Classwork N°11
due to 11th May 2012

 Exercise: "Application of combinators to natural language analysis: Quantification"

1. Universal and existential quantifiers

Please represent the following sentences using the operators of the universal or existential quantification. Are there ambiguous sentences having more than one reading?

| Every: $(\forall x)[P(x) \Rightarrow Q(x)]$ | Every: $(\lambda P.\lambda Q((\forall x)[P(x) \Rightarrow Q(x)]))$ |
| Some: $(\exists x)[P(x)\ \&\ Q(x)]$ | Some: $(\lambda P.\lambda Q((\exists x)[P(x)\ \&\ Q(x)]))$ |

a) All cats are mammals.

b) Some cats were sleeping by the fire.

c) Some chairs are in the lounge.

d) Every man loves a woman.

e) A boy kissed every girl.

2. Formal semantic analysis of the quantifiers

Give the analysis of the following sentences which contain the quantifiers using the combinators. The illative quantifiers Π_2 and Σ_2 are defined in term of the combinators.

$$[\ \Pi_2 =_{def} ((B(CB^2)\Phi) \Rightarrow \Pi_1)\ ]$$

$$[\ \Sigma_2 =_{def} (B(CB^2)\Phi)\ \&\ \Sigma_1\ ]$$

f) Some girl likes Fred

g) Every boy admires a saxophonist (ambiguous)

h) Every man knows Dexter

i) Several girls carried a box (ambiguous)