**CSFV**

**University of Washington**

**Monthly Technical Report for August, 2012**

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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

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# Verigames - Project Progress

**1. Expected Progress This Month**

This month we planned on ramping up our new software engineer and continuing to hire. We planned on implementing a new type system into the game and perform work towards incorporating flow sensitivity into the game. We also intended to begin trials with ingesting larger software programs.

On the game side we intended to begin the design of the game’s logging and playback systems.

**2. Accomplishments This Month**

Our newest programmer, Jonathan Burke, got up to speed on checker-framework and modified checker-framework-inference to work with the latest version of checker-framework. He also created a basic division by zero type system (which may be turned into a game), however, at the moment it needs more work as numeric overflow makes it not very useful in the default case.

Our subcontractor Julia Srl has detected what appear to be bugs in Hadoop. They are not security-related, but are promising evidence about their approach nonetheless. Julia Srl is building an information flow abstraction for languages with heap and dynamically allocated objects in the heap. The abstraction uses a Boolean variable for each program variable, which is set if a secret is reachable. The tricky part is when fields are updated by storing a secret

inside. In that case, all variables potentially reaching the updated object must be considered as potentially reaching a secret. This will be improved later, by using an oracle semantics similar to what was done for nullness.

We made incremental progress on the design of logging and playback of gameplay, which were informed by conversation with the integrator. We set up a weekly conference call with integrator and held discussions on integration design and technology choices.

We continued to evaluate resumes to find appropriate candidates for interview.

**3. Deliverables Submitted**

N/A

**4. Publications Made**

N/A

**5. Meetings**

* Weekly UW Verigames team meeting
* Weekly integrator conference call

**6. Issues or Concerns**

Issues and concerns have not changes much since last report:

Hiring has been slower than we’d like; finding truly good candidates has been difficult. We had planned on having at least two software engineers by now, but currently we only have one. We continue to look for qualified candidates.

Iterative game development cannot start until our IRB (already approved on our side) is approved with all of the other IRBs. 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.

Finally, we have some internal concern about with our use of visual metaphor for gameplay in special cases (such as map keys). In cases like this, metaphors such as “pipes and balls” or “roads with traffic” break down and can be difficult to intuitively understand by non-technical players. In the coming months, we will need to think carefully about these representations so that we either find a solution that does make sense and continues the metaphor, or that we find a way to effectively teach the mechanics of these objects to players as simply one of the immutable “rules” of the world of the game.

**7. Plans for Next Month:**

We plan to finish up the changes to the divide by zero type system and convert this type system (or another, if we deem this one to be not useful) into a game.

We plan to initiate trials with larger software programs. Implementation and data structures may need adaptation for larger programs; for example, instead of a list of constraints, something more organized and efficient may be necessary.

Work towards incorporating flow sensitivity into the game.

Continue hiring process.

**8. Financial Summary**

Projected third month expenditures were estimated at $310k. Actual was only $24k. Jonathan Burke, Programmer, was added to the project. Additional hiring is still in progress. Lower than projected staffing also resulted in lower travel costs for the Kickoff Meeting. Subcontract to Julia S has been established, but billing takes time to work through both systems, so initial projections for the subcontract are backed up as well.