Classwork N°6
due to 30th March 2012

Exercise: "Application of combinators to natural language analysis: Extraction asymmetries"

1. To apply successfully the combinators to natural language analysis, we need to handle adequately the introduction and elimination rules by beta-reduction defined for each combinator. Especially, the control of the intro. Rules can appeal to some syntactic tool. Referring to the given combinatorial rules and types, give the formal semantic analysis of the following sentences:

***CCG types**: a. primitive types: S for sentence, NP for noun phrase and proper noun, N for common noun*

b. derived types: (S\NP) for intransitive verb (unary), (S\NP)/NP for transitive verb(binary), (N/N) for adjective, (NP/N) for articles, (S\NP)\(S\NP) for adverb of verb, (N/N)/(N/N) for the adverb of adjective, etc.

CCG rules:

e1: (y/z) e2:(x\y)	e1:x(NPobj)	x:e1 CONJ x:e2
----------<**Bx**	----------<**C***	----------> (>**Φ**)
(x/z): **B** e2 e1	y/(y\x): **C*** e1	x: **Φ** CONJ e1 e2

(a) Anna likes but Manny hates the horror movie. (type of *but: CONJ*)

(b) I will show to him and give to you an engraving. (type-raised argument)

→ type of *will*: VP/VP; type of *show/give*: (VP/PP)/NP; type of *to*: (PP/NP)

(c) I will show a painting and give a flower to him. (NP-shift)

(d) I will travel to and return from the beautiful city of Dublin (NP shift)

→ type of *to/from*: (PP/NP)

(e) a sculpture which I will buy today and sell tomorrow (leftward extraction)

→ type of *which:* (N\N)/(S/NP)