

CS846 Paper Review Form - Winter 2012

Reviewer: Philip Mitchell

Paper Title: Alloy: A Lightweight Object Modelling Notation

Author(s): Daniel Jackson

1) Is the paper technically correct?

- Yes
- Mostly (minor flaws, but mostly solid)
- No

2) Originality

- Very good (very novel, trailblazing work)
- Good
- Marginal (very incremental)
- Poor (little or nothing that is new)

3) Technical Depth

- Very good (comparable to best conference papers)
- Good (comparable to typical conference papers)
- Marginal depth
- Little or no depth

4) Impact/Significance

- Very significant
- Significant
- Marginal significance.
- Little or no significance.

5) Presentation

- Very well written
- Generally well written
- Readable
- Needs considerable work
- Unacceptably bad

6) Overall Rating

- Strong accept (award quality)
- Accept (high quality - would argue for acceptance)
- Weak Accept (borderline, but lean towards acceptance)
- Weak Reject (not sure why this paper was published)

7) Summary of the paper's main contribution and rationale

for your recommendation. (1-2 paragraphs)

Daniel Jackson presents a new modelling language called Alloy. The language is built on another language called Z by simplifying the syntax and adding new features to make object modelling easy. Objects are linked by relations, and those relations and those objects are constrained using a set notation. There are no scalars, only sets. Along with the modelling language, Jackson describes how the constraints within the models can be verified for consistency by checking to see if there exist any values for the relations that satisfy all constraints. Although the modelling language allows for infinite sets in the relations, the constraint checking is limited to finite scope, so the absence of a solution is not necessarily mean that there is no solution, perhaps at a larger scope.

The paper performs a strong comparison to UML and OCL, although Jackson struggled to find anything positive to say about these technologies, so one is left suspicious that there is some bias in the comparison. Nevertheless, there is a respectable amount of criticism of Alloy throughout the paper as well. In fact, there are some cases in which Jackson is perhaps too pessimistic about his language. For example, he states that "it seems unlikely that it will ever be possible to analyze a large, monolithic specification...." With today's technology, in particular cloud computing and systems like hadoop, the model analysis can be divided across many computers fairly easily, so much larger models can be analyzed. There are good comparisons to other technologies as well, although they were kept very brief. There were a few places throughout the writing where I would have liked to see more background, or at least a citation (e.g. "the most elementary calculus that involves relations is undecidable"). Overall, though, the paper presents a very interesting language

which has proved to be inspirational and is still actively supported today.

8) List 1-3 strengths of the paper. (1-2 sentences each, identified as S1, S2, S3.)

S1 - The paper includes a detailed explanation of the language and explanations as to why each of the constructs was chosen. Constructs that were left out were also mentioned along with explanations as to why they were left out.

S2 - The comparison to UML and OCL was detailed and complete. Jackson made it very clear why he believes Alloy is better than these technologies.

S3 - Jackson analyzes many possible criticisms of Alloy explains, where possible, why these criticisms are not as significant as one might think. Where a criticism is significant, Jackson graciously accepts it as a limitation and suggest future enhancements to address it.

9) List 1-3 weaknesses of the paper (1-2 sentences each, identified as W1, W2, W3.)

W1 - The paper is excessively long. The analysis is very exhaustive and in some cases tends to be repetitive.

W2 - There are a few places that could use more citation, such as "the most elementary calculus that involves relations is undecidable."

W3 - Some assumptions were made regarding the reader's knowledge, such as knowledge of closures, which could have been resolved with a brief background summary. A brief description of the Z programming language could have been presented earlier so that similarities and differences were more apparent while reading the description of the Alloy language.