Dependency Parsing

COMP3361 — Week 7

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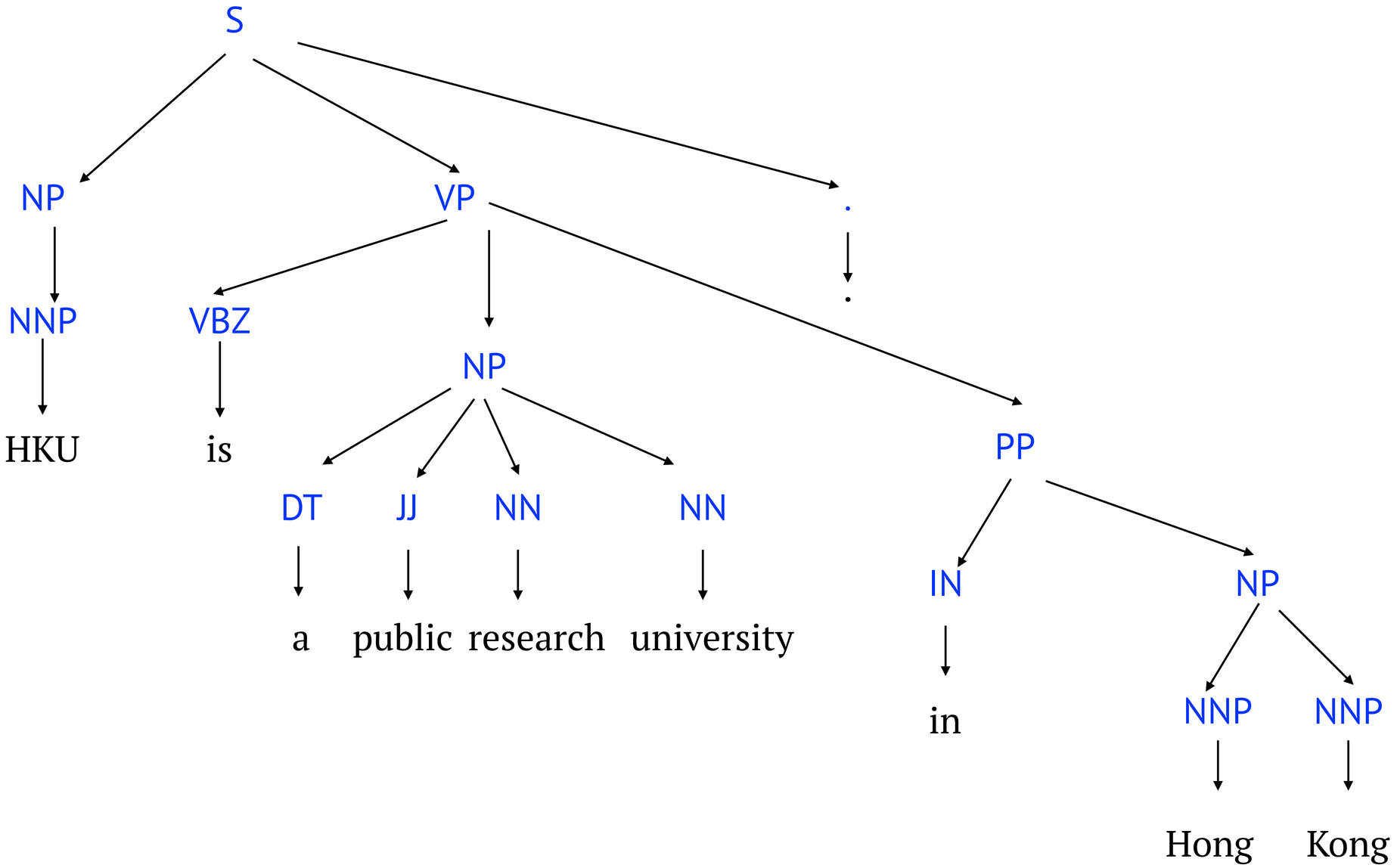
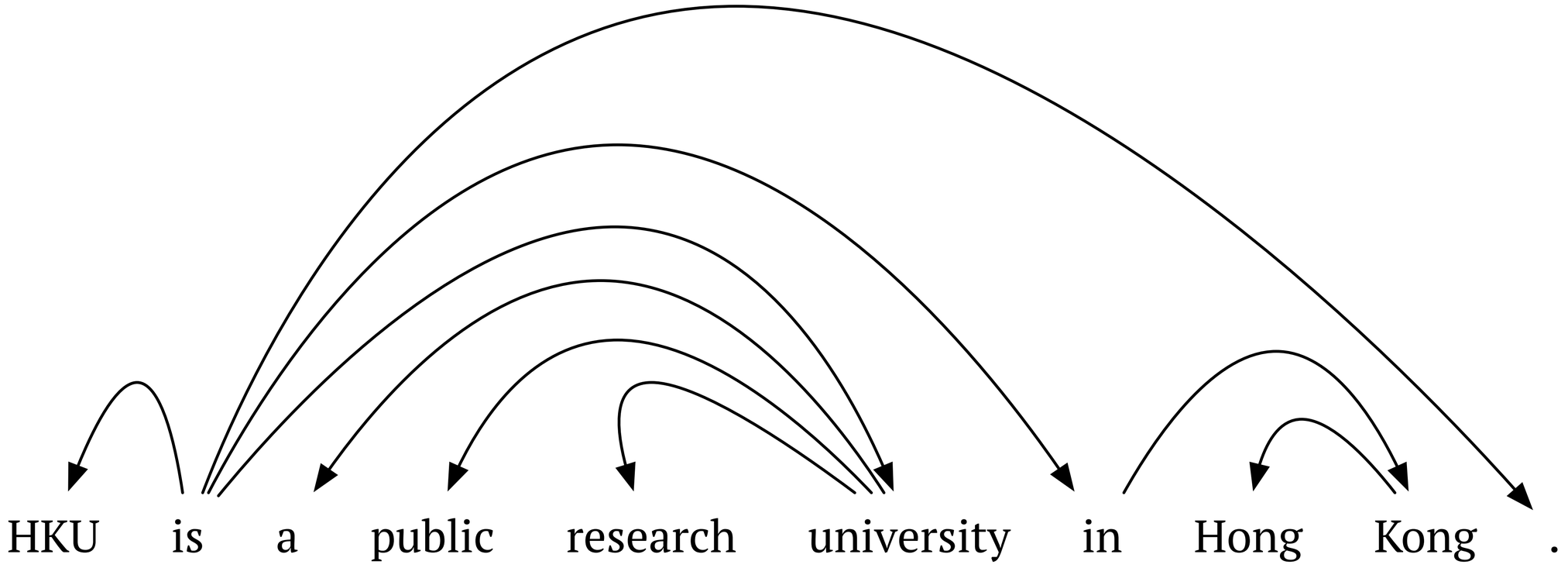
Department of Computer Science, The University of Hong Kong

