Recitation #10

18-649 Distributed Embedded Systems
Friday 6-Nov-2015
Announcements and Administrative Stuff

- Project 9 was due last night

- Project 10 has already been posted
  - Due Thursday November 12

- Monday Office Hours
  - 4:30-5:30 BH 237B
  - Move to Tuesday?
Modifying Network Interface

You may make **one and only one** of the following modifications to the input interface:

1. Add mCarPositionIndicator to the input of the Dispatcher and Drive Control, OR
2. Add mDriveSpeed and mCarLevelPosition to the input of the Dispatcher.

Other modifications can be made with approval from a TA

This is to avoid turning one controller into a brain node:

- Adding an input to Dispatcher to make it smarter is acceptable
- Adding an output to Dispatcher so it can control the doors is not
Lessons your classmates learned (so you don’t have to)

- Peer reviews caught at least 70% of bugs for almost every group

- Check your handin

- Use version control
  - Commit early, commit often

- Write scripts for testing
  - Don’t blindly trust scripts
More Lessons

- Have an emergency sequence diagram to trace everything

- Bugs aren’t necessarily in the module that looks like it’s misbehaving
  - Dispatcher bug causes doors not to open

- Single states with multiple values are likely to cause problems
  - Leveling state

- The TAs are not obliged to run your tests manually if these scripts do not work.
Float Comparisons in the testbench

- **Comparisons of floats are awful**
  - Especially when things gets cast back and forth to doubles

- **Possibilities**
  - Use bounds. The test bench supports $<=$ and $=>$
  - Use integer messages (e.g. multiply by 100)
Project 10

- 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

- **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 used 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 cars 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 transmission constraint table:

<table>
<thead>
<tr>
<th>Drive Command Values</th>
<th>FastSpeed &gt;= DriveSpeed &gt;= SlowSpeed, UP</th>
<th>SlowSpeed &gt;= DriveSpeed &gt; LevelSpeed, UP</th>
<th>LevelSpeed &gt;= DriveSpeed &gt; 0, UP</th>
<th>DriveSpeed &gt;= 0, STOP</th>
<th>LevelSpeed &gt;= DriveSpeed &gt; 0, DOWN</th>
<th>SlowSpeed &gt;= DriveSpeed &gt; 0, DOWN</th>
<th>FastSpeed &gt;= DriveSpeed &gt;= SlowSpeed, DOWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast, Up</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow, Up</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level, Up</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stop, Stop</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level, Down</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Slow, Down</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Fast, Down</td>
<td></td>
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<td></td>
<td>X</td>
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<td>X</td>
</tr>
</tbody>
</table>
Questions?