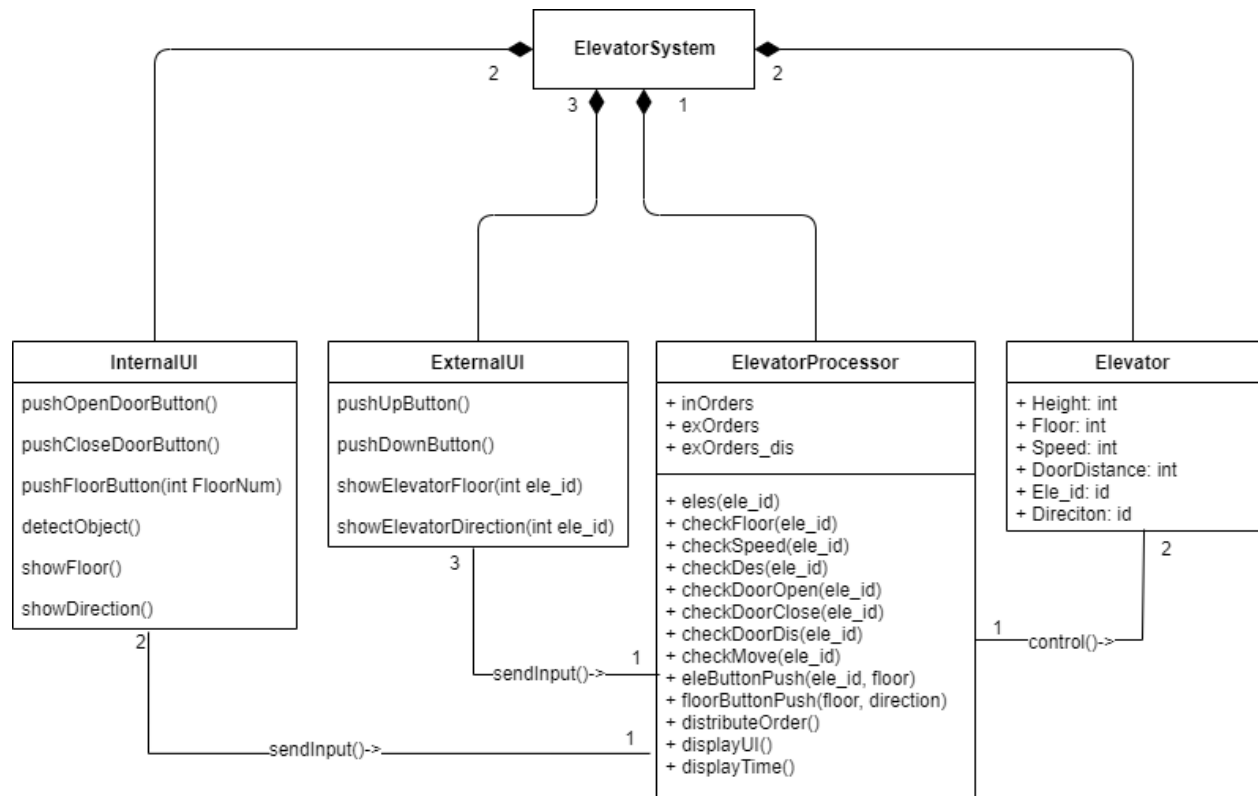
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Table of Contents

System Architecture.....	2
Software Specifications.....	3
S1: Elevator implementation	3
S2: ExternalUI Implementation.....	8

