INF223 Categories for Software Engineering
Spring 2006

— Exercise Set 7 , for group meeting 10.03.2006 —

1. (a) Show that $id_\Sigma : \Sigma \to \Sigma$ defines an isomorphism from $\langle \Sigma, \Phi \rangle$ to $\langle \Sigma, c_\Sigma(\Phi) \rangle$ in $\mathbf{PRES}_{LTL}$.

   (b) What can we say about Ψ and Ψ' if $id_\Sigma : \Sigma \to \Sigma$ defines an isomorphism from $\langle \Sigma, \Psi \rangle$ to $\langle \Sigma, \Psi' \rangle$ in $\mathbf{THEO}_{LTL}$?

2. Let $\mathbf{C}$ be a category and a :$\mathbf{C}$. Show that id_a is the initial object in the slice category $a \downarrow \mathbf{C}$.(Note, that this result applies to the category $\mathbf{SET}_\perp$ since $\mathbf{SET}_\perp$ is "equivalent" to the slice category $1 \downarrow \mathbf{SET}$.)

3. Let $\mathbf{C}$ be a category, x an arbitrary object and 0 an initial object of $\mathbf{C}$. Show that the sum of x and 0 exists in any category $\mathbf{C}$.