Debugging
Credit

• This lecture is a summary of the 9 golden rules of debugging presented in the book ‘Debugging’ by David J. Agans

• The book is extremely easy to read and very entertaining

• Many examples we can all (and will) be able to relate to are used, as well as the techniques used to solve them
The Rules

• Understand the System
• Make it Fail
• Quit Thinking and Look
• Divide and Conquer
• Change One Thing at a Time
• Keep an Audit Trail
• Check the Plug
• Get a Fresh View
• If You Didn’t Fix It, It Ain’t Fixed
Understand the System

• Read the manual

• Read everything in depth

• Know the fundamentals

• Know the road map (understand the construction of the system)

• Know your tools

• Look up the details
Make it Fail

- Do it Again
- Start at the Beginning
- Stimulate the failure
- Don’t simulate the failure
- Find the uncontrolled condition that makes it intermittent
- Record everything and find the signature of intermittent bugs
- Don’t trust statistics too much
- Know that ‘that’ can happen
- Never throw away a debugging tool
Quit Thinking and Look

• See the failure

• See the details

• Build instrumentation in

• Add instrumentation on

• Don’t be afraid to dive in

• Watch out for Heisenberg

• Guess only to focus the search
Divide and Conquer

• Narrow the search with successive approximation

• Get the range

• Determine which side of the bug you are on

• Use easy to spot test patterns

• Start with the bad

• Fix the bugs you know about

• Fix the noise first
Change One Thing at a Time

• Isolate the key factor

• Grab the brass bar with both hands (Try to work out exactly what has gone wrong)

• Change one test at a time

• Compare it with a good one

• Determine what you changed since last time it worked
Keep an Audit Trail

- Write down what you did, in what order, and what happened as a result
- Understand that any detail could be the important one
- Correlate events
- Understand that audit trails for design are also good for testing
- Write it down!
Check the Plug

• Question your assumptions
• Start at the beginning
• Test the tool
Get a Fresh View

• Ask for fresh insights

• Tap expertise

• Listen to the voice of experience

• Know that help is all around you

• Don’t be proud

• Report symptoms, not theories

• Realise that you don’t have to be sure
If You Didn’t Fix it, it Ain’t Fixed

- Check that it’s really fixed
- Check that it’s really your fix that fixed it
- Know that it never just goes away by itself
- Fix the cause
- Fix the process