

Assignment 4: Modelling with Spin

Azar 30

1 Introduction

The goal of this assignment is to use Spin toolset to specify and verify the controller of an elevator.

2 Task 1

Please visit <http://spinroot.com/spin/Man/README.html> to download and learn how to install Spin. There are a lot of examples at the directory of your installation. Please use them to become more familiar with Promela.

If you are a Windows user, you should also install Cygwin, ActiveTCL (to use iSpin), Graphviz (to use the automata view). I recommend you to use another editor for revising Promela codes.

3 Task 2

In this assignment you will modify the specification of an elevator given in [elevator.pml](#) to make it resemble our University elevator. You can read [elevator.pdf](#) which explains the initial Promela model. There exist many variations of this model on web, but be aware that our assumptions in this assignment are completely different.

The problem with the elevator specification is that the elevator doors can open and close without a request from a user. Change the original elevator model so that this cannot happen: introduce two button processes for each door; one button for upward and one for downward direction. Please be noted that the first and last floors have only one button. The buttons at each floor are randomly “pressed” (their status becomes ON), and the elevator will open and close the doors when it is at a floor if and only if the button for that floor has been previously pressed, and the direction of the pressed button matches the direction of the elevator. (Caution: This means that you should allow the door to open and close for a second time when the button is re-pressed before the elevator leaves the floor.) The elevator should stop at a floor if there is a request for it regarding its direction.

A button at floor i^{th} becomes un-pressed whenever the door at floor i^{th} is opened and the direction of the evaluator matches the direction of the button. You can use “mtype {UP,DOWN,ON,OFF}” to denote ON/OFF status for buttons and UP/DOWN for directions.

4 Task 3

Verify the correctness of your specification by defining appropriate assertion(s) to examine if the doors are opened correctly.

5 Deadline and Deliverables

The deadline of this project is Azar 30th at 11:59pm. You should submit your Promela code together with a report explaining your changes on the code. In your report you should explain the newly added variables, processes and assertion(s). Make a zip from your files and rename to your family. Send your zip file to fghassemi@ut.ac.ir. Late submissions will get penalty for each day that the submission is late.