

**Due Date:** At the START of class on Tuesday, **February 21, 2012.**

Note: If you are late, you will lose 15%.

For this assignment you are supposed to develop an executable, high-level requirements specification of a simplified embedded control unit for a rapid transit link system, such as the Evergreen Line, a new rapid transit line will connect Coquitlam to Vancouver via Port Moody and Burnaby. The Evergreen Line will be a fast, frequent and convenient SkyTrain service, connecting Coquitlam City Centre through Port Moody to Lougheed Town Centre in approximately 15 minutes.

**The system operates as follows:**

- Consider that you are dealing with a new Evergreen Line station to be built, such as Coquitlam Central Station Plaza, which will be similar to the Production Way Skytrain station.
- There are two tracks on which trains travel in opposite directions.
- There are sensors on each of the tracks that can detect if a train is coming, or if a train is currently halting at the station.
- Once a train completely stops, the system should open the doors within 2 seconds (*liveness*), and after some period of time (say between 10 and 12 seconds), the doors should be closed, if it is safe to do so.
- Note that it is important that at least 2 seconds before a train starts moving the system closes the doors (*safety*).

You should write an executable CoreASM specification for this problem, with appropriate output that shows the status of both the tracks and the doors of the trains. The format of the outputs can be as follows:

Time: 1.13 seconds

Track1: Empty

Track2: Empty

Time: 2.43 seconds

Track1: Coming

Track2: is Empty

Time: 5.53 seconds

Track1: Stopping (Doors: Closed)

Track2: Empty

Time: 7.13 seconds

Track1: Stopping (Doors: Open)

Track2: Empty

Time: 15.93 seconds

Track1: Stopping (Doors: Open)

Track2: Coming

Time: 17.33 seconds

Track1: Stopping (Doors: Closed)

Track2: Stopping (Doors: Closed)

Time: 20.43 seconds

Track1: Empty

Track2: Stopping (Doors: Open)

**Hint:** The ASM model of the Railroad Crossing example has been discussed in class, and you can find an executable CoreASM model of this example at

<http://sourceforge.net/apps/mediawiki/coreasm/index.php?title=Examples>

You may use this example, trying to refine and change the required parts.

**Note:** This assignment is again a group assignment. Working as a team will greatly simplify the task in several ways, for instance, by analyzing the functional requirements as a team activity and reasoning about alternative design choices, discussing the pros and cons of each option with the other team members.

### SPECIFICATION FORMAT

- Prepare a concise but illustrative informal description (which may include diagrams) of your high-level controller specification. This description should also provide the rational for the key design choices you have made in your model.
- Submit a hardcopy and also an electronic copy in PDF providing both the informal description as well as a complete formal model of your controller specification in CoreASM.
- Submit an executable CoreASM file (Full name and student number of all team members should be commented at the beginning of your executable source code).
- Submit the documents and CoreASM file to your TA (syaghoub@sfu.ca).
- Recall how to professionally write a technical document from what you have learned in the last assignment!