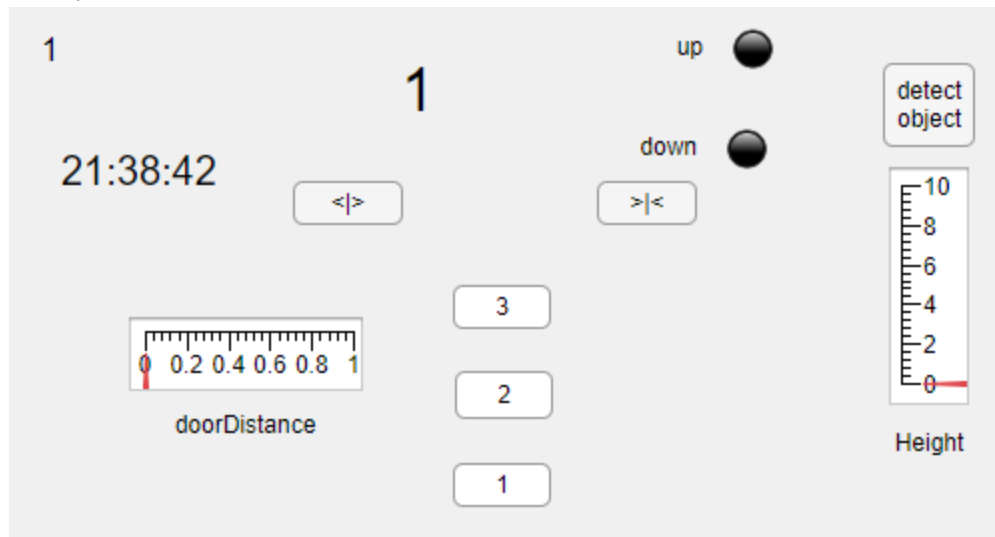
System Architecture

The system architecture is shown below:

