

Eclipticon

Cody-James LeBlanc, Kevin Jalbert, Jeremy S. Bradbury,

Chris Forbes, Ramiro Liscano

Software Quality Research Group

University of Ontario Institute of Technology

Oshawa, Ontario, Canada

{kevin.jalbert, jeremy.bradbury, ramiro.liscano}@uoit.ca,

{codyjames.leblanc, chrisjf}@gmail.com

<http://sqrg.ca>

Overview

- Concurrency is being used in more software
- **Threads** introduce **concurrency bugs** in code
- Want to aid in **testing efforts**

Concurrency Bugs

- **Multiple** threads can be **scheduled** in different ways
- The different schedules make testing and debugging **difficult**
 - **Data Races** – two or more threads access **unprotected shared data**, resulting in inconsistent access to the shared data
 - **Deadlock** – the **order** of lock acquisition prevents other threads from acquiring the needed lock

Naïve Solution

- Run test code **over-and-over** under different:
 - Operating systems
 - System loads
 - Number of processors
- Want to explore the possible different schedules
 - No guarantee in **coverage**

Better Solution

- Instrument **noise** into source code
- Threads schedule **differently** every execution
 - **Random** chance of noise
 - **Random** amount of noise
- Eclipticon = Eclipse & Concurrency
- Similar tool: IBM ConTest **[EFN+02]**

Instrumentation Details

- Only concerned with **areas of interest**
 - (i.e., before a **thread switches** processors)
- Looking at **interest** points:
 - Synchronized
 - Barrier
 - Latch
 - Semaphore
- Using **thread delays** as noise:
 - Sleep
 - Yield

Targeted Testing

- Able to have **fine** and **coarse grain** control of where to place instrumented noise
- Allows **targeting** testing efforts on **suspicious and problematic** areas
- No need to instrument all of the source code

Demonstration

Action Plan

- Release Eclipticon
- Integrate with JUnit
- Evaluate Eclipticon
- Feedback and ideas are welcomed

Eclipticon

Cody-James LeBlanc, Kevin Jalbert, Jeremy S. Bradbury,

Chris Forbes, Ramiro Liscano

Software Quality Research Group

University of Ontario Institute of Technology

Oshawa, Ontario, Canada

{kevin.jalbert, jeremy.bradbury, ramiro.liscano}@uoit.ca,

{codyjames.leblanc, chrisjf}@gmail.com

<http://sqrg.ca>