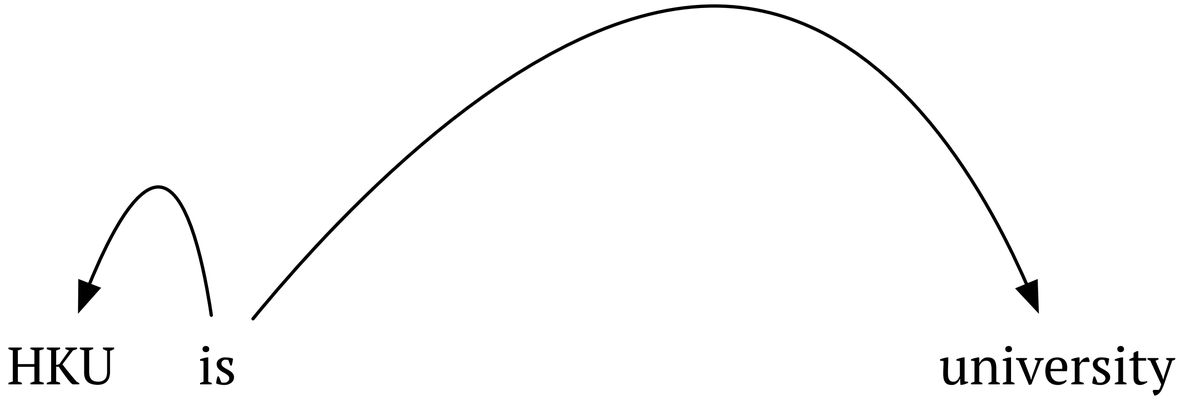
Phrase-structure Parsing

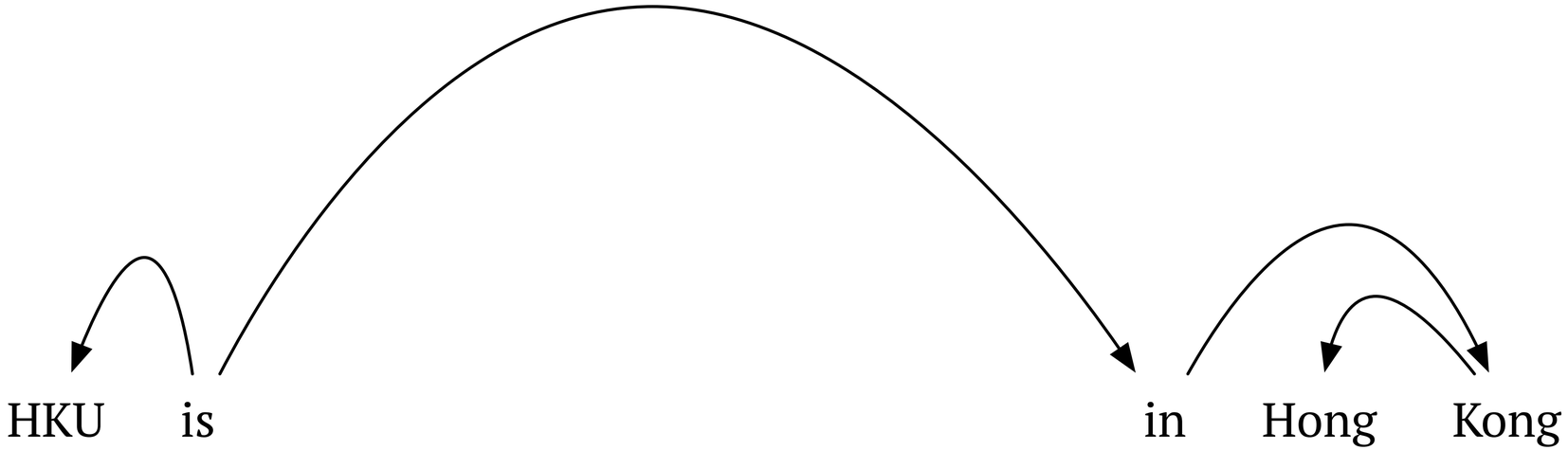


Dependency Parsing

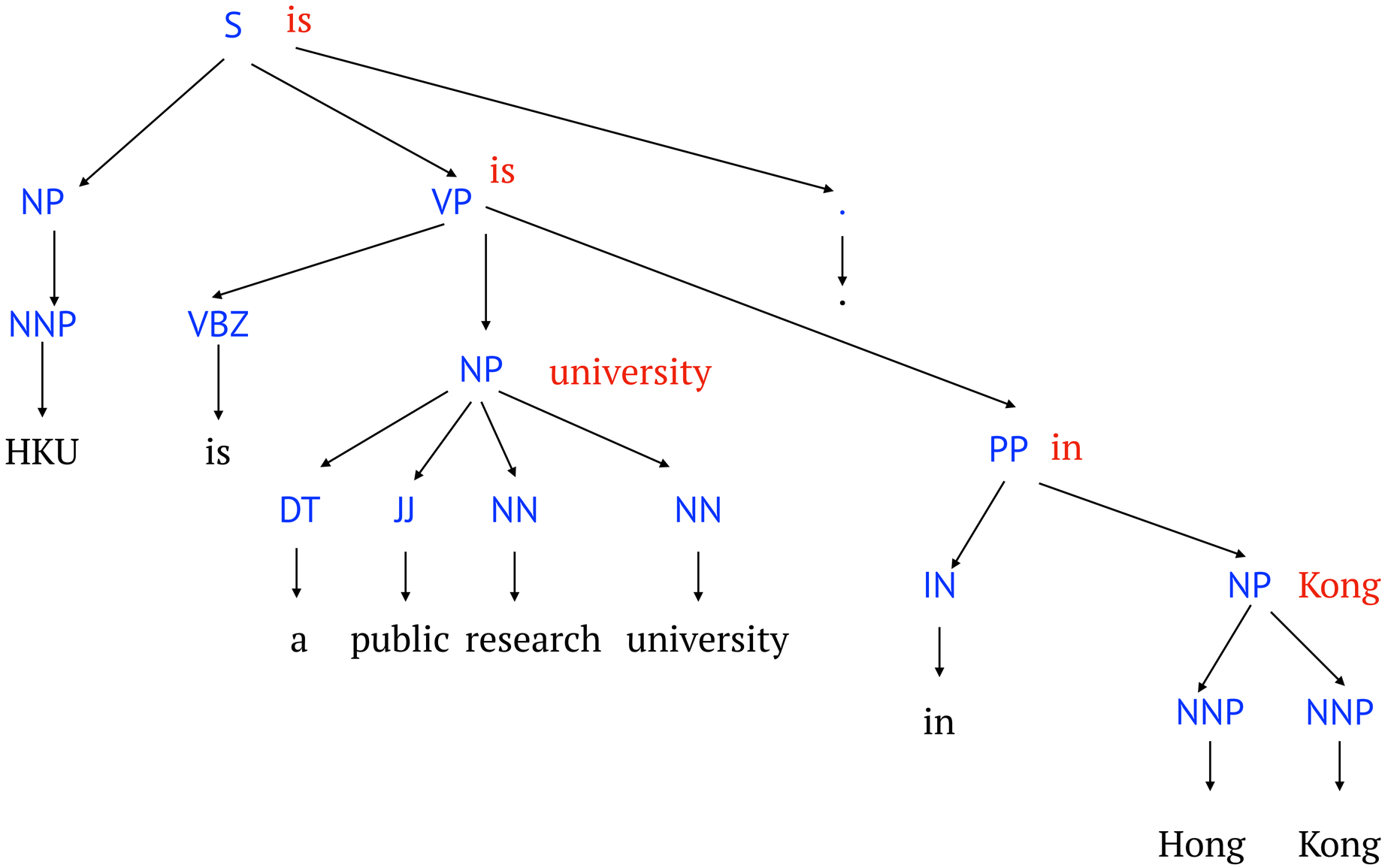


Dependency Parsing

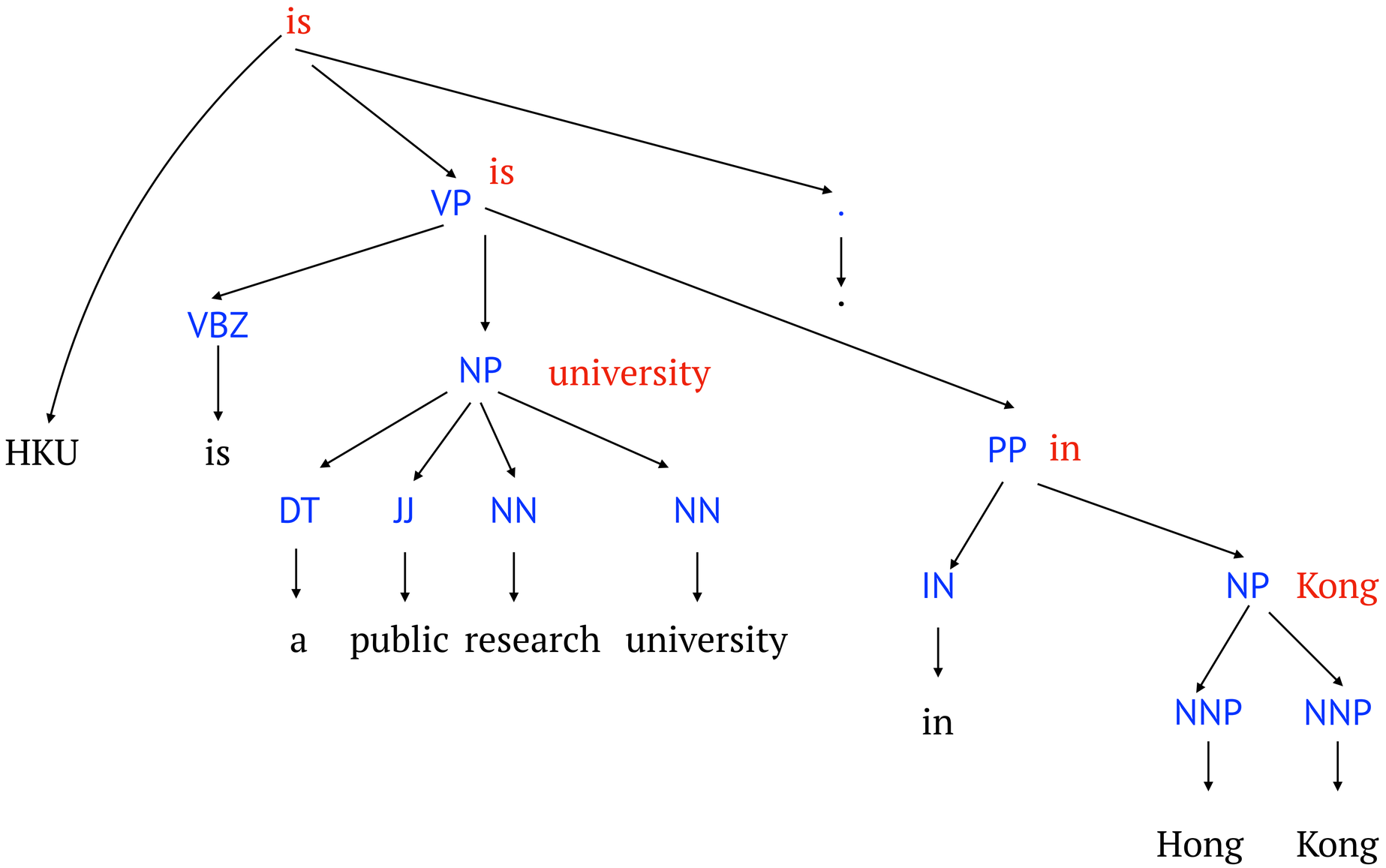




Phrase-structure -> Dependency