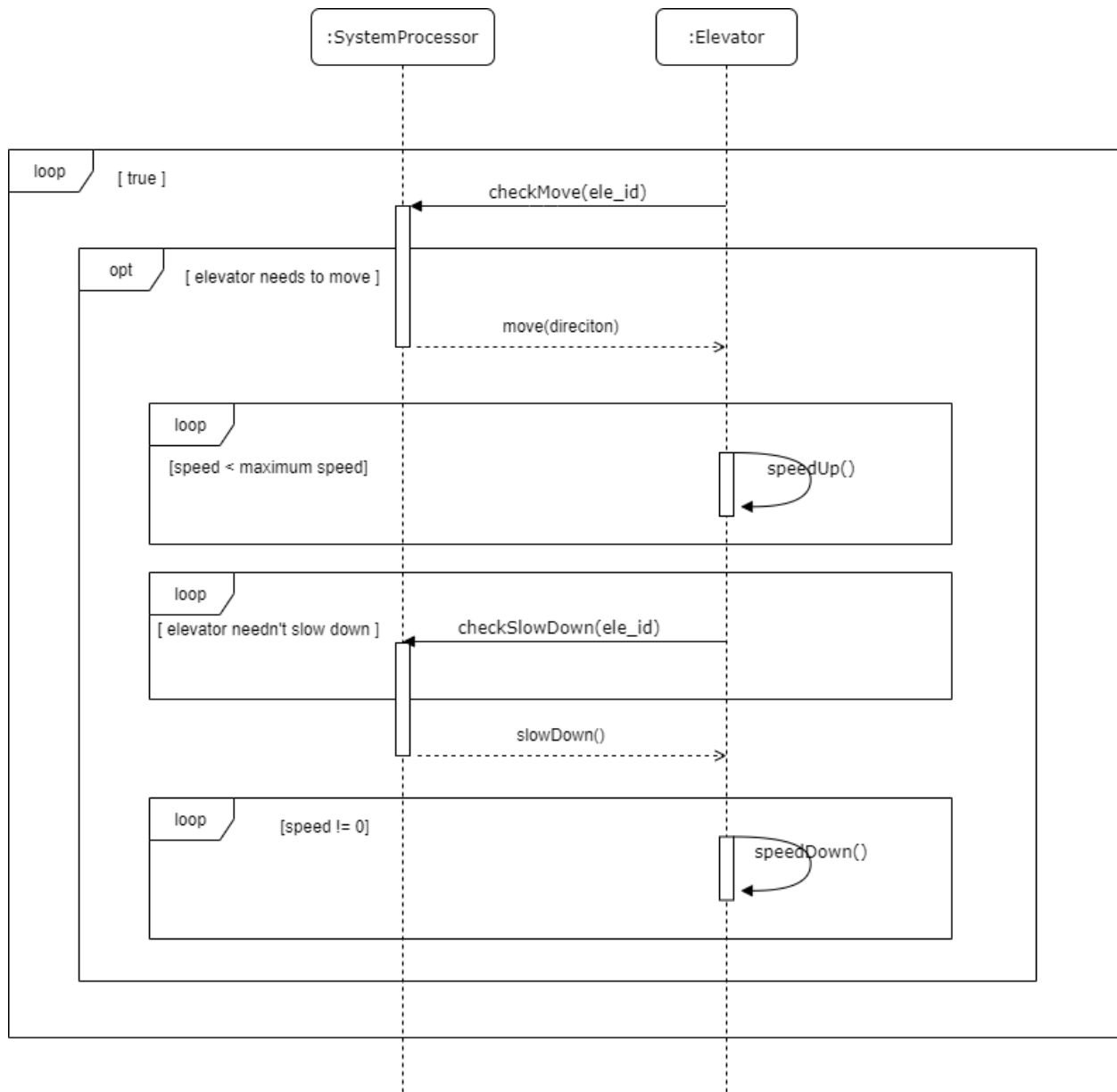


Software Specifications

S1: Elevator implementation



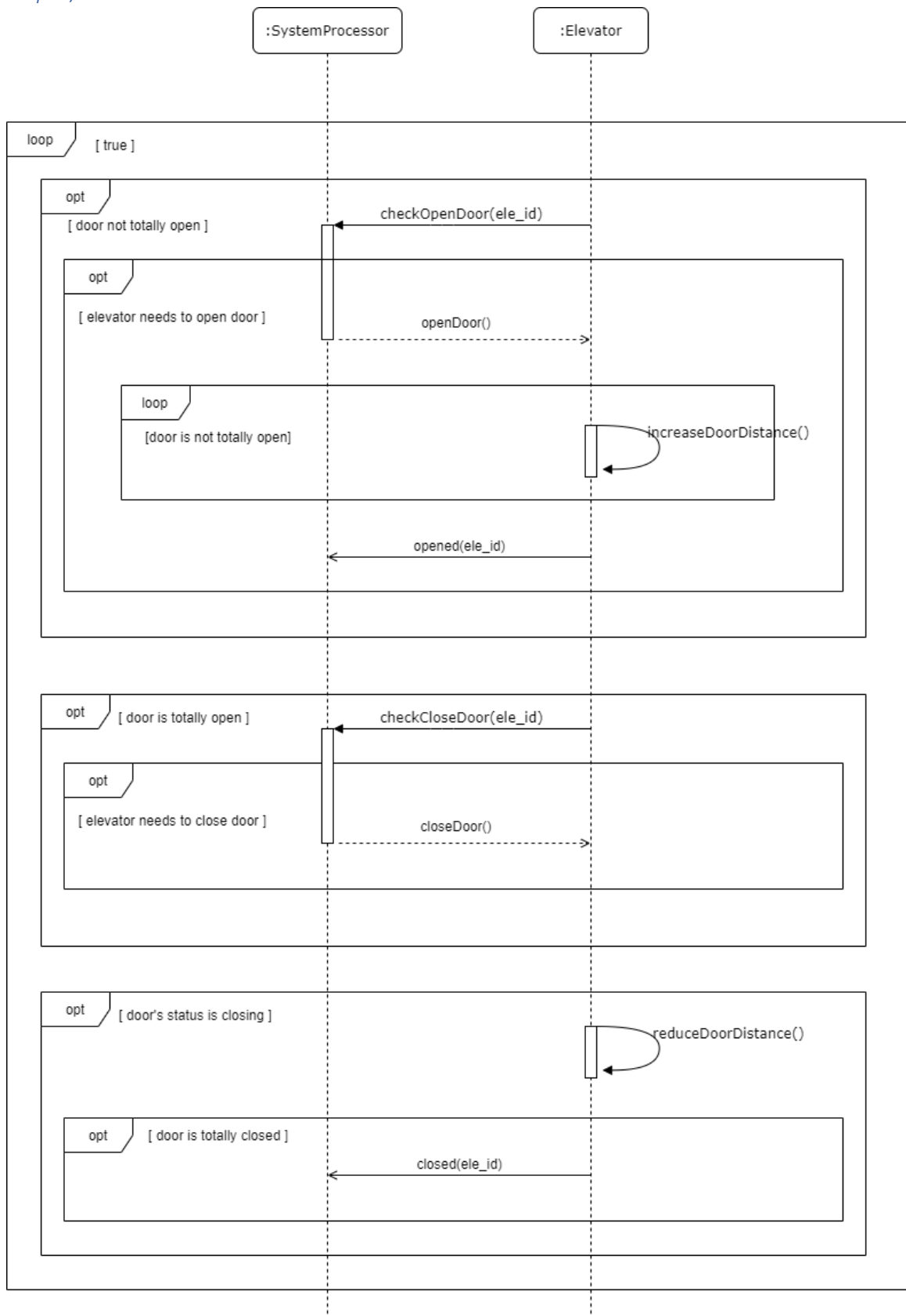
S1.1: Move



- S1.1.1: Select floor
 1. Idle floor button clicked
 2. If the current moving direction is idle, or the direction from current elevator floor to selected floor is same with current moving direction
 - a. Add the floor to the internal order list
 - b. Lighten the floor button
- S1.1.2: Deselect floor
 1. Lightened floor button clicked
 2. If the elevator is stopped, or the floor is not the only one order

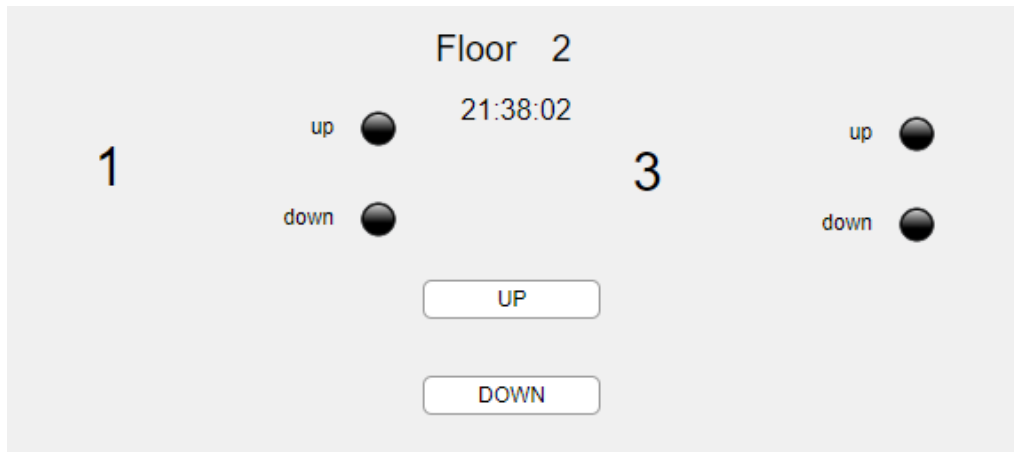
- a. Remove the floor to the internal order list
 - b. Turn off the floor button
- S1.1.3: Check whether elevator should start to move
 1. If the elevator's direction is idle
 - a. If the floor order in the internal order list and the list of external orders distributed to the elevator is below the elevator current floor, change the direction be down and let the elevator go down
 - b. Else if the floor order in the internal order list and the list of external orders distributed to the elevator is above the elevator current floor, change the direction be up and let the elevator go up
 2. Else if the elevator's direction is up
 - a. If the floor order in the internal order list and the list of external orders distributed to the elevator is above the elevator current floor, let the elevator go up
 - b. Else let the elevator's direction be idle
 3. Else if the elevator's direction is down
 - a. If the floor order in the internal order list and the list of external orders distributed to the elevator is below the elevator current floor, let the elevator go down
 - b. Else let the elevator's direction be idle
- S1.1.4: Check whether elevator should stop accelerating
 1. If the elevator's speed meets the maximum speed, then the elevator stops accelerating
- S1.1.5: Check whether elevator should start to slow down
 1. If the next floor is in the internal order list or in the system external order list, and the distance between the elevator and the floor equals to the buffer distance, then let the elevator slow down
- S1.1.6: Display UI
 1. For each floor's external UI
 - a. Change the displayed floor number of each elevator according to its position
 - b. Change the light of direction lamp of each elevator according to its moving direction
 - c. Change the light of up/down button according to external order list
 2. For each elevator' internal UI
 - a. Change the displayed floor number according to the elevator's position
 - b. Change the light of direction lamp according to the elevator's moving direction
 - c. Change the light of floor number button according to the elevator's internal order list.

