CSCP 689: Special Topics in Reliable Concurrent Software

Dr. Jeff Huang
Fall 2014
Who Am I

- Recently joined Aggieland!
- Got my Ph.D. in 2012
- Interested in (dynamic and static) program analysis
  - Theoretical foundations (mathematical models)
  - Applications (e.g., compiler, testing, debugging, verification, performance tuning, security, distributed computing, etc.)
- Most recent interest
  - concurrent software reliability analysis
Multicore Is Everywhere
Concurrent Programming Is A Headache
Real World Disasters

Therac-25  3+ dead

2012 Facebook IPO glitch
$500 million losses for investors

North American Blackout of 2003

50 million people in dark
This Course

• Understand in deep why concurrent programming is hard

• Learn the state-of-the-art techniques to improve concurrent software reliability
Who Are You

• Your name
• Advisor
• Research interests
• What do you expect from this class
Course Structure

• Read/discuss many great papers on concurrent software reliability
  – Fundamental program analyses
  – Practical analysis frameworks and tools
  – Fundamental concurrency concepts
  – Techniques in testing, debugging, detecting and fixing concurrency bugs

• No textbook!!!
  – All papers online

• Exams: None!!
Administrative Info

• Course homepage
  – http://parasol.tamu.edu/~jeff/course/689_fall2014

• Meetings
  – Tue & Thu 2:20pm-3:35pm, 425A HRBB

• Communications
  – My email: jeff@cse.tamu.edu
  – My office: 427C HRBB
  – Forum: https://piazza.com/class/hz2tz9n5de9357
General Policies

• Attendance: mandatory
• Arrive on time to class
• Silence your cell phone

• Late policy: no late work
Required Work

- 20% paper presentations
- 20% paper summaries
- 10% class participation
- 50% final project
Paper Presentations (20%)

• Two or three presentations on similar topics per class
• Each presentation
  – 20min talk & >5min discussion
• Each student may present 2-3 papers
  – Paper list: 
    http://parasol.tamu.edu/~jeff/course/689_fall2014/papers.html
  – Register papers before or on Sep 10th
  – First come first serve
Paper Presentations (20%)

• Important presentation skills
  – Focus on high-level ideas
  – Illustrate basic ideas using concrete examples and pictures
  – Do *not* copy algorithms/formulae/complex examples from the paper
  – Include interesting/non-trivial questions you want discuss in the class
  – Practice your talk!

• Be ready to lead the discussion
Paper Summaries (20%)

• Write 1-page summaries for all papers that will be discussed
• Answer the following questions:
  – Problem definition
  – Key insights/contributions
  – Weakness/flaws
  – Opportunities for future work
  – Your problems in understanding the paper
Paper Summaries (20%)

- *Due midnight the day before the lecture*
- Don’t copy sentences out of the paper
- Spelling and grammar count!!!
- Presenters are exempt from writing the summary for papers they are presenting
Class Participation (10%)

• Attend class and actively engaged in discussion

• Assume your audience has read the paper
• Try to say non-obvious, interesting things
• Depth is more important than breadth
Final Project (50%)

• Either by yourself or with another student
• Try to work on an ambitious project that may not work eventually, rather than a simple project that is guaranteed to work
• I will give several project ideas, but you are encouraged to create your own project

• Make it your own research project, rather than a class task
• Let’s publish them!!!
Final Project (50%)

• Talk to me before 10/1 to decide your project. (Make sure your project is approved by 10/1).

• 10/2: Proposal (1-2 pages) and presentation (2-5 minutes)

• 10/30: Midterm project report (10 minutes)

• 12/1: Final report (6 pages, 10 points, ACM style) and submit with your source code and all relevant data.

• 12/2: Project presentation and demo (20 minutes each)
Important Notice

• Signup on discussion forum
  – https://piazza.com/class/hz2tz9n5de9357

• Next lecture
  – Tuesday, Sep 9th, 2:20pm, 425A HRBB
  – Read the papers in the course schedule

• You don’t have to write any summary now!