Topics: more on the challenge of natural language processing (NLP); evidence for complex structure within sentences.

I. Example application: sentiment analysis

  1. (a) This laptop is <u>a great deal</u>.

      (b) <u>A great deal</u> of media attention surrounded the release of the new laptop.

      (c) If you think this laptop is <u>a great deal</u>, I've got a nice bridge you might be interested in.

  2. This film should be <u>brilliant</u>. It sounds like a <u>great</u> plot, the actors are <u>first grade</u>, and the supporting cast is <u>good</u> as well, and Stallone is attempting to deliver a <u>good</u> performance. However, it can't hold up.

II. The importance of recognizing intentions

From Grishman (1986), pg. 157. We imagine that A is a human traveller, and B is some sort of speech-enabled automated kiosk system.

    A: Do you know when the train to Boston leaves?
    B: Yes.
    A: I want to know when the train to Boston leaves.
    B: I understand.

## III. Examples of attachment ambiguity

  1. "List all flights on Tuesday."

  2. "List all flights on the double."

  3. "Copy the local patient files to disk."

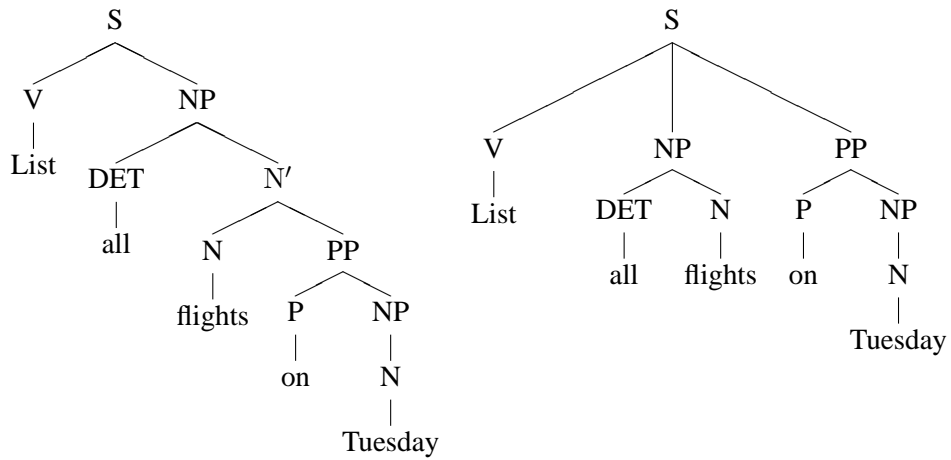## IV. A highly ambiguous sentence

"I saw her duck with a telescope."

Note: many interpretations are possible, but these do *not* correspond to *all* possible combinations of possible interpretations of the various "sub-units" of the sentence. (We will not discuss in depth theories that account for this "non-combinatorial explosion".)

V. Tree representation of possible syntactic analyses, reduced form Here, arguments of or modifiers to an item are shown in a sibling relationship with the item in question.

```
      List
         \
          all
             \
              flights   on Tuesday
```

```
        List   all flights   on Tuesday
```
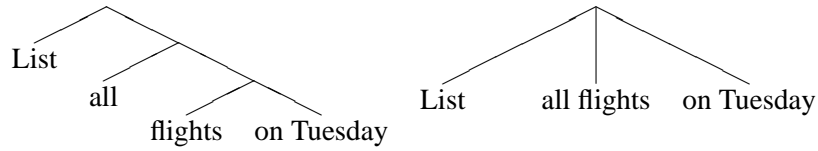
VI. An alternative representation with constituent labels Other analyses are possible (and indeed, current theories vary).

```
              S
            /   \
          V      NP
          |     /  \
        List  DET   N′
              |    /  \
             all  N    PP
                  |   /  \
              flights P   NP
                      |    |
                     on    N
                           |
                        Tuesday
```

```
           S
         / | \
        V  NP   PP
        |  / \  / \
      List DET N P  NP
           |   | |   |
          all flights on N
                          |
                       Tuesday
```

NP=noun phrase; VP=verb phrase; PP=prepositional phrase. N′ (pronounced "N-bar") is a "bare noun phrase". The labels just above the leaves represent parts of speech (POS); DET=determiner.