

Assignment 6

Readings: Glance through chapter 10 and read chapter 11.1-11.2 in Jurafsky-Martin.

Instructions: No coding is necessary this time. Pass the assignment by writing your solutions on paper, and explaining them to the TA during lab time.

Problems:

1. Find all the syntax trees derivable from the sentence “*He built the shed with a hammer in the yard behind the house*”, and the grammar:

S	→	NP VP	Pron	→	he
NP	→	Pron	Verb	→	built
NP	→	Det Noun	Prep	→	with
NP	→	Det Noun PP	Prep	→	in
VP	→	Verb NP	Prep	→	behind
VP	→	Verb NP PP	Noun	→	hammer
PP	→	Prep NP	Noun	→	shed
Det	→	the	Noun	→	yard
Det	→	a	Noun	→	house

For each tree, explain what a semantically sensible interpretation of the tree might be (if there is a sensible interpretation). In particular: Where is the shed? Where is the hammer? Where is the yard?

2. Consider the grammar:

S	→	NP VP	PP	→	Prep NP
S	→	VP NP	Noun	→	time
NP	→	Noun	Noun	→	flies
NP	→	Det Noun	Noun	→	arrow
NP	→	Noun Noun	Verb	→	time
NP	→	Noun PP	Verb	→	flies
VP	→	Verb	Verb	→	like
VP	→	Verb NP	Prep	→	like
VP	→	Verb PP	Det	→	an

- (a) Convert the grammar into a weakly equivalent Chomsky normal form grammar.
- (b) Using your new grammar, use the CKY algorithm to parse the sentence “*time flies like an arrow*”. Show your completed parse table as result.
- (c) How many correct analyses of the sentence can you find? Explain how you can retrieve these analyses from the parse table.
- (d) Draw the syntax trees corresponding to your analyses in (c).