Phrase-structure -> Dependency

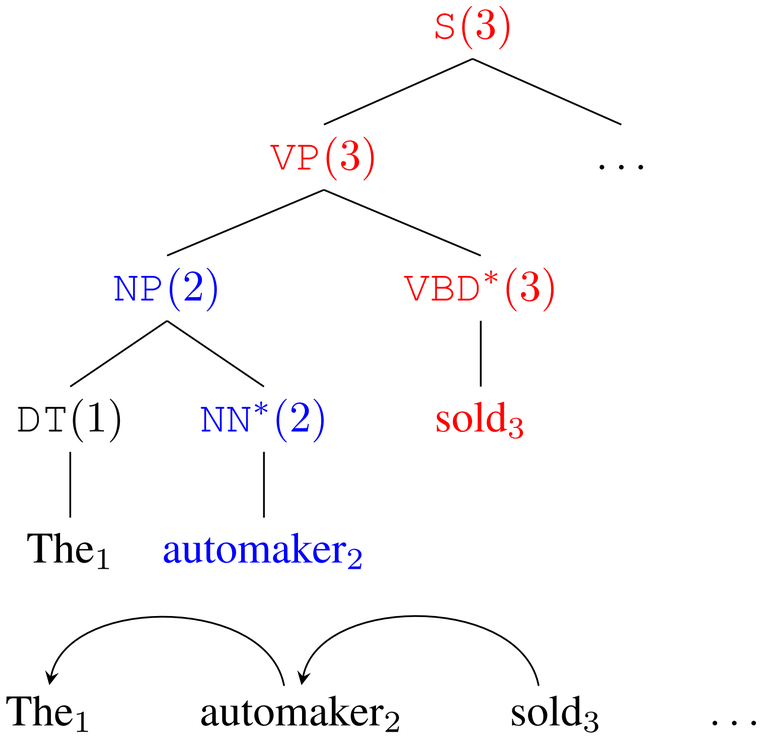


Phrase-structure -> Dependency

One-to-one mapping with head rules.

Possibly many different head rules —
Stanford Dependencies, YM Dependencies.

Easy, deterministic.



