

TTK4145 Routines

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1 System Overview

The system consists of a number of elevator nodes where each elevator delegates its own locally recieved orders to the other nodes based on a cost function.

The fault tolerance of the system is built on every elevator keeping a copy of all orders even the ones itself has not been assigned to. When one of these orders have been sitting for too long every system that has a copy of the order will execute it.

The elevator itself operates on a standard elevator statemachine where orders in the current direction of travel are prioritized

2 Button is pressed, calling elevator to floor

- Button module detects the button press
- Button module alerts main module of the press
- Main checks to see if order already exists in system
- if already exists: make sure light on button is on and exit routine.
- if not: continue routine
- Main checks to see if order is internal:
- if order is internal: add order as local in Orders module, turn on light and exit routine
- if order is external: continue routine
- Add order as global locally in Orders module and adds timestamp
- Request cost of order from other nodes and wait for answer
- Calculate cost of order for current node and choose executing node based on costs calculated and recieved
- If cost lowest on local node: add order as local in Orders module
- If cost lowest on external node: Delegate order to external node
- Make sure light for button is on

3 External node requests cost for Order

- Main module receives request
- Main module adds order as global in Orders module
- Main calculates cost based on orders in Orders module
- Main sends back its cost to the requesting node

4 External node delegates order

- Main receives delegation
- Main adds order as local to Orders module

5 Node starts up

- Main calls all init() functions
- Elevator init() makes elevator go to top floor
- Elevator goes down to all floors, stops and opens door at each
- Elevator alerts Main that startup is complete

6 Elevator stops at floor and opens door

- Elevator module alerts Main that elevator is stopping at floor
- Main calls clearOrders(floor) in Orders module
- Main calls sendClearOrders(floor) in network interface

7 Elevator state machine operation

- If orders exist in the direction elevator is already going: keep going
- If no orders exist: stop at next floor
- If orders only exist opposite of direction of travel: turn around
- If elevator reaches floor with orders either internal or in direction of travel: stop and open door
- If elevator reaches top or bottom floor: Stop and open door if orders exist
- If elevator is stopped: check for orders: if found go there: else stay stopped

8 Global order times out

- Main notices timeout
- Main adds order as local in Orders module