

# Assignment 11

## Automata & Theory of Computation

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1. Find an s-grammar for  $L = (aaa^*bb^*a)$ .

$S \rightarrow aA$   
 $A \rightarrow aA \mid bB$   
 $B \rightarrow bC$   
 $C \rightarrow aC \mid D$   
 $D \rightarrow \epsilon$

2. Show that the following grammar is ambiguous:

$S \rightarrow A_1A_2,$   
 $A_1 \rightarrow aaA_1 \mid \lambda,$   
 $A_2 \rightarrow aaaaA_2 \mid \lambda.$

in case "aaaa"

first way:

$S \rightarrow A_1A_2$

$A_1A_2 \rightarrow aaA_1A_2 \rightarrow aaaaA_1A_2 \rightarrow aaaa\lambda \rightarrow aaaa$

Second way:

$S \rightarrow A_1A_2$

$A_1A_2 \rightarrow \lambda A_2 \rightarrow aaaaA_2 \rightarrow aaaa$

Both methods produce the same "aaaa" string,  
but they have different generation processes

Thus, this grammar is ambiguous.