Embedded System I
Final exam

Mode

Students must do a complex project, composed by some sub-project, specifications, tests & docs.
Base evaluation is 24/30 points, student can increase score explaining his choices and his contribution to a project. Each student single or two-coupled must write code and a series of documents.
Exam will be done all ensemble to present entire project, sub systems and system test; at end of system test each sub group explain his contribution to project.

Two Line Lift Project

Exam project is an electronic subsystem to actuate a double line person lift.
System must have:

- Two Passengers cabin (button box depend from dig in microcontroller used)
- Almost three floor, up limit auto configurable counting floors button box
- At floor external calling buttons for up or down
- SPI Daisy Chain or I2C[1] communication bus from
  - all floor button box
  - cabin button box
- dispatch unit
  - motor subsystems (two unit)
    - simulate motor driving
    - simulate line sensors detecting motion
  - floor showing status panel

Sub Systems requirement

- Floor button box
  - One button to call for up
  - One button to call for down
  - One indicator call for up pressed
  - One indicator call for down pressed
  - Check if one button is missing then system detect if is ground or more high floor
- Passenger cabin button box
  - One button call for each floor or numeric keyboard
  - Up down motion indicator
  - Floor indicator
  - Stop Button
  - Alarm Button
  - Door open button
- Dispatch Unit
  - Centralize all request and status
  - Compute the optimum
  - Send to right lift request
- Motor Unit Simulator
  - Receive Requests from Dispatch Unit
  - Send to system cabin position & status

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[1] Must be done a choice and motivate them

- Button/Switch to simulate system break
  - Simulate cabin motion (timing from a floor to other floor)
  - If available, use a "servo motor" to rotate a disk with floor number and able to see:
    - Start ramp
    - Continuous motion
    - Stop ramp
- Passengers cabin IN/OUT & light simulator
  - Connect to Motor Simulator
  - When enabled (cabin stopped at floor) set numbers of out and in person
    - If all passengers out cabin light off (saving energy) and cancel all request from cabin button box
- Auxiliary components
  - A I2C or SPI (or both) monitor to debug, displaying data locally on LCD Display and send all traffic to host PC (Serial.print)
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