1. Syntactic Structure: Two Views(In the linguistic structure of human languages, there are two views)

1.1 Constituency Grammar (Phrase Structure, CFG)

Phrase structure, which is then represented in terms of **context-free grammars** (https://www.geeksforgeeks.org/theory-of-computation/what-is-context-free-grammar/)
(https://www.youtube.com/watch?v=SlSA9vEXCm4)
Phrase structure organises words into nested constituents.
Nearly all the words fall into a few basic classes representing their nature and how they behave in sentences. (nouns, adverbs, adjectives, etc.).

- **Organises words into nested constituents**:
  - Words → phrases → larger phrases
- **Parts of Speech (POS)** categories: noun, adjective, determiner, preposition, verb, etc.

Example:

```
the cuddly cat by the door
```

  - "the cuddly cat" → noun phrase (NP)
  - "by the door" → prepositional phrase (PP)
  - Combine to form a larger NP.

Starting unit: word

the, cat, cuddly, by, door

Words combine into phrases(Then once we've got words, we start putting them into bigger units, phrases.)

the cuddly cat, by the door

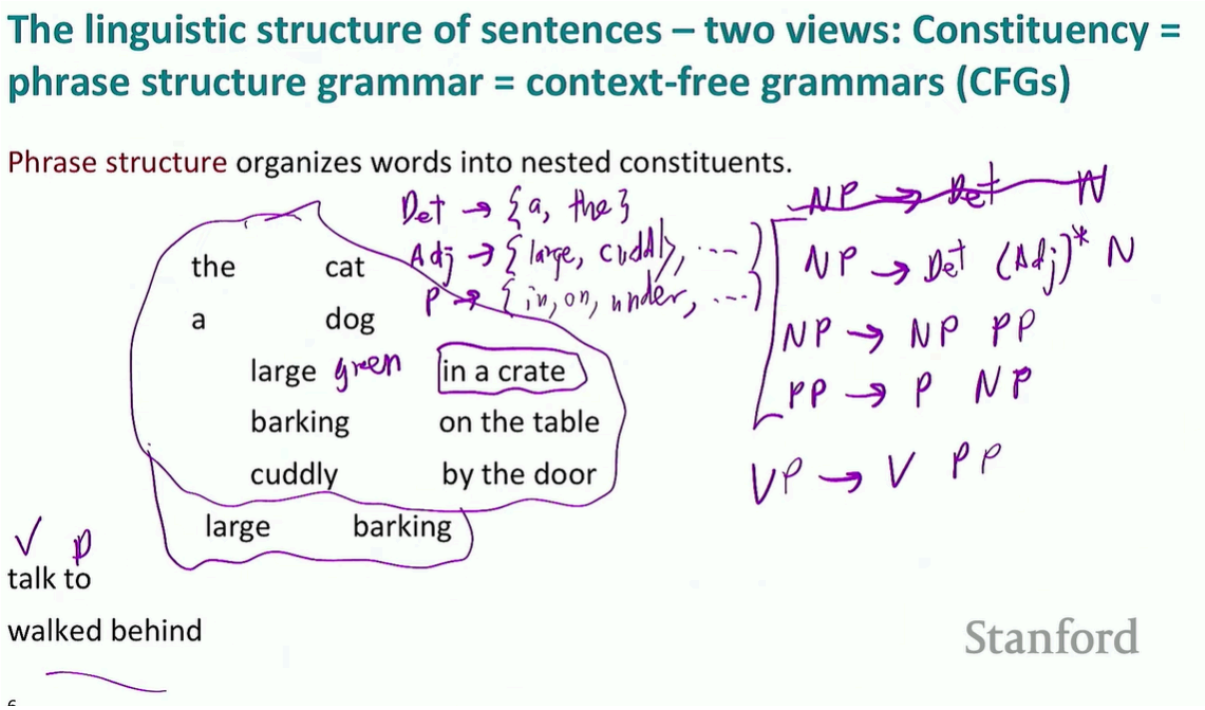
Phrases can combine into bigger phrases

the cuddly cat by the door

Some Rules (CFG form):

- `NP → Det N`
- `NP → Det Adj* N`
- `NP → NP PP`
- `PP → P NP`

We can construct a context-free grammar that represents the structure of English sentences.



Useful for generating **phrase structure trees**.

1.2 Dependency Grammar

Dependency structure means figuring out the main word (headword) in a sentence and identifying which words describe or modify it. Using this approach, we can see how words are connected and which ones depend on others.
In other words, the Dependency structure shows which words depend on (modify, attach to, or are arguments of) which other words.

- **Focuses on relations between words**:
    - **Head**: main word

    - **Dependent**: modifier or argument
- Represented as **directed arrows**: *head → dependent*.
- Usually forms a **tree**: single root, no cycles.
- Can be **typed**: e.g., `nsubj`, `obj`, `obl`, `amod`.

Example:

`Look in the large crate in the kitchen by the door`

    - `Look` is the head
    - `in` (modifies `look`), `crate` (object of `in`), `large` (modifies `crate`), etc.