**CSFV**

**University of Washington**

**Monthly Technical Report for February 2013**

Reporting period: 1 February 2013 – 29 February 2013

Date of Report: 15 March 2013

Project Title: Verigames

Contract Number: FA8750-12-C-0174

Program Manager: Dr. Drew Dean, DARPA I2O

Submitted by:

Michael Ernst / Zoran Popović

Computer Science & Engineering

University of Washington

AC101 Paul G. Allen Center, Box 352350

185 Stevens Way

Seattle WA 98195-2350

Fax: (206) 543-2969

E-mail: {mernst, zoran}@cs.washington.edu

**Distribution List**

DARPA/I2O

ATTN: Drew Dean

team-dean@darpa.mil

3701 North Fairfax Drive

Arlington VA 22203-1714

AFRL/RITA

ATTN: Dilia Rodriguez

Dilia.Rodriguez@rl.af.mil

525 Brooks Road

Rome NY 13441-4505

**Unclassified - For Official Use Only**

# Verigames - Project Progress

**1. Expected Progress This Month**

* Attend and present at CSFV PI Meeting, February 5-7, 2013 in San Antonio, TX.
* Annotations:
  + Complete work on annotations in qualified types, and start working on annotations on compound types in inserted receivers and casts.
  + Determine how AST paths will be stored in the XML.
* Complete integration of the dataflow framework.
* Continue creating type systems: Encrypted, SafeFileType, and OneWayHashWithSalt.
* Game design:
  + Continue investigating game design simplification, especially centered around buzzsaw placement and game board graphics.
  + Complete visual development on non-pipe-centric representation of game board.
  + Finish integrating new graphics library.
* Integration:
  + Send list of initial level parameters to TopCoder.
  + Respond to TopCoder mini-site questionnaire.
* Continue hiring.

**2. Accomplishments This Month**

We attended and presented at CSFV PI Meeting, February 5-7, 2013 in San Antonio, TX. We presented our latest progress on type checking, annotations, and the visualization of game levels, as well as our thoughts around approach to promoting social intelligence and player engagement in the game.

Annotations in qualified types is nearly done, and annotations on compound types in inserted receivers and casts is complete.

Unfortunately, we did not complete the integration of flow sensitivity as we had planned to this month, but we are close with only a small remaining number of outstanding bugs on large programs. This is a task with three separate parts: integration into the checker framework, the inference framework, and then the game solver. We do believe that this will be complete next month.

We continued the creation of type systems: Encrypted, SafeFileType, OneWayHashWithSalt, and Lock.

We decided on the simplification of buzzsaws and balls— we will remove them from the game. We concluded that buzzsaws were not necessary in the game anymore and replaced them with conflicts (see January report). Travelling balls are not necessary if we define a conflict simply as a large pipe going into a small pipe. Cutting down on travelling balls (and/or cars) will cut down on the amount of visual noise we present to the player, theoretically allowing us to increase the complexity of the kinds of levels we give to players

Our non-pipe-centric visual interpretation of level is still under development. We are working through how to represent structures such as map.get, polymorphism, and recursion. We are also working on the graph layout approach for the boards. Large programs are resulting in large, complex levels with many squares and pipes, which are difficult to lay out in a readable and aesthetically pleasing way.

We sent a list of initial level parameters to TopCoder and discussed API integration. We plan on getting deeper into the integration work in March. Currently, we do not have any concerns with the API or proposed schedule. We have also been in contact with TopCoder over the mini-site designs, filling out the questionnaire and providing feedback on the site design contest.

**3. Deliverables Submitted**

N/A

**4. Publications Made**

“**JavaUI: Effects for Controlling UI Object Access**”

by Colin S. Gordon, Werner Dietl, Michael D. Ernst, and Dan Grossman.

In *ECOOP 2013 — Object-Oriented Programming, 27th European Conference*, (Montpellier, France), July 3-5, 2013.

“**Rely-Guarantee References for Refinement Types Over Aliased Mutable Data**”

by Colin S. Gordon, Michael D. Ernst, and Dan Grossman.

In *PLDI 2013, Proceedings of the ACM SIGPLAN 2013 Conference on Programming Language Design and Implementation*, (Seattle, WA, USA), June 17-19, 2013.

.

**5. Meetings**

* CSFV PI Meeting, February 5-7, 2013 in San Antonio, TX.
* Weekly UW Verigames full team meeting
* Weekly UW CGS design meeting
* Weekly integration conference call

**6. Issues or Concerns**

Iterative game development cannot start until our IRB is approved. Our game design and development process is highly reliant on gathering data from real players and making adjustments to the game based on perceived patterns of play. Our inability to collect and study data in the short term means that there are a number of game design questions that will remain open for the time being.

**7. Plans for Next Month:**

* Complete work on annotations in qualified types.
* Complete integration of the dataflow framework.
* Determine how AST paths will be stored in the XML.
* Continue creation of type systems.
* Continue iteration on new representation of game levels.
* Decide on representation of map.get in new representation.
* Pick finalists in TopCoder mini-site competitions.

**8. Financial Summary**

Projected expenditures for the month were estimated at $104k. Actual expenditures were $70k. A Julia Srl invoice for $8k is pending but will likely post in March. Travel expenditures for the PI meeting have posted.