Assignment 13
Semantics, WS 2013/14

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Read in the lecture notes: Chapter 5

Do not use tactics in the following exercises.

Exercise 13.1 Define the eliminator for *nat* as a function in Coq.

Exercise 13.2 Define dependent pair types $(\Sigma x : A.B)$ with π_1 and π_2 as eliminators in Coq.

Exercise 13.3 (Non-Dependent Pair Types)

a) Define the (non-dependent) pair type $A \times B$ with π_1 and π_2.

b) Show that you can define the match eliminator for pair types using π_1 and π_2.

c) Convince yourself that you cannot prove the η-law $p = (\pi_1 p, \pi_2 p)$.

Do not use matches except when defining π_1 and π_2.

Exercise 13.4 (Dependent Pair Types)

a) Define dependent pair types $(\Sigma x : A.B)$ with the match eliminator *elim* in Coq.

b) Define π_1 and π_2 using *elim*.

c) Give the typing rule for *elim*.

d) Prove the η-law $s = (\pi_1 s, \pi_2 s)$ using *elim* (Leibniz equality).

e) Convince yourself that you cannot define *elim* using the projections.

f) Show that *elim* is definable using π_1, π_2, and the η-law.

Do not use matches except when you define *elim*.