ECE 18-649 Final Project Report

December 1, 2014

Group # 11
Ting Xu
Eric Newhall
Mengzhe Li
Jonathan Leung

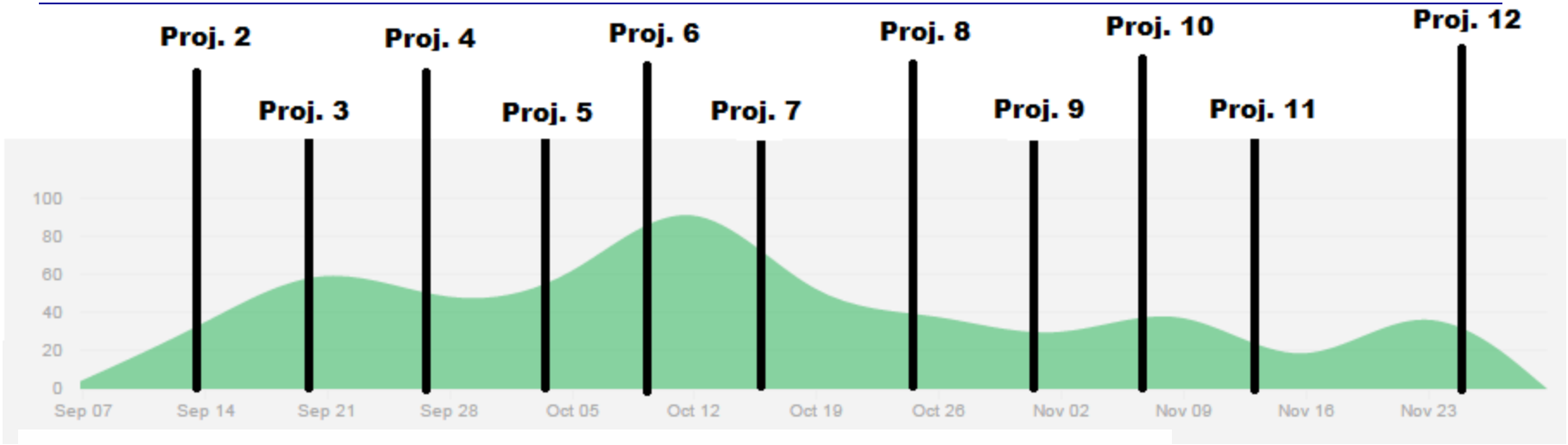
Overview

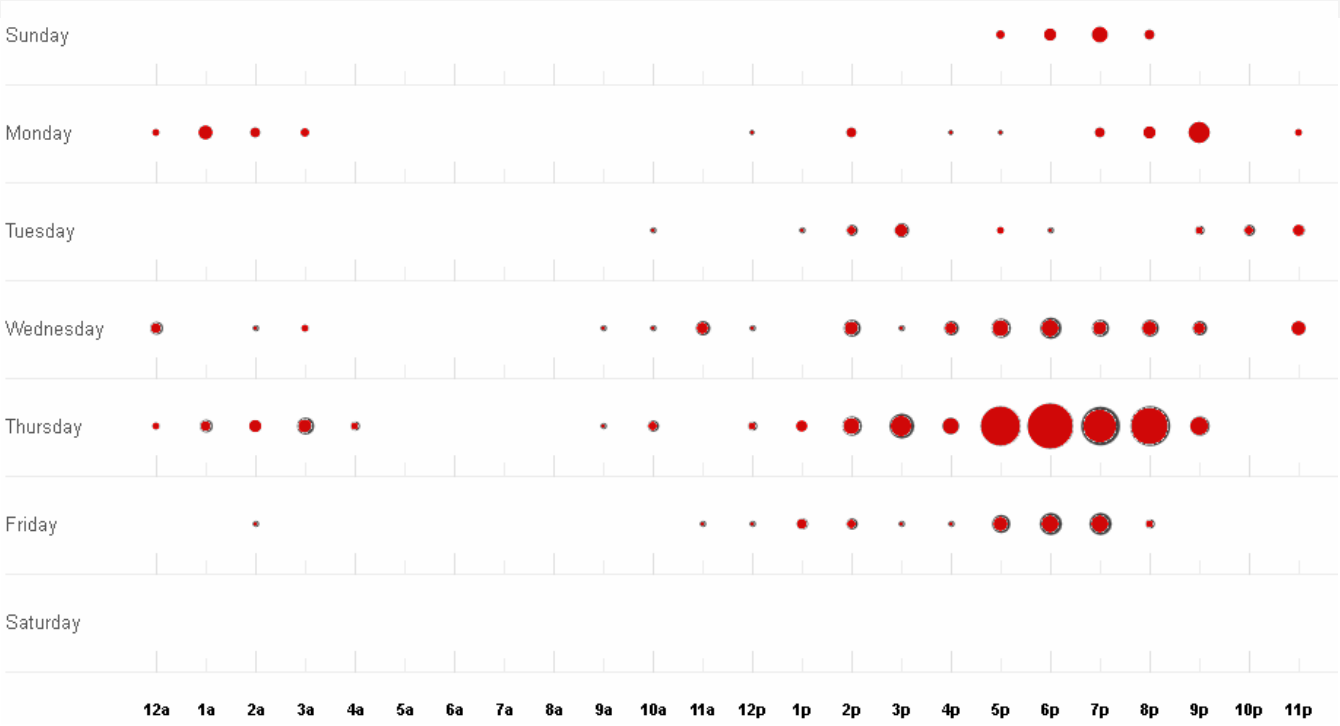
- Project Statistics
- Door Control Requirements
- Door Control State Chart
- Door Control Testing
- Door Control Interactions
- Lessons Learned
- Open Issues & Suggestions

Project Statistics

Name	Mid-Semester	Final	Difference
Sequence Diagrams	18 SD, 116 arcs	19 SD , 128 arcs	(+1) (+12)
Requirements	47 lines	57 lines	(+10)
StateCharts	21 states, 28 arcs	25 states , 37 arcs	(+4) (+9)
Non-comment code	1089 lines	2211 lines (Monitor: 764 lines)	(+1122)
SLOC per man hour	3	4	(+1)
Approx. Cost	$13,500	$20,240	(+$6,740)
Test files	35	46	(+11)
Revisions	17	28	(+11)
Peer Reviews	62	99	(+37)
Defects Found	44 found by PR 9 found by others	47 found by PR 20 found by others	(+3) (+11)