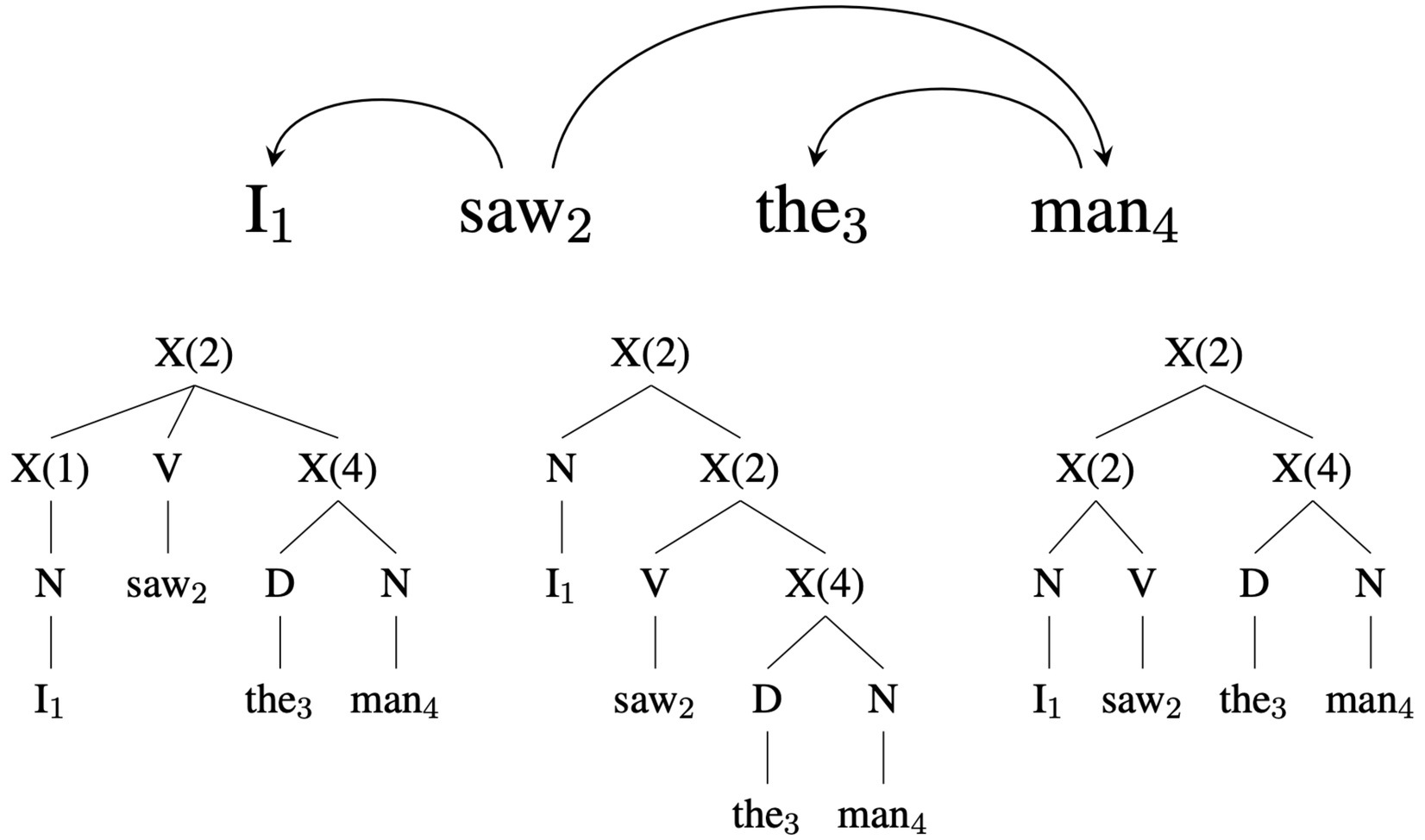
VP —> NP VBD

NP —> DT NN

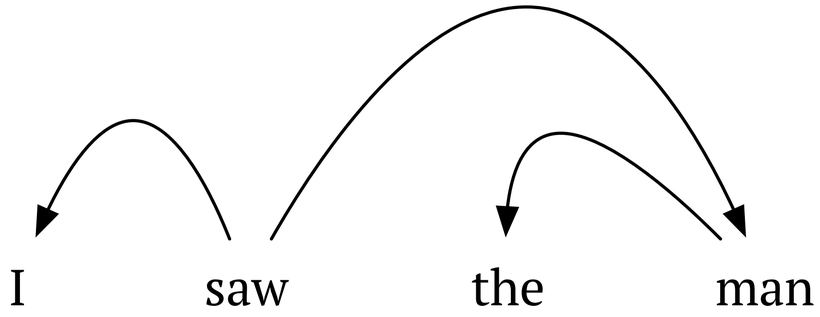
...

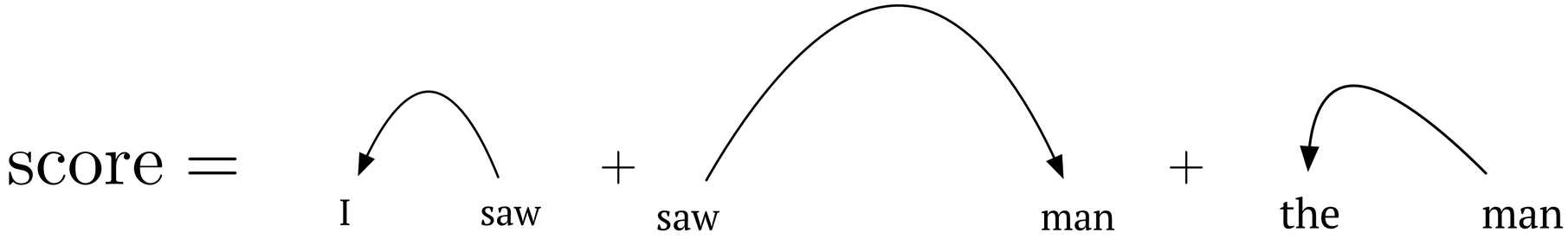
(Collins, 2003; De Marneffe and Manning, 2008; Yamada and Matsumoto, 2003; Johansson and Nugues, 2007)

Dependency -> Phrase Structure



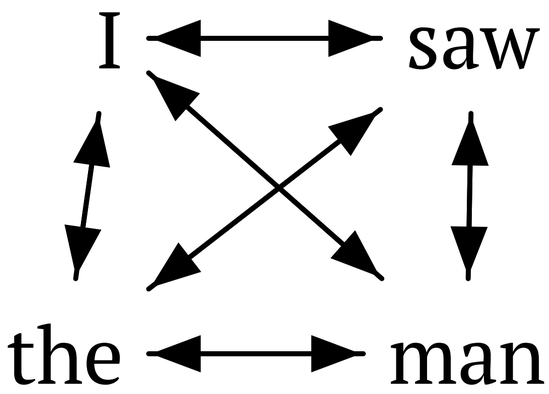
Dependency Parsing (Graph Based)

