

**Name:**

**(You may work in pairs)**

## **Parsing in Prolog C'td**

### ***Tutorial 3***

#### **The Parser Files**

- Copy with the files from:  
/proj/courses/comppsy/Tutorial3  
or download from the course web-page.

#### **Extending the grammar**

In this tutorial we will extend the grammar we have been using with the left-corner parser, to cover the major (local and global) syntactic ambiguities discussed in class:

A. NP/VP Attachment Ambiguity:

“The cat [saw [the dog] [with the binoculars]]”

“The cat saw [the dog [with the bowl]]”

B. NP/S Complement Attachment Ambiguity:

“The man [realised [his goals]] yesterday”

“The man realised [[his goals] were unattainable]”

“The man realised that [[his goals] were unattainable]”

C. Clause-boundary Ambiguity:

“Since the man [reads [the book]] [the article was easy]”

“Since the man reads [[the book] was easy]”

D. Reduced Relative-Main Clause Ambiguity:

“[[The man [delivered the junkmail yesterday]]”

“[[The man [delivered the junkmail]] read it]”

“[[The man who was [delivered the junkmail]] read it]”

We will then examine the behavior of the parser, to see how serial backtracking works, and how well (or not) it captures human behavior.

**Note:** in the prolog file, the above sentences (and partial grammar), use common lexical items to reduce the grammar size.

#### **1. The PP-Attachment Ambiguity: NP vs. VP**

Look at the grammar and lexicon, and determine what kind of syntactic structure is can account for. Now, based on the syntax trees you've been given, what rules and lexical entries do you need to add to parse the sentences in A:

(REMEMBER: Our LC-Parser can only have binary branching rules (exactly two, categories on the RHS). What are the implications for your NP and VP attachment rules?)

Test the parser. Can you get it to generate both attachments of the PP. If not, why not? Can you change the grammar or parser to prefer the alternative parse? Note: “write” commands have been added in the parser (like we have to output the stack), so you can see what rules are being attempted (without doing a full trace).

## **2. The NP/S Complement Ambiguity**

Make sure the grammar can parse all three example sentences. You’ll need a rule that enables the “that” to appear at the beginning of the complement clause. What initial attachment does your parser attempt for the determiner following the main verb? Why? How might you change this preference?

## **3. The NP/Z (clause boundary) Ambiguity**

Again, extend the grammar to permit this local ambiguity, giving your rules below. Again, which attachment does your parser prefer for the NP following the first Verb. Does this reflect the human preference? (Hint: You can’t write unary-branching rules for this parser).

## **4. The Reduced-Relative Ambiguity**

Again, extend the grammar to permit this local ambiguity, giving your rules below. What attachment does your parser prefer for the first verb? Does this reflect the human preference?