Project Statistics



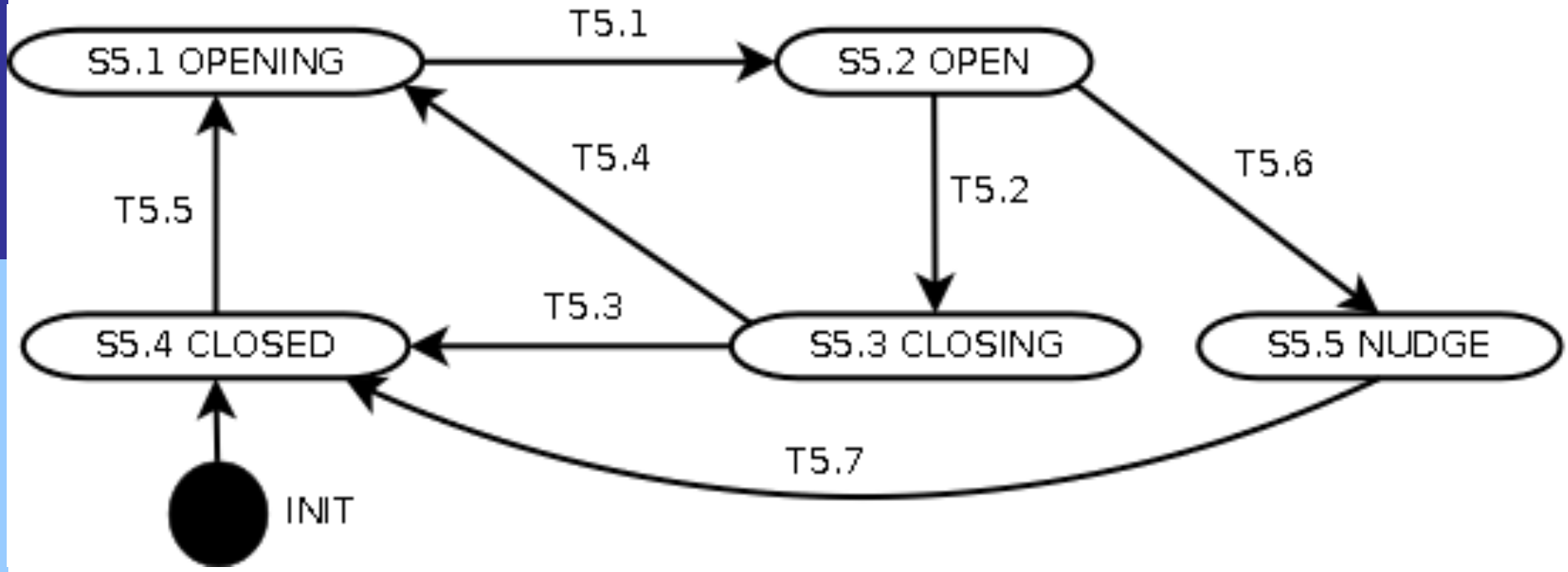


Ting Xu

Door Control - Requirements

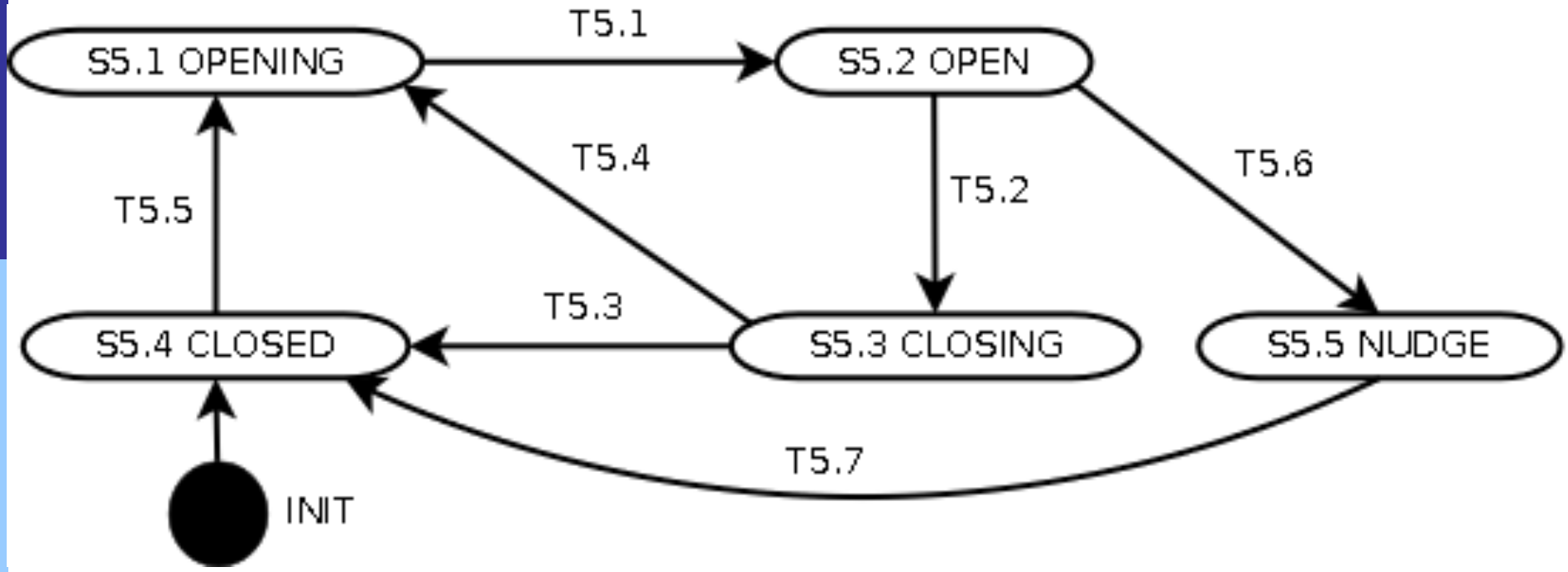
RT10	For each stop at a floor, at least one door reversal shall have occurred before the doors are commanded to nudge.
5.9	When Reversal = false and CountDown <= 0 and mCarWeight < MaxCarCapacity and mAtFloor.getCurrentFloor() != mDesiredFloor.getFloor(), DoorMotor[b,r] should be commanded to Close.
5.13	When Reversal = true and CountDown <= 0 and mCarWeight < MaxCarCapacity and mAtFloor.getCurrentFloor() != mDesiredFloor.getFloor(), DoorMotor[b,r] should be commanded to Nudge.

