

Software Requirements for a Lift Controller

Néstor Cataño

Homework – Week 02Due: 01/Feb/2016

Guidelines

- 1.. You will write the software requirements for a Lift Controller. Written requirements must be based on the software elicitation notes given below.
- 2.. You are given a template to write your software requirements. Make sure you use, complete, and turn in the enclosed template. You must use Moodle to turn in your answers.
- 3.. Make sure you write both functional and non-functional requirements for the Lift Controller following the enclosed template. Functional requirements encode User Stories (US), and non-functional requirements can be Quality Attributes or constraints.

Elicitation Notes

Client - Skyhi elevator co. Contact (technical) Jason Hukins 01202 489345, X 4783. I/v 15/6.

Previous s/w contractor unsatisfactory. (Late and buggy!) Full h/w details available. Looking for full spec by 1/10. Will pay instalment for spec and negotiate for the rest (Andy can cover this - needs to contact Geoff Shepperd (finance Director).) H/w all to hand - full specs available (got copies). Interface blocks all operate at 0-5 V (20 mA) - direct port connection no prob.

Max 4 lifts per controller, max 20 floors. One lift per shaft (next generation won't be!) All lifts, same # of floors.

Requirements.

All lifts (if > 1) to be used approximately equally.

Lift only reverses direction if it has no outstanding lift calls in its current direction (lift send-button inside lift, lift call-button outside lift)

Must not change motor polarity whilst moving! (I'll blow) In emergency, stop all motors (if poss.).

Lift calls should be serviced by the lift that will get there soonest (approx.). Tricky to predict - could pick up more calls on the way.

Services calls in the order it gets there - not the order they are made.

Indicators

Light for each floor - one set in each lift + one set on each floor (all switch together - can treat as one set).

Switch on basis of nearest floor so one off, one on when about half way between.

Sensors.

3 sets for each floor - warning either side+ at: Go hi (5v) when lift present (i.e 20 cm either side).

If stopping, send slow signal to motor within 0.3 secs of warning and stop 0.2 +/- 0.1 secs after

at signal. (Stop delay has to be reconfigurable.) Top and bottom floors only have one set of warning sensors. (Obviously?).

Lift must always stop when arriving at top or bottom!

Lift normally moves at 1.2 m/sec. In slow mode, 0.3 m/sec. Takes approx. 1 sec to slow (i.e. about 0.75 m) and moves about 0.15 m between stop signal and actually stopping.

Lift will stop at floor if there is a lift-send or a lift-call and moving right way or top /bottom. - **R**

Doors.

Doors cycle every time it stops. (Note - cannot cancel a request.)

Controller only needs to send open/close signal - doors handle the rest. Door sensors (just the one per lift) go hi when shut/open. Never move lift with doors open - **R**

Also one block sensor per door but connects direct to door controller - we don't need to worry.

If lift calls or sends request while doors open or closing, open again and restart wait. (Wait is 4 secs +/- 0.5) - **R**.

Note max pins - each lift fast, slow, direction (3 out) + sensors, (# floors \times 3) - 2 (all in) + indicators (# floors, out) + doors, close/open + closed/opened (2 out, 2 in).

To start lift go straight to fast, to stop must go to slow first (except in emergency? - he'll check). - **R**

Next week - 10:00 - ring on Tue to confirm.

What to Hand In?

Write a full specification requirements document for the Elicitation notes above. Write your requirements classified as Safety, Call Servicing, Configuration (what a Lift is composed of), Performance, Reliability, Physical Environment.