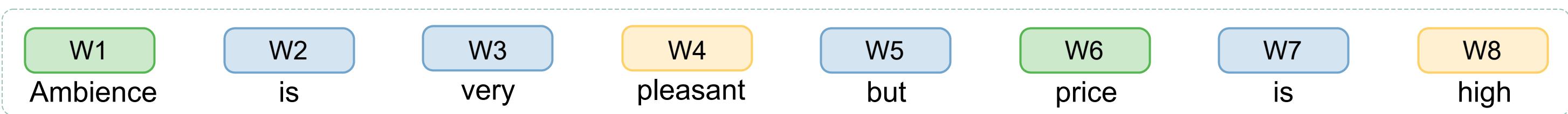
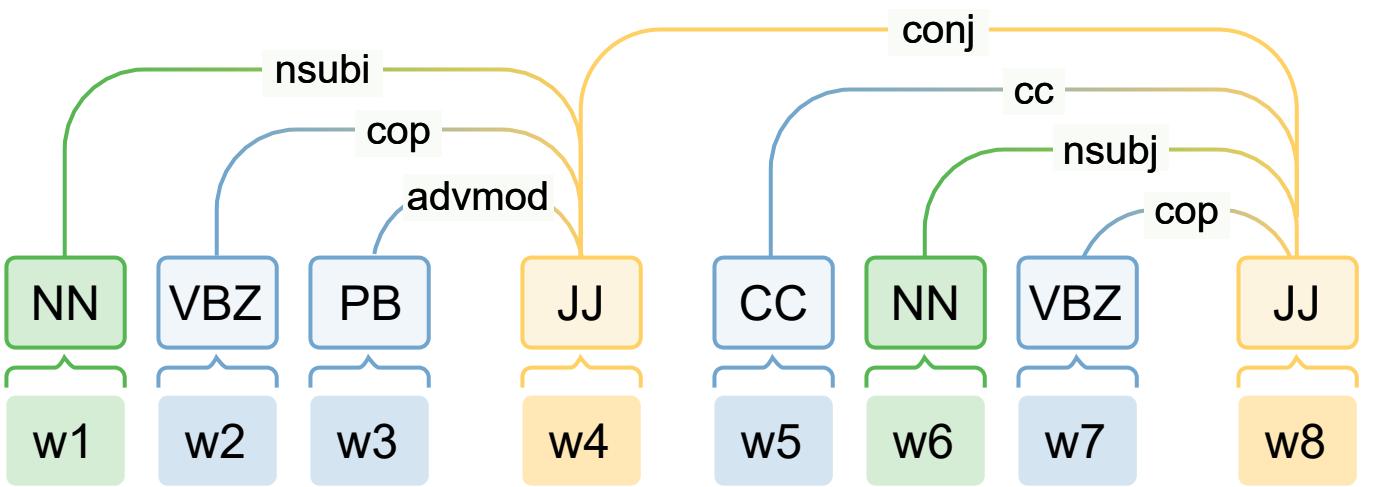


Raw Input: "Ambience is very pleasant but price is high"

① Word Tokenization and Indexing



② Dependency Parsing with Stanza



Bias Construction:

- Tree distances: BFS shortest paths
- Relation types: Encoded as integers
- Max distance: Dmax = 20 (truncated)

③ Matrix Construction Preview

	W1	W2	W3	W4	W5	W6	W7	W8
W1	0	2	2	1	2	3	3	2
W2	2	0	2	1	2	3	3	2
W3	2	2	0	1	2	3	3	2
W4	1	1	1	0	1	2	2	1
W5	3	3	3	2	0	2	2	1
W6	3	3	3	2	2	0	2	1
W7	3	3	3	2	2	2	0	1
W8	2	2	2	1	1	1	1	0

Tree-Bias Matrix ($\text{bias}^{\text{tree}}$)

Relation	Code	Example
• nsubj	1	w4 w1
• cop	2	w4 w2
• advmod	3	w4 w3
• conj	4	w4 w8
• cc	5	w4 w5
• nsubj_rev	11	w1 w4
• none	0	no relation

More ...

Dependency-Bias Matrix (bias^{dep})

④ Initial Node Feature Construction

Pos Embedding
 $U_i^{\text{pos}} \in \mathbb{R}^{384}$



Dep Embedding
 $U_i^{\text{dep}} \in \mathbb{R}^{384}$

Initial Node Features
 $H^{(0)} \in \mathbb{R}^{768}$

AUX, ADV, NOU, ADJ,.....

nsubj, cop, adv, mod,...