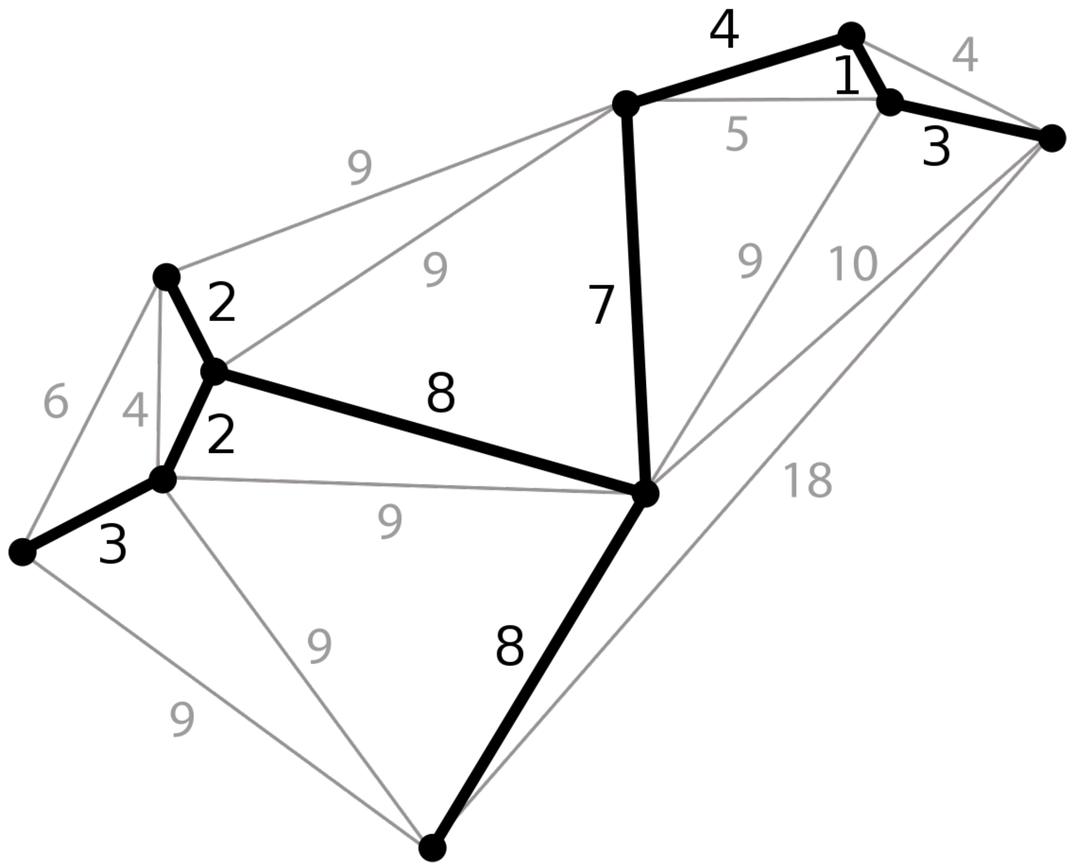




arc-factored model

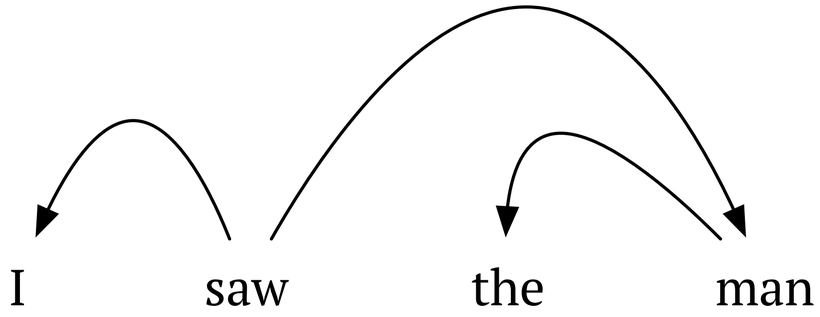
Dependency Parsing (Graph Based)

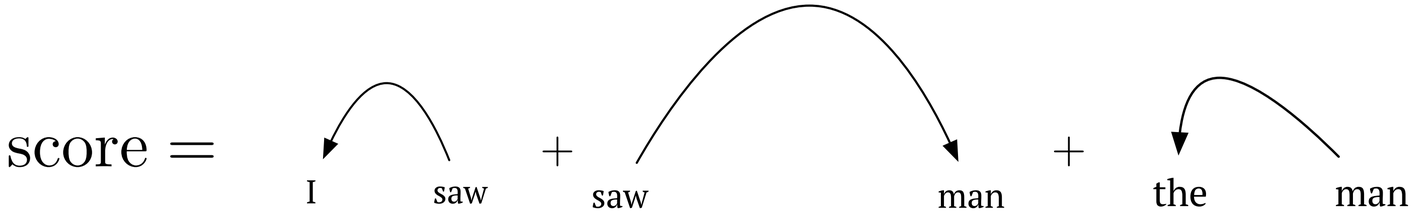




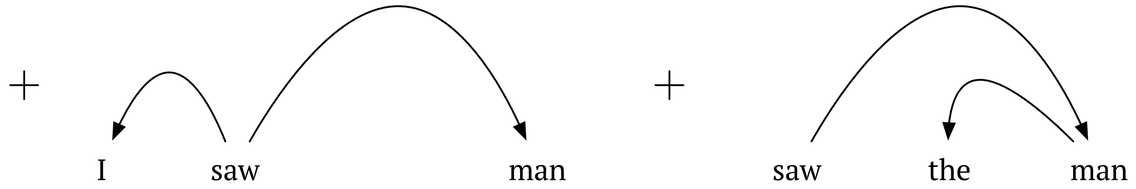
Chu–Liu/Edmonds' algorithm
(maximum spanning tree)

Dependency Parsing (Graph Based)





arcs



siblings

grandchild

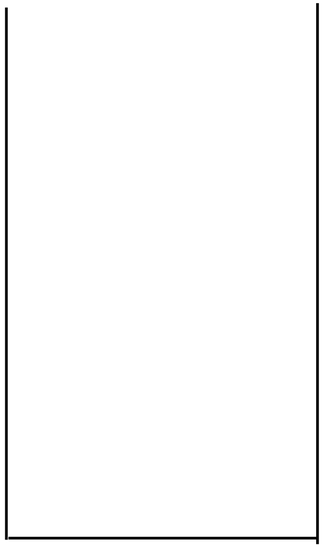
higher order features
in dependency parsing

Dependency Parsing (Transition Based)

