Syntactic Theory
Tree-Adjoining Grammar (TAG)

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Outline

Linguistic Relevance of TAG

Variants of TAG
Two Important Properties of TAG

- Elementary trees can be of arbitrary size, so the domain of locality is increased
  → Extended domain of locality (EDL)
- Small initial trees can have multiple adjunctions inserted within them, so what are normally considered non-local phenomena are treated locally
  → Factoring recursion from the domain of dependency (FRD)
The lexical entry for a verb like “loves” will contain a tree like the following:

With **EDL**, we can easily state agreement between the subject and the verb in a lexical entry.
Compare the corresponding CFG rules: agreement has to be transferred between at least three different rules:

- $S \rightarrow NP_{3.sg} \ VP_{3.sg}$
- $VP_{3.sg} \rightarrow V_{3.sg} \ NP$
- $V_{3.sg} \rightarrow loves$
This lexical entry of “read” will license strings like “the book I read”
The above trees allow the insertion of the auxiliary tree in between the WH-phrase and its extraction site, resulting a long distance dependency; yet this is factored out from the domain of locality in TAG
An Extended Example

(On the whiteboard)
Outline

Linguistic Relevance of TAG

Variants of TAG
A simple way is to associate feature structures with the nodes of the elementary trees. The operations of substitution and adjoining are defined in terms of unifications of appropriate feature structures.

All the feature structures are fully specified. Adjoining operation creates a new structure that does not maintain all of the properties in the original structures.
Each internal node is viewed as a pair of quasi nodes, called top and bottom.

Feature structures are associated with quasi nodes.

Substitution and adjoining operations are defined to unify these feature structures into the new tree.
Adjoining Operation in FTAG
Substitution Operation in FTAG

\[ f_s \sqcup f_r \]
Obligatory Adjunction (OA) can be specified by a pair of quasi nodes with incompatible feature structures.
Adjunction is not possible if any of the two feature structure unifications fails.

```
S[^tense +]
   |         |
 NP   VP
   |         |
 V    NP
     |         |
 met

S[^tense +]
   |         |
 NP   VP
   |         |
 V    S^*[^tense <1> +]
     |         |
 thinks
```

```
Tree-adjoining grammars.