Updates

• Homework:
  – Last week homeworks graded on canvas
    • Project workload has been INCREASING
    • Homework workload is DECREASING

• Homework grading
  – Points are mostly for effort
  – Read comments on canvas, even if you got full points
  – Full points does not mean you got the right answer
    • We’ll try to cover some common issues in recitation
    • If you’re not sure – ask!
Updates

• Projects:
  – Project 8 graded on canvas
    • If you handed in late, it might take a while longer
  – Project 9 due tonight
  – Project 10 is live

• Friday MORNING last day of class is
  *last hand-in opportunity*
  – Morning after exam
  – After that, more time is course “Incomplete”
Today

• Project 9 questions?
• Project 10

• Be sure to fill out weekly surveys!
Project 10

• **Solve 10 mazes**, including new ones
• Get design package up-to-date
• Write more runtime monitors
• Peer review or new runtime monitors
• Create a system build ("release candidate")
New Mazes

- 4 new mazes
- Brings total to m1-m10
- Acceptance tests
More Invariants

• tick_monitor
  – Invariant: between calls to tickInterrupt, there shall be at most one call to each of poseInterrupt, orientationInterrupt, visitsInterrupt, and bumpInterrupt
  – tickInterrupt happens once after every call to moveTurtle, so this invariant effectively checks that moveTurtle does only one of each action per call
More Invariants

- **wall_monitor:**
  - Invariant: turtle checks bumped(…) for edge some time before moving through that edge
  - A proxy for not moving through walls
  - Monitor should keep track of calls to bumped(…) (but can limit how many it keeps track of)
  - Subtleties in implementation; project page gives details/hints
More Invariants

• face_monitor:
  – Invariant: for any call to bumped(x1,y1,x2,y2), the turtle shall be facing the wall segment with endpoints (x1,y1) and (x2,y2)
  – Remember that the wall segment with endpoints (x1,y1),(x2,y2) and the wall segment with endpoints (x2,y2),(x1,y1) are geometrically the same
More Invariants

• forward_monitor:
  – Turtle moves in direction it is facing
• solved_monitor:
  – Turtle stops turning & moving at end
• atend_monitor:
  – Turtle only calls atEnd if it is really at end
Monitor grading

• Correctness of each monitor
  – Does it do what it is supposed to do?
  – 7 monitors, including one from project 9

• Does turtle trigger monitor violations?
  – All 8 monitors, including “free” one from project 9

• Monitors can have bugs too!
  – Violation could be code; could be monitor

• If you think it is a timing bug come to office hours
  – Timing issues happen infrequently in ROS
    • Don’t be too quick to blame this! Usually it is a bug in your code
  – In-person meeting required to diagnose timing issues
    • Don’t be too quick to blame this! Usually it is a bug in your code
Build Process

• “Release Candidate” build package
  – A cleanly built system ready for acceptance tests
  – A single .tar.gz (usually) or .zip file with scripts that will build, install, run tests, etc.

• What’s in your build?
  – ANDREWID_build.sh – build & unit tests
  – ANDREWID_run.sh k – run maze #k (1..10)
  – ANDREWID_all.sh – build, unit test, all mazes
  – ANDREWID_P10.tar.gz
    • A file that contains everything, including scripts above
    • Procedure: unpack it into a clean virtualbox image, run “ANDREWID_all.sh” and absolutely everything should happen automatically to ensure your project is working
Also, design info up-to-date

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Evaluation</th>
<th>Points Given</th>
<th>Points Possible</th>
<th>Evaluation Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROJECT 10</td>
<td>Grading TA</td>
<td>0</td>
<td>350</td>
<td>(points given can be higher due to bonus)</td>
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<tr>
<td>ANDREWID_P10.tar.gz or .zip</td>
<td></td>
<td>0</td>
<td>230</td>
<td>10 Unpacks, executes, and runs per instructions; no build errors</td>
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<td>10 Successfully compiles warning/error free with project 8 warning profile</td>
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<td></td>
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<td>100 Turtle solves each maze</td>
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<td></td>
<td></td>
<td>70 All monitors implemented correctly; no points for step_monitor</td>
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<td>40 No monitor warnings at run time across all mazes</td>
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<td>40 Max 5 visits per square on a maze</td>
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<tr>
<td>p10_documentation[...].pdf</td>
<td></td>
<td>0</td>
<td>100</td>
<td>10 Updated to match final system (See Project 7 for expectations)</td>
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<td>10 Updated to match final system (See Project 7 for expectations)</td>
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<td></td>
<td></td>
<td>10 Reasonable coding style even after any changes, bug fixes</td>
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<td></td>
<td></td>
<td>10 Updated to match final system (See Project 8 for expectations)</td>
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<td></td>
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<td>10 Peer review checklist used for your code</td>
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<td>20 Peer review issue log, including status of bug fixes</td>
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<td></td>
<td>10 Are all peer review issues fixed or otherwise resolved in a reasonable way?</td>
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<tr>
<td>p10_writeup[...].pdf</td>
<td></td>
<td>0</td>
<td>20</td>
<td>4 Instructions as required. Other points for it actually working given above</td>
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<td>4 Describes issues found with testing and invariants, including any fixed.</td>
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<td>4 Describes invariant violations, including any fixed.</td>
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<td>4 Reflects on valuable practices</td>
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<td>4 Other project feedback</td>
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Project Questions?
HW #31: Safety Envelope Requirements and Failsafe

- 31.1: Household thermostat (temperature hazard)
- 31.2: Automotive engine speed
- 31.3: DC power supply for laptop computer
- 31.4: Household electric resistance space heater (fire hazard)
- 31.5: Electric cooker (rice/ slow cooker, not a pressure cooker)
- 31.6: Gas-fired household water heater with tank
- 31.7: Garage door with electric open/close motor
- 31.8: Cell phone
- 31.9: Microwave oven
- 31.10: Robotic floor vacuum