TTK4145 real time programming

Every elevator operates as an individual node in the network. When a new order is requested the responsible elevator transmits it to the network before accepting. We will be using UDP, as packets can be lost at any time we will be relying on receiving ACKs after sending a message. The elevators will periodically send out pulses to signal that they are still alive if they have not communicated in a while. They will also keep track of how long it has been since they heard from the other elevators to make sure that they are still online. Every elevator is responsible that its local events are handled properly so if it is unable to connect to the rest of the network it must handle them as a solo elevator

Deciding on which elevator executes what order is done by a non-ambiguous algorithm calculating a cost function, where the elevator with the lowest cost executes the order. Some elevators will have a slightly higher priority to decide tiebreaks.

For the cost algorithm to function properly the elevators must have the same information available to them when deciding. This entails that an elevator receiving an order cannot accept it until it has been transmitted and accepted by the rest of the network. The status register is described below.

Name	**Description**	**Size and type**
External orders	Values are true if the corresponding button is pressed at a floor. N*(up, down)	N*2 Boolean
Internal orders	Values are true if the corresponding button is pressed within an elevator	N*M Boolean
Elevator status	Holds important information about the other elevators that is used in the cost calculation	Array[M] last floor – int Array[M] direction – int Array[M] isDead – Boolean

Stop button handling

If the stop button is pressed the elevator will cancel all its internal orders and stop the elevator in place. It cost will be set to inf and it will not execute any more orders until the stop button is pressed again. If it is pressed in a floor the doors will open.

Definitions:

N – Number of floors

M – Number of elevators

Internal order – order requested from within the elevator

External order – order requested from outside the elevator