

## - Properties of Natural languages (NLs)

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- Computational Linguistics
- Ambiguities in natural language

### NLs Properties

a) Productivity of NL {  
No. of phonemes in English = 46  
No. of messages that can be generated:  $\infty$  }

b) Discreteness: Cat +s  
Unskilled = un + skilled

c) Syntax:

the hits)  
with traps  
sham poos rock(s) some  
boys can]

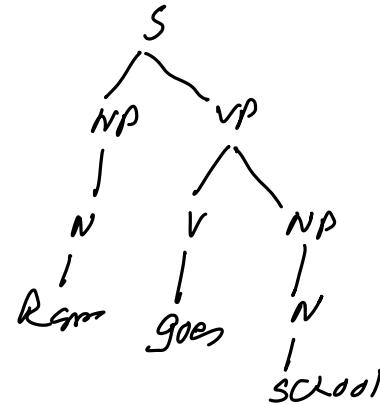
} no meaning without organization.

Arrange: The caned boys hit(s) some poos traps with sham rock(s).

d) Grammar of inference

Ram goes School.

How, the  
binding is grammatically  
correct. Grammatical.



$S \rightarrow NP\ VP, \ NP \rightarrow N, \ N \neq Ram/School$

$VP \rightarrow V\ NP, \ V \rightarrow goes$

What is meaning &  
How to represent it?

We associate predicate logic with parse tree:

goes(ram, School).  
goes(ram, goes(School)).

Parse Tree & Predicate Given meaning

Sentence =

Subject + Predicate,  
 Ram goes School.

## Computational Linguistics

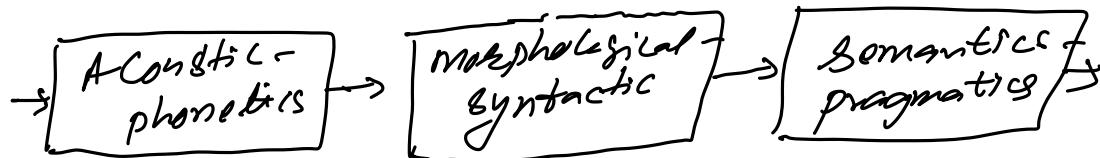
Language processing

divided into 3 areas:

- Acoustic-phonetics
- Morphological-syntactics
- Semantics-pragmatics

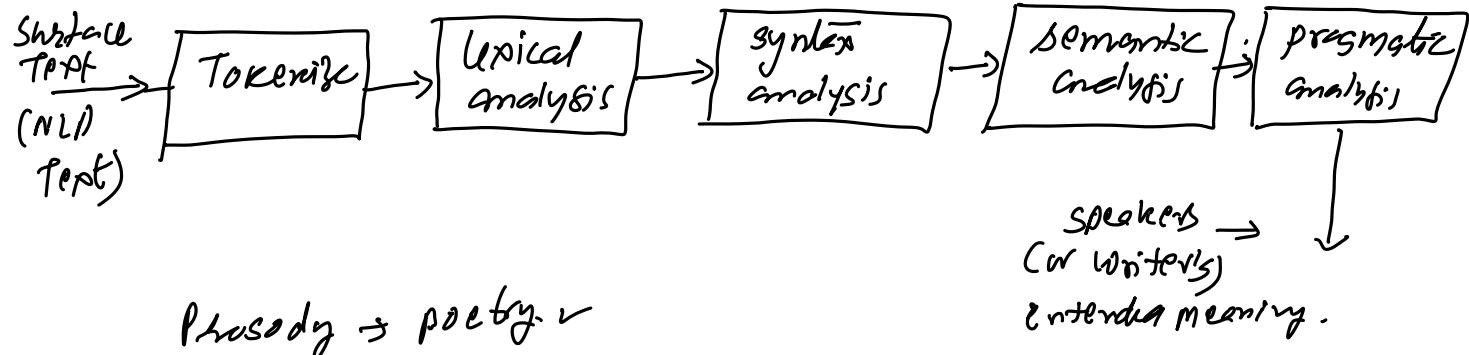
3 levels of

Linguistic analysis



- Knowledge
- phonological - relates sound & the word
  - morphological - lexical knowledge
  - syntactic - structure & grammar
  - pragmatics - how meaning differs due to context.
  - world - world knowledge ?

## Stages of Natural language processing:



## Ambiguities in natural languages:

- simple lexical Ambiguity - e.g. duck
  - duck
  - To escape (ducked)
- structured ambiguity
  - duck (bird) -  $\equiv$
  - V

"I saw man with telescope."  
(Who holds the telescope?)

- Semantic ambiguity, e.g. "go" has many meanings.
- Pragmatic ambiguity:  
c.f. Can you like the rock?  
Question / request
- Referential ambiguity:  
"Jack met Sam at station. He was feeling ill."  
(We need to resolve the reference 'He')

— x x x —

