Constituency Parsing

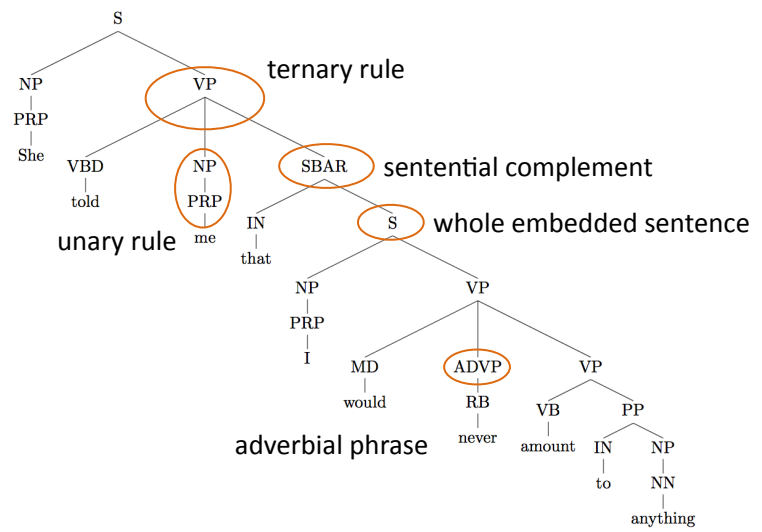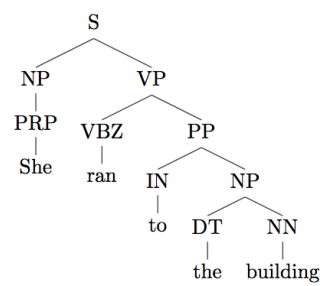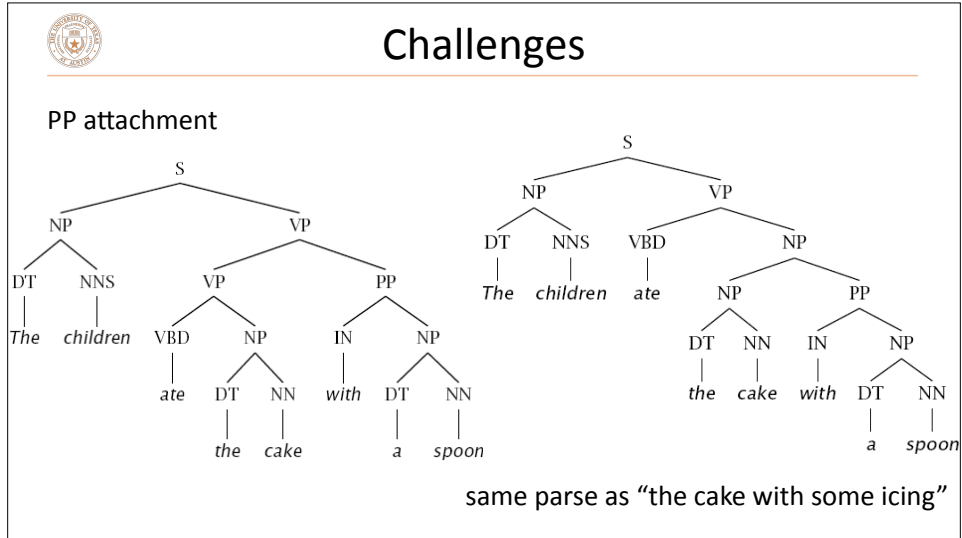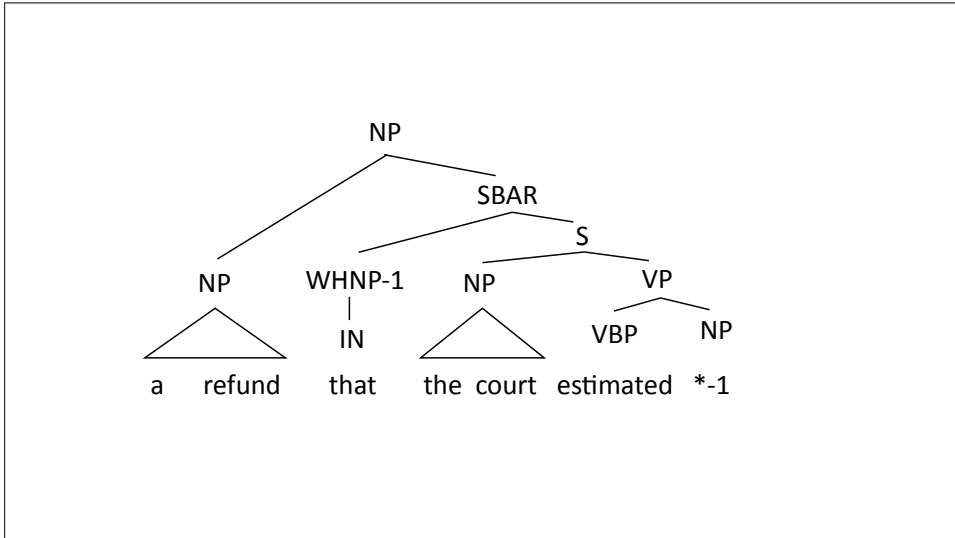
- Study of word order and how words form sentences

- 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

---

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

---

ternary rule

sentential complement

whole embedded sentence

unary rule

adverbial phrase

(top-left slide)

NP

NP — SBAR — S

NP   WHNP-1   NP   VP

IN   VBP   NP

a   refund   that   the court   estimated   *-1

Challenges

PP attachment

S

NP — VP

DT   NNS

The   children

VP   PP

VBD   NP   IN   NP

ate   DT   NN   with   DT   NN

the   cake   a   spoon

NP

DT   NN

the   cake

NP

a   spoon

S

NP — VP

DT   NNS   VBD   NP

The   children   ate

NP   PP

DT   NN   IN   NP

the   cake   with   DT   NN

a   spoon

NP

DT   NN

a   spoon

same parse as "the cake with some icing"

Challenges

Modifier scope:

NP

NP

JJ   NN   NN

plastic cup holder

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]

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*

S

NP — VP

DT   NNS

The   children

VP   PP

VBD   NP   IN   NP

ate   DT   NN   with   DT   NN

the   cake   a   spoon