Lab 7

EECS4312

November 2, 2015

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Learning Outcomes

Limit Alarms Requirements

- You specify and validate the Limit Alarms Problem as a PLC using Hysteresis (from Lab6) and other basic building blocks. (See slides09.pdf).
- You need to discover an environmental constraint to prove the safety validation invariant that the high and low alarm should not sound simultaneously.

Learning Outcomes

Real-Time safety requirements

- Exercise your knowledge of the held-for operator in theories `test` and `alert` for writing requirements involving real-time (as in Section 2.6 in `Isolette-Precise-Requiremenst.pdf` for the details).
- Prove a safety invariant that the alarm is always on whenever the pressure is high.
- Note that the Use Case in Section 2.6 is unlikely to prove directly without prior Lemmas built in a step by step fashion. See the pvs file for some help (but you must finish the rest).

top.pvs

You must specify and prove four theories as shown in the `top.pvs` file below:

```
% Exercises for Lab7
% proveit --importchain --clean top.pvs
top : THEORY
BEGIN
   IMPORTING Time
   IMPORTING Hysteresis
   IMPORTING Limits_Alarm
   IMPORTING test
   IMPORTING alert
END top
```

Preparation

Review slides09.pdf for PLCs and `Isolette-Precise-Requiremenst.pdf` .

Result of running proveit on top.pvs

- See `top.summary` in the `4312-lab7` directory supplied with Lab7.
- The `4312-lab7` directory also has the `Time.pvs` theories (for T-ASAMs)

Submit your work 1

- Remove all files from your `4312-lab7` directory other than ***.pvs** and ***.prf**. files.
- Run the following command in the directory:
- `proveit --importchain --clean top.pvs`
  (see previous slide for summary file)
- All theorems must be proven.

Submit your work 2

- Now submit your `4312-lab7` directory:
  `> submit 4312 lab7 4312-lab7`
- You will get confirmation of your submission.
- Ensure that you follow the instructions (and naming conventions) carefully and precisely to ensure that your submission can be checked.
- To obtain a grade on your quiz, you must complete and submit this Lab according to the instructions.