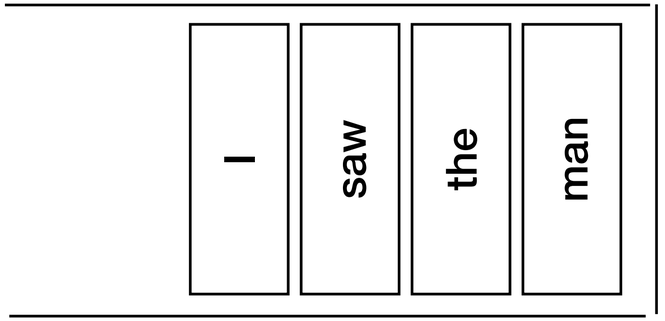
Shift

Left-Arc

Right-Arc



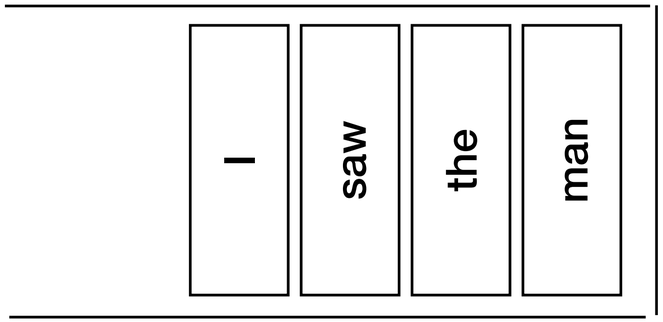
Stack



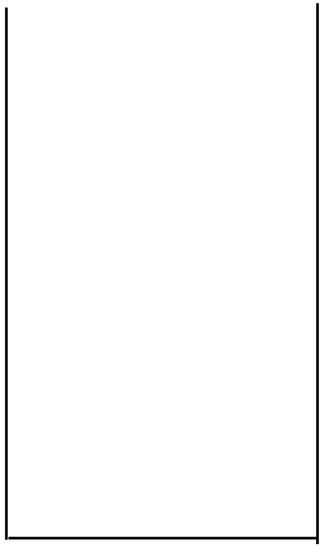
Buffer

Dependency Parsing (Transition Based)

Shift



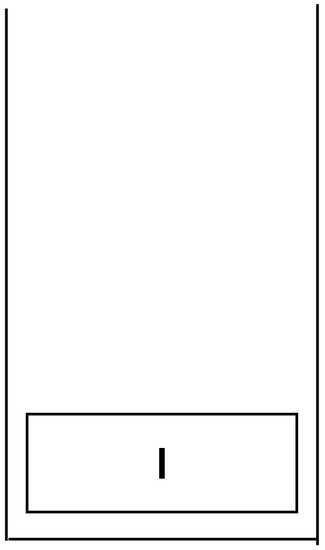
Buffer



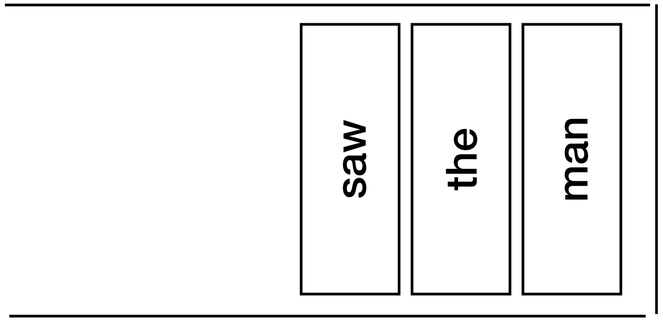
Stack

Dependency Parsing (Transition Based)

Left-arc



Stack



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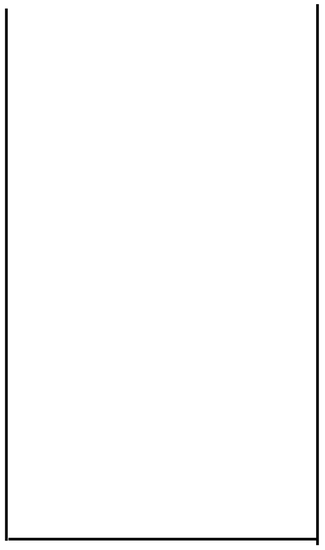
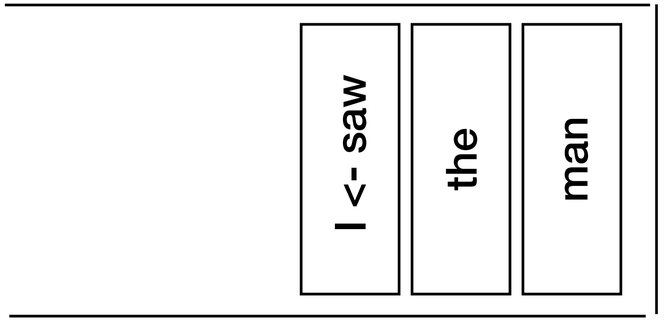


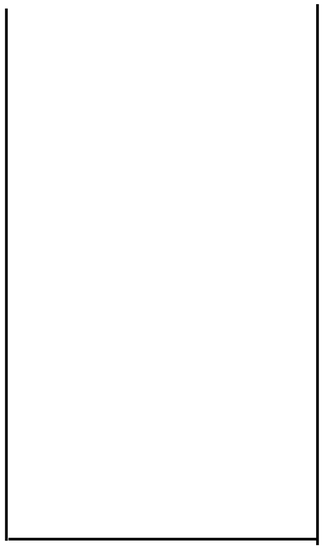
Stack



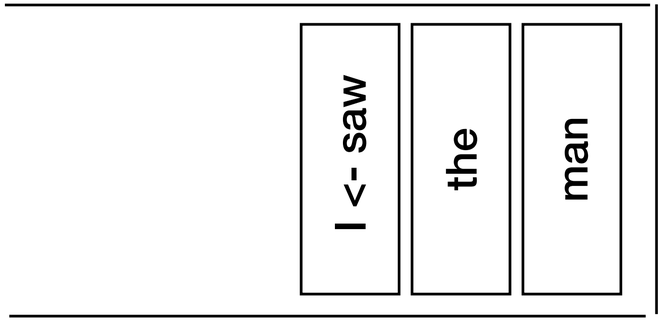
Buffer

Dependency Parsing (Transition Based)

Shift



Stack



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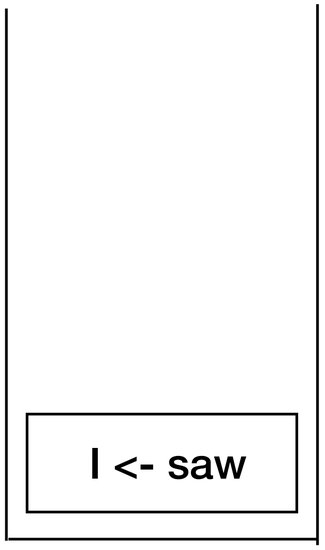
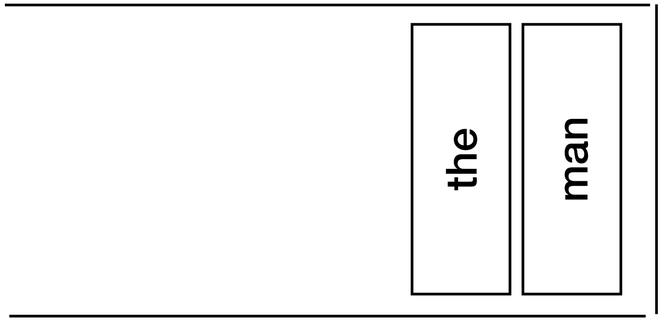


