Some Basic Derivations in Combinatory Categorial Grammar

(1) a. S → NP VP — Phrase Structure Grammar
VP → V NP

b. NP → Leo
NP → Elliot
V → saw

(2) Leo: NP — Categorial Grammar
Elliot: NP
saw: (S\NP)/NP

(3) a. *Forward Application*
X/Y Y X

b. *Backward Application*
Y X\Y X

(4)
```
Leo          saw          Elliot
-----        -------------  -------
NP           (S\NP)/NP    NP
             ------------------------------->
             S\NP
-------------------------------<
        S
```

(5) *Type Raising*
X Y/(Y\X)

(6) a. *Forward Function Composition*
X/Y Y/Z X/Z

b. S/(S\NP) (S\NP)/NP S/NP

(7)
```
Leo          saw          Elliot
-----        -------------  -------
NP           (S\NP)/NP    NP
----TR
S/(S\NP)
-----------------------------------FC
             S/NP
             ----------------------------------->
                    S
```

(8) a. *Coordination*
X CONJ X X

b. and: CONJ

```
(9)          Leo saw        Elliot   and      heard          Eileen
             ---- ----------  ----   -------  ------         -------
             NP   (S\NP)/NP  NP       conj     (S\NP)/NP      NP
                  ---------------->           ------------------------->
                      S\NP                            S\NP
                      ------------------------------------------------&
                                   S\NP
             ------------------------------------------------<
                      S
```

```
(10)         Leo saw        and      Eileen   heard          Elliot
             ---- -------   ----     -------  ------         -------
             NP   (S\NP)/NP  conj     NP       (S\NP)/NP      NP
             ----TR                            ----TR
             S/(S\NP)                          S/(S\NP)
             ---------------------------FC     ---------------------------FC
                  S/NP                          S/NP
                  ------------------------------------------------&
                                 S/NP
                                 ------------------------------------------------->
                                                S
```