Graph-Based Tools: The Contest

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Abstract. This event is the second instance of the contest for graph transformation-based tools, which was first held as part of the AGTIVE workshop. The aim is to stimulate tool development by providing a sense of competitiveness, as well as the chance to get to know and learn from the features of other, related tools.

1 Aims of the Workshop

Tools are crucial for the promotion of graph transformation in industry. It is only with the ready availability of reliable, easy-to-use tools that the attractions and benefits of graph transformation can ever become clear to anyone not having a prior education in this field. Furthermore, given the inherent complexities of the method, tool performance is an important issue. As a community we should be constantly working to improve tool support in all these aspects.

A variety of tool environments exists, supporting different graph transformation approaches and to some degree serving different purposes. There are some examples of tool comparisons, e.g., (2, 3, 6); furthermore, Varro et al. (9) propose some benchmarks to be used for such purposes. Nevertheless, having a certain application in mind, it is difficult for newcomers to decide the right graph transformation tool to use. Moreover, even for most of the tool experts it is true that they know much about one or two tools but little about the others.

To stimulate both the continued improvement of tools and the wider dissemination of knowledge about existing tools, GraBaTs 2008 comprises a *tool contest*, building upon the contest held as part of the AGTIVE 2007 symposium (see (7)). The aim is to compare the expressiveness and the performance of graph transformation tools, along a number of selected case studies. This year, we have extended the contest with a live session to also measure the usability of tools in a controlled environment. The desired outcome is threefold:

– To learn about the pros and cons of each tool for different applications. A deeper understanding of the relative merits of different tool features will help to improve graph transformation tools and to indicate open problems.
– To identify common functionality across tools. By identifying features that are becoming mainstream, developers may decide to reuse functionality from other tools and focus more on unique added value.

– To instill a sense of challenge and competition that will motivate tool developers to continue their efforts. There is nothing like seeing, and being inspired by, the features of other tools to stimulate progress in one's own.

The case studies, outlined in Sect. 2, were selected from the entries received after an open call for cases. The second phase of the contest consists of the development of solutions to these case studies. At the time of writing, we cannot yet estimate the response to the call for solutions.

In addition, with respect to the first tools contest we have added the concept of a *live session*. The idea of this session is that the participants (limited to those who have explicitly registered to this session) will receive a case description on the spot, and will be asked to provide a solution, using the tool of their choice, within a fixed time frame of half a day. This experiment complements the solutions submitted to the pre-defined cases; it will provide valuable data about the flexibility and ease of use of the various tools.

2   The Cases

A Case Study for Program Refactoring. This case study, described in (4), concerns the implementation of three non-trivial source code (viz., Java) refactorings: *Encapsulate Field*, *Move Method*, and *Pull-up Method*. Input and output are to be given in a GXL-formatted encoding of Java programs. The case aims to enable comparison of various features of graph transformation tools, such as their expressiveness and their ability to interact with the user.

The AntWorld Simulation Tool Case. This case study, described in (10), complements the Sierpinski triangles benchmark studied in AGTIVE 2007 (cf. (8)). The case has been designed such that the tools will most likely not run into memory problems. Over time, the number of Ants grows to the square of executed rounds. Thus, the focus of the benchmark is the movement of Ants. This can again be done with reasonably simple rules that mainly employ local search. Thus, the AntWorld simulation stresses local rule application. Another aspect of this case is the visualisation of the ants.

Transforming BPMN process models to BPEL process definitions. This case study, described in (1), considers the definition of model transformations between two languages for business process modelling, namely BPMN and BPEL. The model transformations should achieve four evaluation criteria: completeness, correctness, readability and reversibility.

3   Conclusion

The previous instance of the tool contest, summarised in (7), identified strong and weak points and made a number of recommendations. In this second instance we have taken measures to resolve the weaknesses and take the recommendations into account.

Explicit challenges. It was recommended to include explicit challenges in the case descriptions. This has been implemented by requiring case submissions to include a description of the challenges involved.

Ranking. It was recommended to take measures to enable the ranking of submissions. We have responded to this by requiring that all case studies provided a set of variation points. This enables a comparison of the solutions on a common basis while leaving enough room for differentiation. Moreover, a reference server is set up so that solutions can be run and compared on an equal basis, making a more objective ranking possible.

Case categories. It was recommended to include more case categories, such as, for instance, "NP-complete problems" and verification issues. Unfortunately, neither of these topics is featured among the selected cases (see above).

Separate workshop. It was recommended to organise the next instance of the tool contest as a separate workshop, so that there would be more time for all submissions to be demonstrated (this being an important incitement for further improvements). Clearly, this recommendation has been implemented.

At the time of writing, we cannot yet make a statement about the success of these measures. In any event, we hope to have a lively workshop, with a healthy mixture of competitiveness and cooperation.

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