Constituency Parsing

- Tree-structured syntactic analyses of sentences
- *Constituents:* (S)entence, (N)oun (P)hrases, (V)erb (P)hrases, (P)repositional (P)hrases, and more
- Bottom layer is POS tags
- Examples will be in English. Constituency makes sense for a lot of languages but not all

Syntax

- Study of word order and how words form sentences
- Why do we care about syntax?
  - Multiple interpretations of words (noun or verb? *Fed raises*... example)
  - Recognize verb-argument structures (who is doing what to whom?)
  - Higher level of abstraction beyond words: some languages are SVO, some are VSO, some are SOV, parsing can canonicalize

```
NP  VP
  PRP  VBP  IN
   She  ran  to
  DT  NP
   the  building
```

```
S
  NP  PRP
   She  that
  VBD  IN
   told  to
  DT  NP
   the  building
```
Challenges

Modifier scope:

```
NP  
  NP
  JJ NN NN
plastic cup holder
```

Complement structure:

*The students complained to the professor that they didn’t understand*

Coordination scope:

*The man picked up his hammer and saw*

*compare: The man picked up his hammer and swung [Eisenstein book]*

Challenges

PP attachment

```
S
  VP
  VP PP
  NP
  IN NP
  DT NNS
  The children
  ate NP IN NP
  DT NN
  the cake with a spoon
```

same parse as “the cake with some icing”

Constituency

- How do we know what the constituents are?
- Constituency tests:
  - Substitution by proform (e.g., pronoun, did so)
  - Clefting (It was with a spoon that…)
  - Answer ellipsis (What did they eat? the cake) (How? with a spoon)
  - Sometimes constituency is not clear, e.g., coordination: she went to and bought food at the store