# LING/C SC 581:
## Advanced Computational Linguistics

Lecture 13

# Today's Topics

*Did everyone manage to install the structural probes program?*

- Case study: a variety of passives

**Reminder**:

- Homework 6
  - due next Monday midnight

# Passives

- **Examples**:
  1. John was arrested
  2. Who was arrested
  3. John was believed to have been arrested     (*exceptional passivization*)
  4. It is believed that John was arrested
  5. That John was arrested is believed by everyone
  6. John had insults shouted at him                    (*indirect passive*,  Emonds 2007)

# Passives

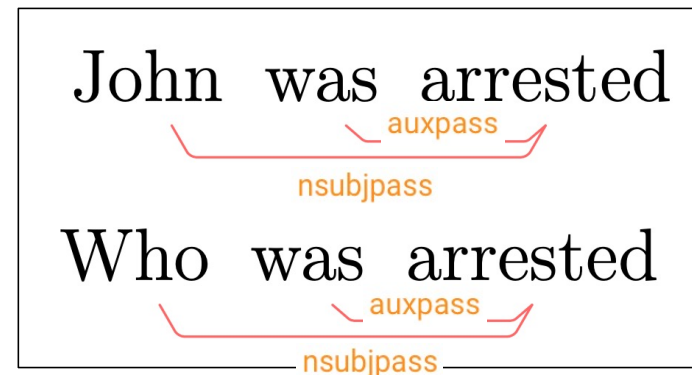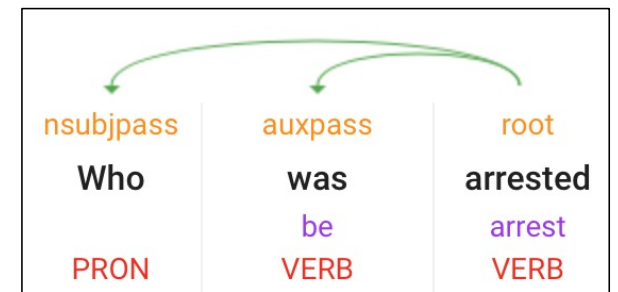- **Examples**:
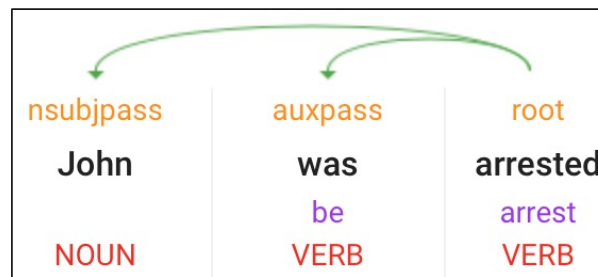  1. John was arrested
  2. Who was arrested

- SP program:

```
printf "John was arrested\nWho was arrested" | python3 structural-
probes/run_demo.py example/demo-bert.yaml
Constructing TwoWordPSDProbe
Constructing OneWordPSDProbe
[demoing]: 2it [00:01,  1.58it/s]
```
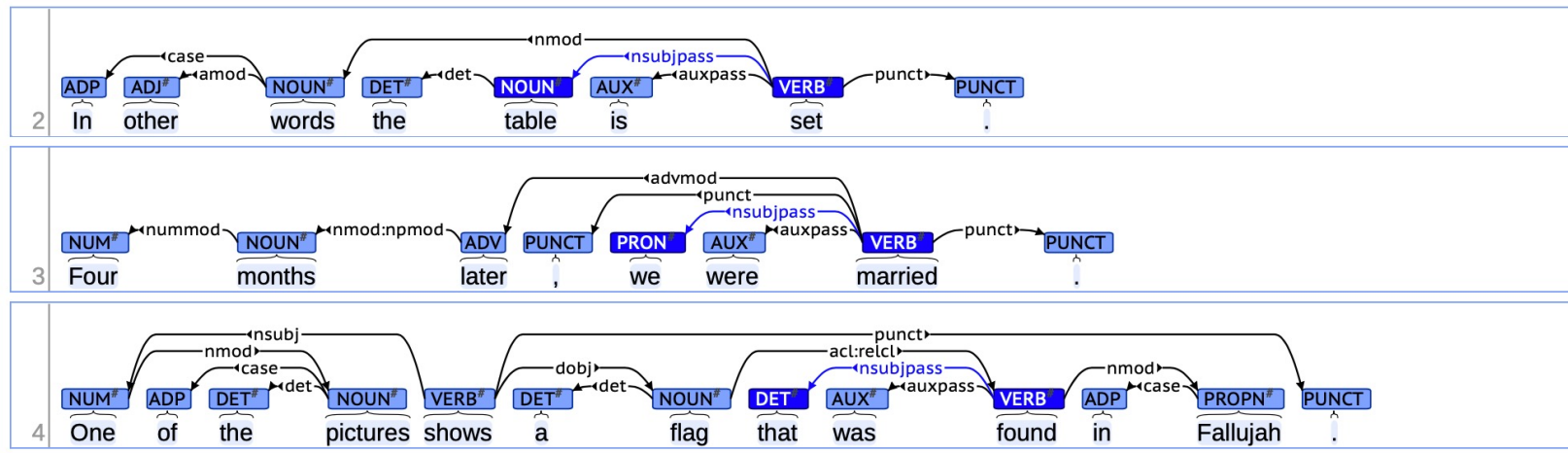
# nsubjpass

