

Chomsky Normal Form

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Announcements

- Handouts
 - Solutions and grading guidelines for midterm
 - A run of CKY algorithm (Pg. 262-263 Sipser)
 - Chomsky Normal form, H/W #5
 - If you did not pick up any last Friday
- I will hand back your graded midterms
- Wait till **tomorrow** to get back to me with grading questions on the midterm

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Couple of slides on the midterm

- Mean: 63.5
- Median: 65
- Total: 90

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You must be thinking...

- What a loser...
 - Did he not have anything else to over the weekend ?

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Questions ?

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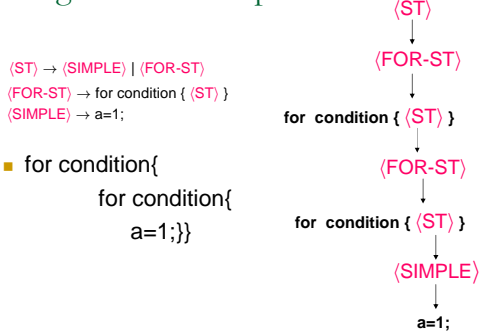
Puzzle for today

- $L = \{ a^i b^j c^k \mid i=j \text{ or } j=k \text{ and } i, j, k \geq 0 \}$
- Prove that L is context-free
- Prove that L is inherently ambiguous
 - Every grammar G for L is ambiguous
 - There is a $w \in L$ such that it has two parse trees

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On grammars and parse trees



In particular

- All rules are of the form
- $\langle VAR \rangle \rightarrow (\Sigma U V)^*$

Questions ?

Up next...

- A "special" form of context free grammar
- Due to Noam Chomsky...



Yet another model ?



Chomsky Normal Form

- Every rule is of the following form
- $S \rightarrow \epsilon$
- $A \rightarrow BC$
- $A \rightarrow a$
- $B, C \neq S$
- $A, B, C \in V$ and $a \in \Sigma$

Yeah... so what ?



Why is this interesting

- Every context free grammar can be converted into CNF
 - Today
- Useful in compilers
 - Your compiler class maybe
- Has some interesting properties
 - Has a "clean" structure
 - See H/W #5