Door Control - Statechart



S5.3 CLOSING	Car doors are in the process of closing	DoorMotor[b,r] = Close mDoorMotor[b,r] = Close Reversal = true
S5.4 CLOSED	Car doors are closed and stopped	DoorMotor[b,r] = Stop mDoorMotor[b,r] = Stop Reversal = false
S5.5 NUDGE	Car doors close at nudge speed with no additional reversals	DoorMotor[b,r] = Nudge mDoorMotor[b,r] = Nudge

Door Control - Statechart



T5.2	Reversal = false and mCarWeight < MaxCarCapacity and CountDown <= 0 and mDesiredFloor.f != mAtFloor.f
T5.6	Reversal = true and mCarWeight < MaxCarCapacity and CountDown <= 0 and mDesiredFloor.f != mAtFloor.f
T5.7	mDoorClosed[b,r] = Closed

Door Control - Testing

Bugs found mainly through acceptance testing:

- Passed all unit/integration tests
- Acceptance sometimes throws exception
- Analyze the state of the simulator before exception
- Discuss as a group about the problem, and fixes

Example:

- Crashes when door reversal is triggered
- Set multiple breakpoints near the crash and observed
- Noticed when a passenger triggers door reversal:
  - Door reverses to OPEN (good)
  - *The other* door continues to CLOSE (bad)
- Fixed by giving more information to DoorController

Example:

- Doors still close when overweight

Door Control - Interactions

Door Control interacts with Dispatcher:

- Our elevator (intended design):
  - Doors stay open at floor when there are no pending calls
  - Happens when mDesiredFloor.f == currentFloor
  - This case happens quite often

- Initial design of Door Control: have a countdown
  - Countdown is a constant
  - Doors close when countdown reaches 0
  - When mDesiredFloor.f == currentFloor, doors will cycle
  - Violates R-T7

- To cooperate with the Dispatcher:
  - Added a guard to the transition from OPEN to CLOSING
  - Only close doors when we want to move to another floor

Lessons Learned

Didn’t immediately fix some problems

- Acceptance test delay
- Small ramp-up time
- Almost late hand-in

No Hand-in errors!

- Scripts for running tests
- Git + Drive combo
- Group checking for handin

Team in a good rhythm

- Set meeting dates
- Each person is in charge of a section

Open Issues & Suggestions

Open issues

- Better communication with group messaging
- Better bug tracking

Course suggestions

- All good!

Advice for future students

- Use the down time for testing/improvements
- Soda machine example still useful as ever