



# Computational Linguistics (INF2820 — Stochastics)

$$P(S \rightarrow NP VP) = 1.0; P(NP \rightarrow Det N) = 0.6$$

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# Ambiguity Resolution Remains a (Major) Challenge

## The Problem

- With broad-coverage grammars, even moderately complex sentences typically have multiple analyses (tens or hundreds, rarely thousands);
- unlike in grammar writing, exhaustive parsing is useless for applications;
- identifying the ‘right’ (intended) analysis is an ‘AI-complete’ problem;
- inclusion of (non-grammatical) sortal constraints is generally undesirable.

## Typical Approaches

- Design and use statistical models to select among competing analyses;
  - for string  $S$ , some analyses  $T_i$  are more or less likely: maximize  $P(T_i|S)$ ;
- Probabilistic Context Free Grammar (PCFG) is a CFG plus probabilities.



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*Every time I fire a linguist, system performance improves.* (Fredrick Jelinek, 1980s)



# Basics of Probability Theory