## Treebank Statistics (UD_English)

This relation is universal.

1402 nodes (1%) are attached to their parents as `nsubjpass`.

1365 instances of `nsubjpass` (97%) are right-to-left (child precedes parent). Average distance between parent and child is 3.84022824536377.

The following 11 pairs of parts of speech are connected with `nsubjpass`: VERB - NOUN (713; 51% instances), VERB - PRON (415; 30% instances), VERB - DET (118; 8% instances), VERB - PROPN (112; 8% instances), ADJ - NOUN (12; 1% instances), VERB - ADJ (10; 1% instances), ADJ - PRON (7; 0% instances), VERB - SYM (5; 0% instances), VERB - NUM (4; 0% instances), ADV - PRON (3; 0% instances), NOUN - PRON (3; 0% instances).

# Passives

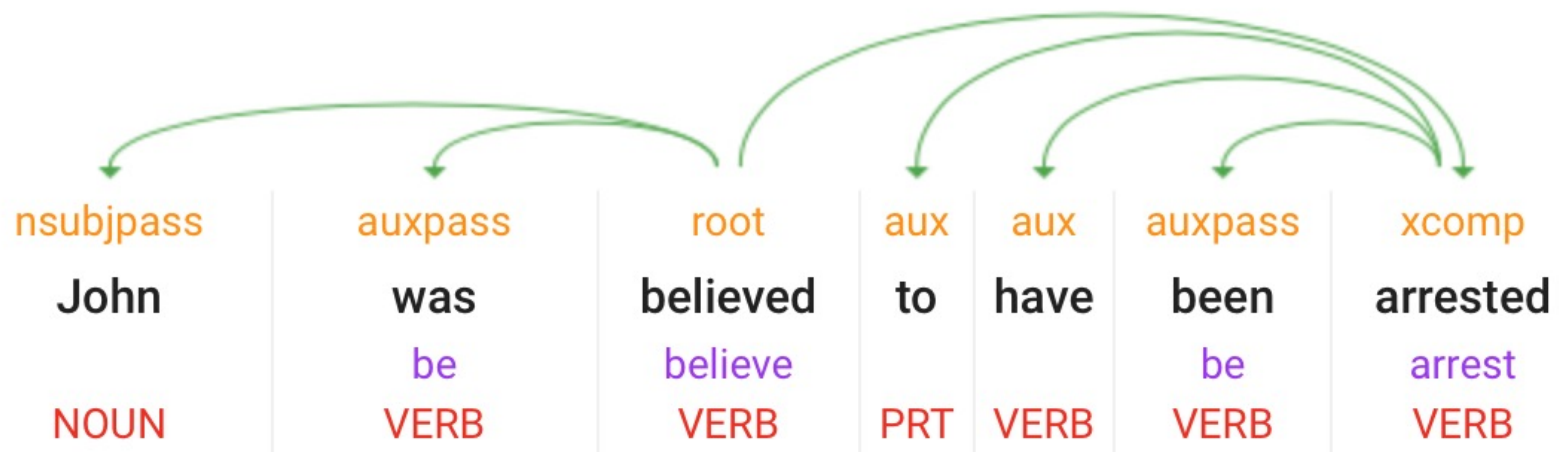3. John was believed to have been arrested     (*exceptional passivization*)

