Homework 4: Domain Specific Frameworks in Smalltalk

Due: December 7, 1999.

In this group homework you will design, implement, and demonstrate a domain specific framework in Smalltalk.

Don't hesitate to contact the staff if you are not clear about what to do.

1. (160 points) Adapt your domain-specific language from homework 2 so that it can be implemented as a framework in Smalltalk. In doing this try to keep the facilities you provide to the user as close as possible to what you implemented in Haskell, so that you can make a fair comparison.

   Recall that in the domain specific language, you are designing a notation for other people to write programs in this domain.

   The implementation is to be done as a framework in Smalltalk, that is, as a set of classes and abstract classes in Smalltalk. You can expect that your users know how to use Smalltalk and inheritance in Smalltalk. Note that, although the users of your framework need not be experts in Smalltalk, you are expected to demonstrate your expertise by making the framework and the notation it provides as helpful as possible for the users.

   Each person in the group should do a fairly nontrivial example showing some aspect of your languge, something about half page or a page or so. Be sure the examples clearly state who did each one. Each of the examples should be different. It's best if each of the examples can show a different aspect of the use of your framework in programming in the domain.

   For this part, hand in:

   - an introduction to your framework that combines a brief commentary with the examples of each of you produced,
   - the reference manual for your framework, including enough examples of each public method to illustrate all facets of its use,
   - the source code for your implementation,
   - tests showing that your example programs work with your implementation, including output,
   - a statement from the group leader certifying who participated.

   Note that the group leader must be someone other than the person who was the leader in homework 2.

2. (80 points) In this problem, you should, as a group, compare, constrast, and evaluate the advantages and disadvantages of Smalltalk vs. Haskell for implementing domain-specific languages and frameworks. This will be graded on insight and clarity, as well as completeness. It would probably be helpful if the group, as a whole, "brainstorms" about the comparision, and then afterwars tries to organize the ideas.

   We won't accept as reasonable arguments that you couldn't do a good job in language x because you don't know how to program well in that language. If necessary, you may want to go back to your Haskell code and improve it to make the comparison fair.

   Again, be sure to include a statement from the group leader certifying who participated. Also include an evaluation of your group process for this whole homework, as described in the course policies and procedures document.