S1.2: Open/Close door

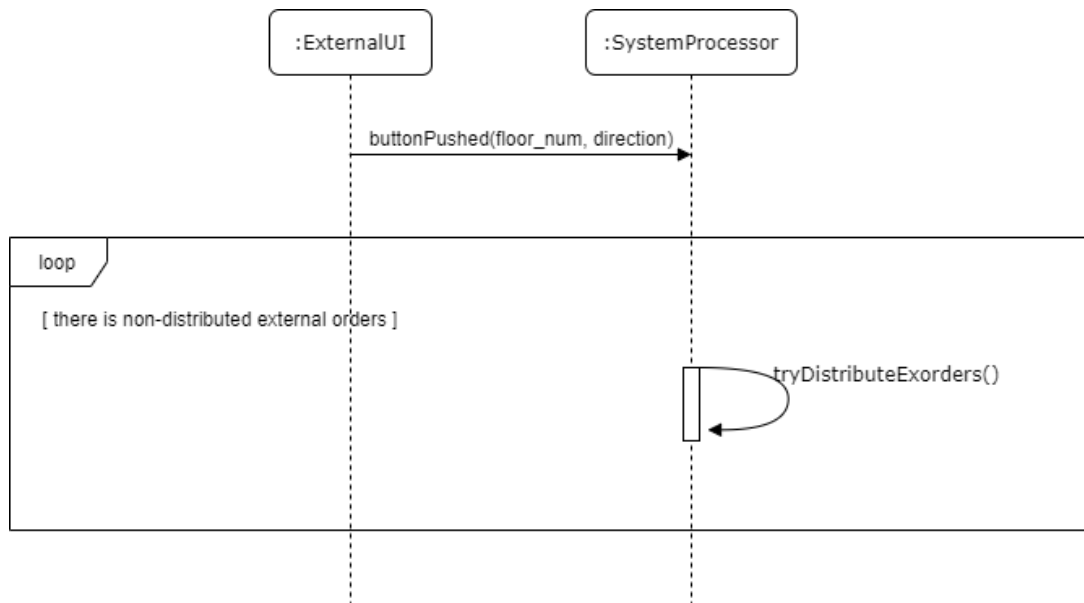


- S1.2.1: Check whether elevator should open door
 1. If the elevator's direction is not idle
 - a. If there is a floor order in the internal order that is equal to the elevator current floor, let the elevator open the door and initialize opening time to zero.
 - b. Else if there is a floor order in the list of external orders distributed to the elevator that is equal to the elevator current floor, change the elevator direction be the direction of the external order, let the elevator open the door and initialize opening time to zero.
 2. Else if the elevator's direction is idle
 - a. If there is a floor order in the list of external orders distributed to the elevator that is equal to the elevator current floor, change the elevator direction be the direction of the external order, let the elevator open the door and initialize opening time to zero.
 - b. Else if there is a floor order in the internal order that is equal to the elevator current floor, let the elevator open the door and initialize opening time to zero.
 3. If the openDoor button is pushed or there is object detected between the doors, let the elevator open the door
- S1.2.2: Check whether elevator should close door
 1. If the openDoor button is not pressed, there is no object detected between the doors
 - a. If opening time is larger than maximum opening time, or the closeDoor button is pressed, then let the elevator close the door

S2: ExternalUI Implementation



S2.1: Make external order



- S2.1.1: Press direction button
 1. If the direction button of this floor is not lightened,
 - a. Add the order combined with this floor number and direction to the external order list
 - b. Try to distribute non-distributed external orders in the external order list
- S2.1.2: Distribute non-distributed external orders in the external order list
 1. For each external order that has not been distributed yet
 - a. Get the ascending order of distances between elevators and target floor
 - b. For each elevator based on the order
 - i. If the elevator's direction is idle, then add this order to the list of external orders distributed to the elevator

- ii. Else if the order's direction is same with the elevator's direction and the order floor is on the path of the elevator, then add this order to the list of external orders distributed to the elevator and remove the order with same floor but different direction from the list.