# Passives

# Passives

3.  John was believed to have been arrested     (*exceptional passivization*)
4.  **It is believed that John was arrested**
5.  That John was arrested is believed by everyone
6.  John had insults shouted at him       (*indirect passive*,  Emonds 2007)
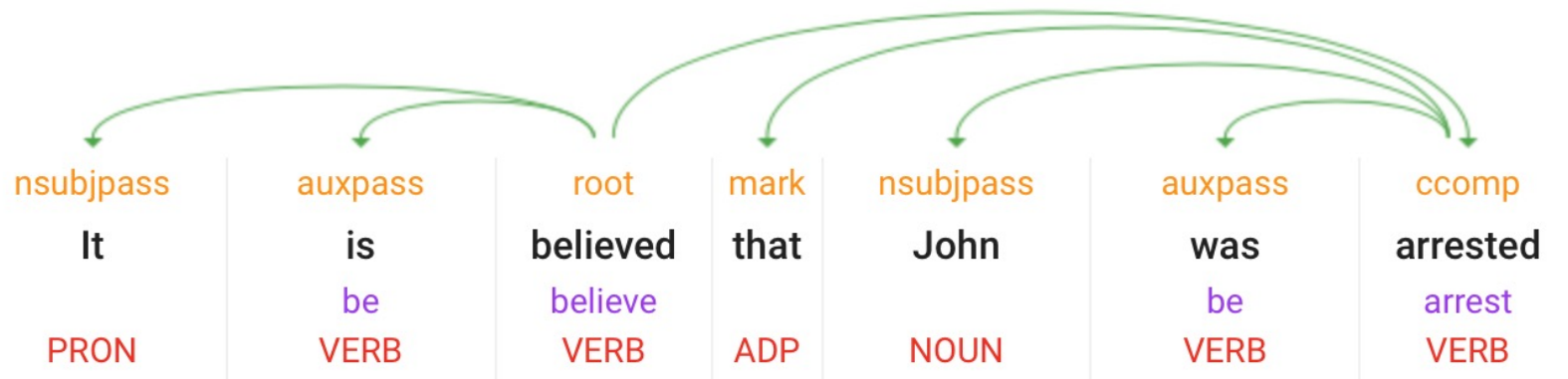
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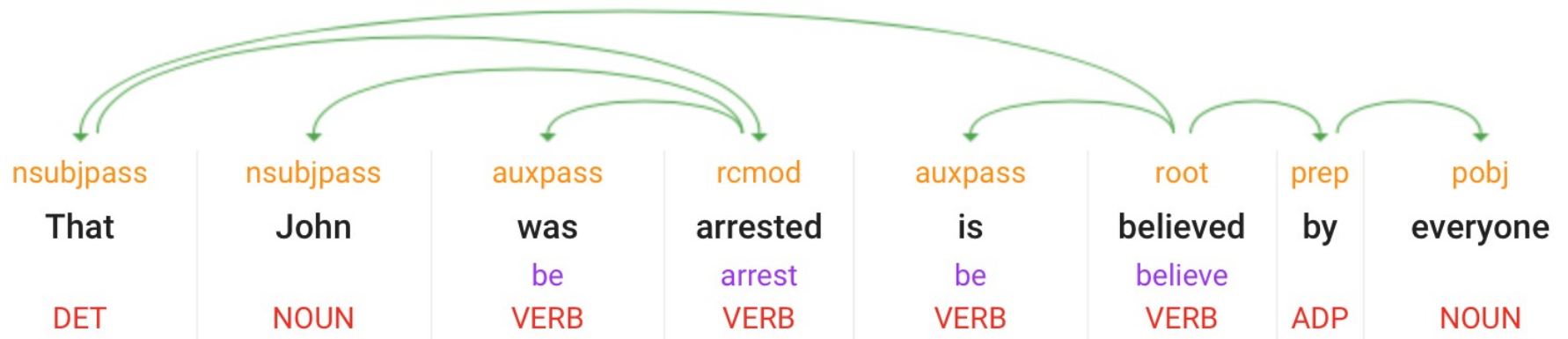
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# Passives

John had insults shouted at him

| nsubj | root | dobj | vmod | prep | pobj |
|-------|------|------|------|------|------|
| **John** | **had** | **insults** | **shouted** | **at** | **him** |
| | have | insult | shout | | |
| NOUN | VERB | NOUN | VERB | ADP | PRON |