Computational Linguistics: Categorial Grammar

Raffaella Bernardi

14/01/2005

1 Exercise 1

(a) Write the semantic rules for the following syntactic rules:

```
s --> np vp
vp --> iv
vp --> tv np
np --> det n
n --> adj n
vp --> aux iv'
n --> student
det --> a
adj --> tall
iv' --> leave
aux --> doesn't
iv --> left
np --> john
```

(b) apply these labeled rules to built the labeled parse trees for

1. "A student left"
2. "A tall student "
3. "John doesn't leave"

2 Exercise 2

Give the types of "a", "student", "left", "tall" and "doesn't" and built the type of the following sentence by means of a tree

1. "A student left"
2. "A tall student "
3. "John doesn't leave"

3 Exercise 3

Give the syntactic and translation rule in Montague style corresponding to the CFG rule below

```
vp --> aux iv'
```

4 Exercise 4

Give the syntactic categories in CG for the words below:

1. does
2. everybody
3. every
4. yet

5 Exercise 5

(a) Convert the following CFG into CG with basic categories $\{s, n, np\}$.

```
s --> np vp
vp --> iv
vp --> tv np
np --> pn
np --> det n
n --> adj n
det --> the, a
pn --> john, peter
n --> man, horse
iv --> walks, swears
tv --> eats, makes
adj --> green, big
```

(b) Try to find English expressions that may serve as example of expressions of the following categories:

1. $(np\backslash s)\backslash(np\backslash s)$
2. $((np\backslash s)\backslash(np\backslash s))/np$
3. $np\backslash(np/n)$
4. $(np\backslash s)/(n/n)$

what rules need to be added or modifier in the CFG above furs expressions to be incorporated?

6 Exercise 5

(a) Augment the lexical entries you have found in Ex. 4 with typed lambda terms. Observe the correspondence between categories and types. (The lexicon is repeated below.)

1. does
2. everybody
3. every
4. yet

(b) use the CG rule to parse the sentences below using both notations presented in class.

1. "A student left"
2. "A tall student "
3. "John doesn't leave"