Earley Parsing in Prolog

Aleksandar L. Dimitrov

Universität Tübingen

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Outline

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- ... resulting in Self-Modifying Programs

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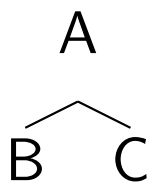
Minimalistic Example

Grammar:

A -> BC

A -> BCD

Input: BCD



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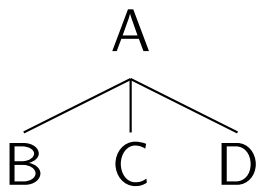

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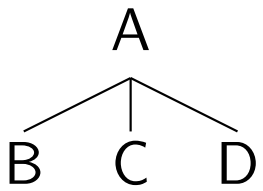

→ Solution: Dynamic Programming

Use of assert in this context

Our original TD parser:

```
parse(C,[Word|S],S) :-
word(C,Word).

parse(C,S1,S) :-
rule(C,Cs),
parselist(Cs,S1,S).
```

Use of assert in this context

Our new TD chart parser:

```
parse(C,[Word|S],S) :-
word(C,Word).

parse(C,S1,S) :- chart(C,S1,S).

parse(C,S1,S) :-
rule(C,Cs),
parselist(Cs,S1,S),
asserta(chart(C,S1,S)).
```

Earley's Algorithm

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- Let's see an example...

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- . . . make an *exhaustive* search on their current domain
- . . . store everything they find on the main chart
- . . . but first operate on what they found themselves (`asserta`)
- All of them rely on `store/3`

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The `store` predicate

- Consider $NP \longrightarrow NP\ Conj\ NP$
- How does Earley avoid left recursion?
- `store` doesn't store anything that's already there!
- But how do we parse recursive structures such as *The dog and the cat and the elephant*?

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- What about Method 2?