Stack



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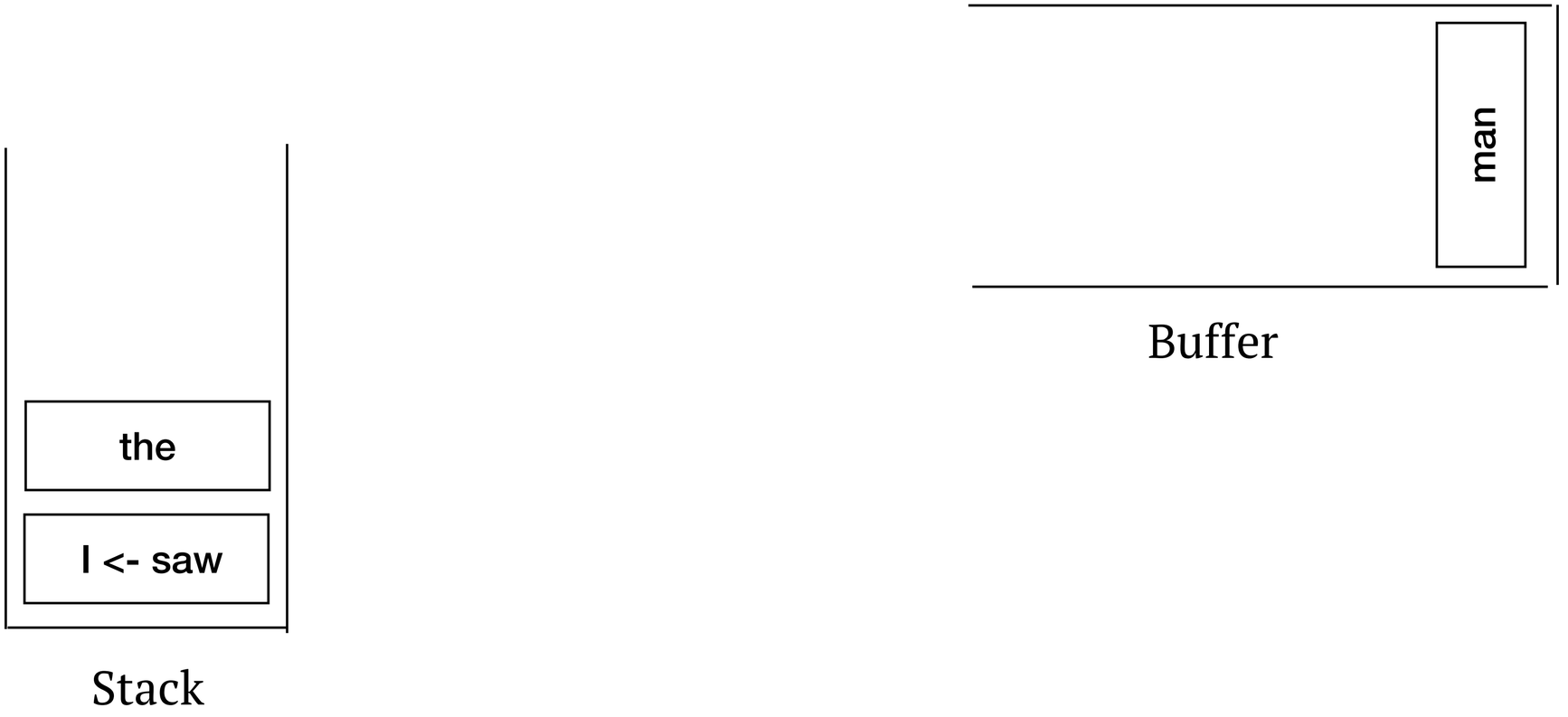
Dependency Parsing (Transition Based)

Shift

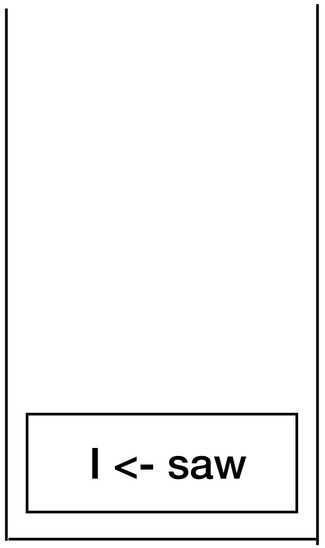
Dependency Parsing (Transition Based)



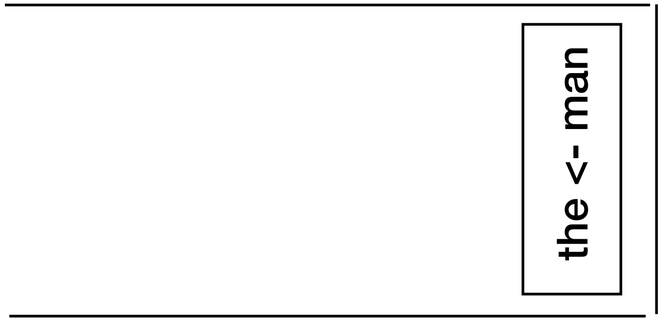
Dependency Parsing (Transition Based)

Left-arc

Dependency Parsing (Transition Based)



Stack

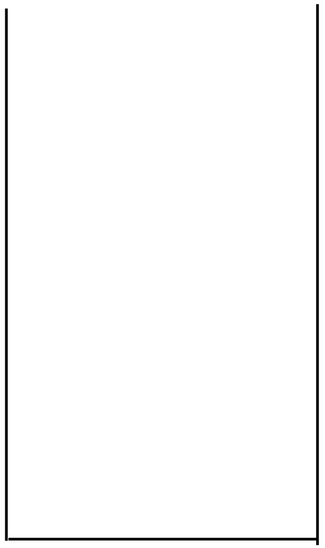


Buffer

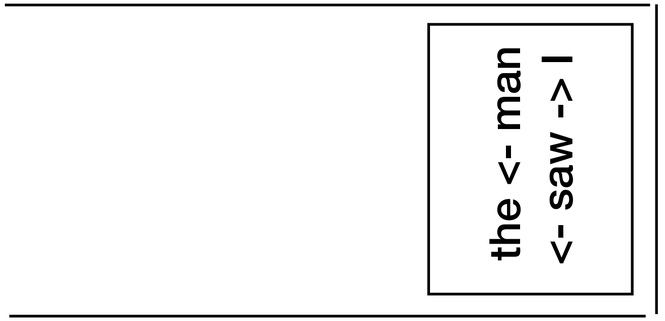
Dependency Parsing (Transition Based)

Right-arc

Dependency Parsing (Transition Based)



