Exercises about the paper "Generic Views on Data Types"

November 1st, 2012

1. (1 point) The main concept discussed in the paper "Generic Views on Data Types" is that of a *generic view* (the paper has a very descriptive title, after all). What is then the *informal* (using natural language) definition of a generic view? More specifically:
   (a) (0.5 points) What are the three components of a generic view?
   (b) (0.5 points) What are the conditions that a generic view must satisfy in order to be said *valid*? *Tip: There are three conditions, one applies to one component of the definition and the other two condition apply to another component.*

Solution:

(a)
i. A set of datatypes, called "view types", "representation types" or "structure types".
ii. A mapping between the universe of user-defined datatypes and the view types.
iii. For each user-defined datatype, a pair of functions (to and from) witnessing the isomorphism between the user-defined datatype and the corresponding view type.

(b)
i. The mapping from user-defined datatypes to view types needs to be *kind-preserving*
ii. The conversion (isomorphism-witnessing) functions need to be well-typed
iii. The conversion (isomorphism-witnessing) functions need to be well-behaved, i.e, inverses of each other