



Code Visualization

Simplifying debugging through the visual representation of data structures and their behavior



People Involved

Students

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Faculty

- Dr. Ryan Stansifer *Client/Advisor*
- Dr. Philip Chan *CSE4201 Instructor*



Motivation

- Tedious debugging tasks
 - Time wasted on code tracing
 - Need to keep track of data movement
- Unintuitive UI design of modern debuggers
 - GDB
 - WinDBG
 - Radare

Goal

- Automatic data visualization
 - Code tracing becomes unnecessary
 - Data movement is animated between steps
- Simple, yet effective GUI
 - No need to memorize commands
 - Accomplish complex tasks more quickly
 - Look pretty :)



Key Features

- Interactive GUI
 - Automatically generate data structure diagrams
 - Animate data movement between steps
- Dynamic code analysis
 - Step line-by-line through source code
- User intervention
 - Manually override incorrect data structure diagrams
 - Choose how certain structures are represented



Technical Challenges

- How does debugging work?
- How do GUI apps work?
- How can user intervention be implemented?



Milestone 1

- Compare and select technical tools
 - GUI
 - Debugger implementation
 - Target programming language
- Provide basic demo(s) of technical tools
- Resolve technical challenges
 - Learn basic emulation or ptrace
 - Learn basic GUI development
 - Decide on implementation for user intervention
- Compare and select collaboration tools
 - Software development
 - Documents/presentations
 - Communication
 - Task calendar
- Create requirement document
- Create design document
- Create test plan



Milestone 2

- Implement basic GUI groundwork
 - Test in various environments
 - GNOME
 - XFCE
 - KDE
 - Various aspect ratios
 - etc.
- Implement debugger/tracer (CLI)
 - Create test programs for debugging
 - Find edge cases



Milestone 3

- Create first set of visual elements
 - Array
 - List
 - Tree
- Detect data structures in target code
 - Array
 - List
 - Tree

Thank You