Stack



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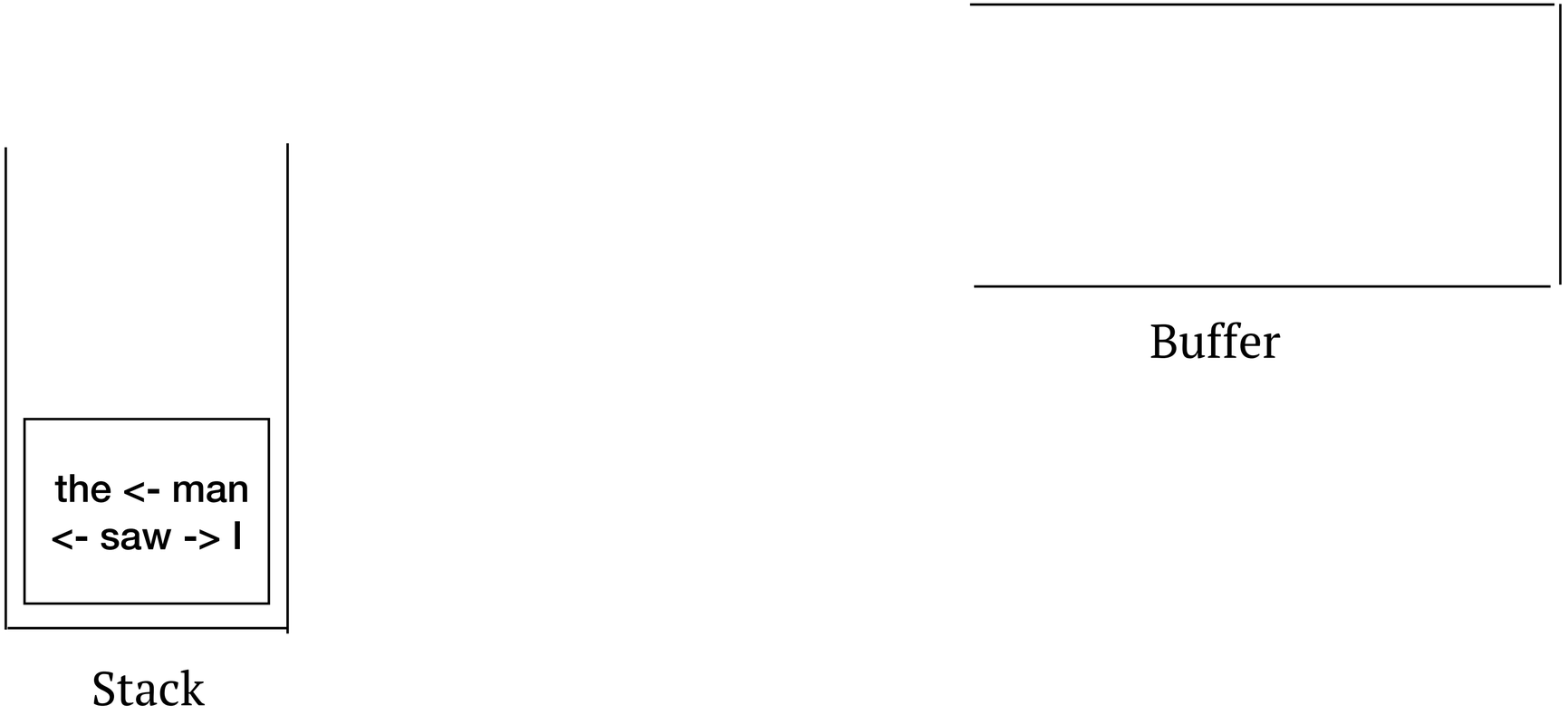
Dependency Parsing (Transition Based)

Shift



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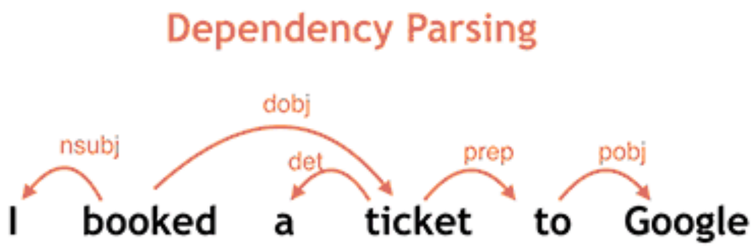
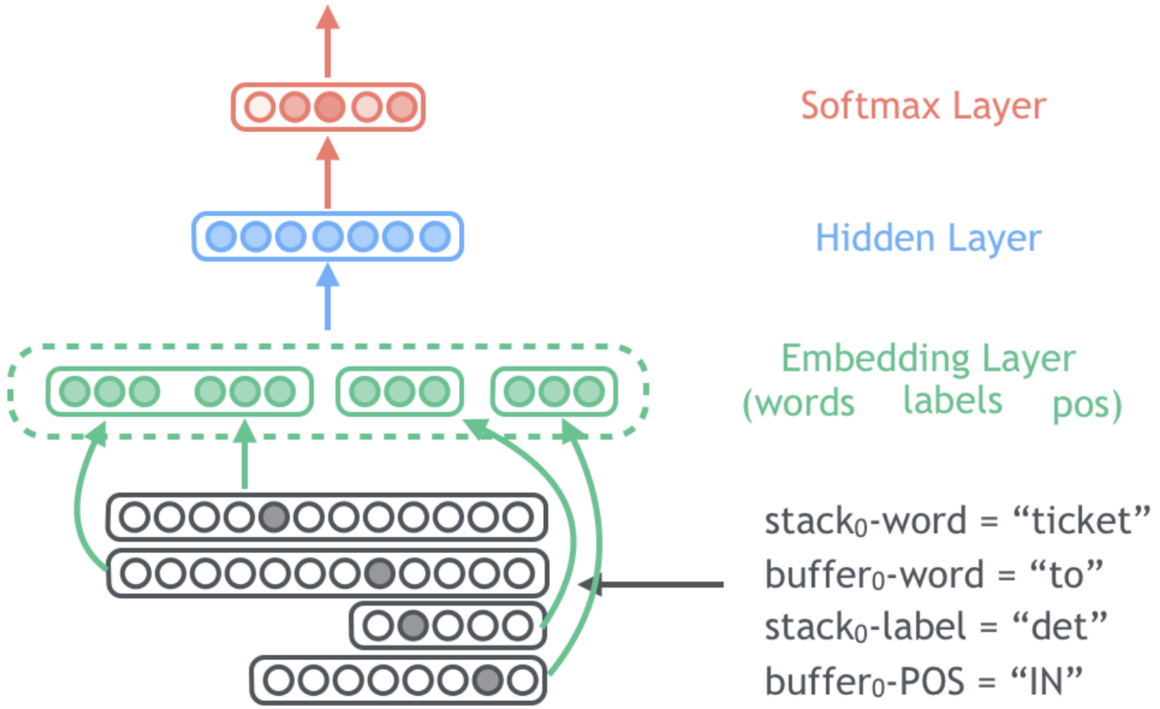


[Chen & Manning, 2014]



Dependency Parsing

Graph based:

The decoding algorithm is slow.

Can consider rich features.

Global optimal.

Transitional based:

Fast. You will just need a FFN to make the decisions.

Local optimal, but mostly the performance is good enough.