

# Recitation #10

**18-649 Embedded System Engineering**

**Friday 10/31/2014**



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**Carnegie  
Mellon**

# Announcements and Administrative Stuff

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- ◆ **Project 10 is due Thursday Nov 6<sup>th</sup> by 10pm.**
- ◆ **Important Grading Note: The grading script REQUIRES correctly formatted files. (e.g unit\_tests.txt, integration\_tests.txt etc)**
- ◆ **Hand in ALL the files needed to run your tests.**

# **Lessons your classmates learned (so you don't have to)**

- ◆ **Peer reviews caught at least 70% of the bugs for almost every group**
- ◆ **Check your handin**
- ◆ **Use version control**
  - Commit early, commit often
- ◆ **Write scripts for testing**
  - Cron is pretty awesome
  - Don't blindly trust your scripts

# More Lessons

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- ◆ **Have an emergency Sequence diagram to trace all than nonsense**
- ◆ **Bugs aren't necessarily in the module that looks like it's misbehaving**
  - Dispatcher bug causes doors not to open.
- ◆ **Single states with multiple possible output values are likely to cause problems**
  - Leveling state

# Float comparisons in the testbench

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## ◆ Comparisons of floats are awful

- Especially when things get cast back and forth to doubles

## ◆ Possibilities

- Use bounds. The test bench supports  $\leq$  and  $\geq$
- Use integer messages (e.g. multiply by 1000)

# Project 10

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- ◆ **Finish what you started in project 9**
  - Pass your unit tests for Dispatcher and Door Control
- ◆ **Finish designing and implementing DriveControl (and anything else you haven't implemented)**
  - Statecharts
  - Unit tests
  - Implementation
  - Traceability
  - Peer reviews:
    - DriveControl statechart
    - DriveControl implementation
    - DriveControl unit tests
- ◆ **Add a monitor for RT 10**

# Monitored Requirements

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- ◆ **R-T6: The Car shall only stop at Floors for which there are pending calls.**
- ◆ **R-T7: The Car shall only open Doors at Hallways for which there are pending calls.**
- ◆ **R-T8: The Car Lanterns shall be use in a way that does not confuse passengers.**
  - **R-T8.1:** If any door is open at a hallway and there are any pending calls at any other floor(s), a Car Lantern shall turn on.
  - **R-T8.2:** If one of the car lanterns is lit, the direction indicated shall not change while the doors are open.
  - **R-T8.3:** If one of the car lanterns is lit, the car shall service any calls in that direction first.
- ◆ **R-T9: The Drive shall be commanded to fast speed to the maximum degree practicable.**
- ◆ **R-T10: For each stop at a floor, at least one door reversal shall have occurred before the doors are commanded to nudge**

# Driving Fast

- ◆ **Fast speed is 5 m/s**
  - Set this with the **-fs 5.0** flag

- ◆ **Remember the speed transition constraint table:**

Drive Speed Values							
Drive Command Values	FastSpeed >= DriveSpeed >= SlowSpeed, UP	SlowSpeed >= DriveSpeed > LevelSpeed, UP	LevelSpeed >= DriveSpeed > 0, UP	DriveSpeed == 0, STOP	LevelSpeed >= DriveSpeed > 0, DOWN	SlowSpeed >= DriveSpeed > 0, DOWN	FastSpeed >= DriveSpeed >= SlowSpeed, DOWN
Fast, Up	X						
Slow, Up	X	X	X	X			
Level, Up		X	X	X			
Stop, Stop			X	X	X		
Level, Down				X	X	X	
Slow, Down				X	X	X	X
Fast, Down							X



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**Questions?**