

EECS 298
System-on-Chip Description and Modeling
Winter 2006

Assignment 2

Posted: January 27, 2006 (week 4)

Due: February 3, 2006 (week 5)

Task: Specification of an Elevator Control Unit (ECU)

Project:

The goal of this project (over the next few assignments) is to develop an Elevator Control System (ECS) for a set of elevators in a high-rise building. As such, the ECS will be a distributed embedded system, consisting of a set of communicating Elevator Control Units (ECU) implemented as System-on-Chip (SoC).

We will start the development of the ECS by creating an initial system specification model for each ECU separately. Then, after each ECU model is properly validated using simulation, we can compose the entire ECS using the developed ECUs and validate the entire ECS. Finally, we will further refine the ECS model and implement it as a set of communicating SoCs.

Instructions:

For this assignment, we will first decompose the ECS into separate ECUs that can be implemented as SoC.

The following list of ECUs can serve as a starting point:

- Floor panel
 - panel at each floor and each shaft with up/down controls
- Floor display
 - display of current floor and direction at each floor
- Floor door
 - Control unit to open/close doors at each floor
- Car panel
 - panel in each car with request controls
- Car display
 - display of current floor and direction in each car
- Car door
 - Control unit to open/close doors in each car
- Main control unit
 - central control unit to control the entire ECS
- Motor control unit
 - control unit for the motor atop each shaft

For each ECU, we will create a proper specification document (in English) and an executable specification model (in SpecC) with a test bench for simulation.

For the following tasks, choose (at least) one ECU from the list above.

Task 1: Specification Document

Write a brief (one page!) specification document for the ECU. This should contain an illustration figure of the device, a schematic view of the SoC and its ports, and a brief description of the functionality (in English).

Task 2: Executable Specification Model

Develop an executable specification model for the ECU SoC (using SpecC). For validation, embed the model into a proper test bench with a stimulus and monitor behavior and demonstrate that it functions correctly by providing a successful simulation run.

Setup:

We will use the server environment described in the previous assignment.

To enable collaboration within the class, a shared directory has been set up on the server:

`/home/eecs298w06/ .`

This directory is readable and writable to everyone in the class (group `eecs298w06`). Feel free to put shared files there. For proper credit, make sure you list yourself as author in each new file. For extensions on shared files, we will simply maintain a list of authors.

As a start, I have already provided a few files with possible conventions in terms of types, ports, and names. Feel free to extend/improve on these files!

Finally, please use the course noteboard for discussion!

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