Logics, Categories, and Colimits for Artificial Intelligence

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Exercise Sheet 14

Due: February 13, 2009

Exercise 14.1 (Monomorphisms in **Set**)

Show that a morphism in **Set** is a monomorphism iff it is injective.

Exercise 14.2 (Uniqueness of left adjoints)

Show that left adjoints are unique up to isomorphism.
That is, given $U : \mathbf{C} \to \mathbf{D}$, if $F_1 : \mathbf{D} \to \mathbf{C}$ and $F_2 : \mathbf{D} \to \mathbf{C}$ are left adjoints of U, then there is a natural transformation $\tau : F_1 \to F_2$ that is an isomorphism in the category $[\mathbf{D}, \mathbf{C}]$ of functors from $\mathbf{D}$ to $\mathbf{C}$.

Exercise 14.3 (Free specifications)

Write a free specification that, given a graph, specifies the graph of all paths.

The exercise sheets may and should be worked on in groups of two (2) students. Please write both names on your solution.