

$\{w \in \{a, b, c\}^* \mid w \text{ contains equally many } a\text{'s, } b\text{'s and } c\text{'s}\}.$

Example:

An unrestricted grammar for the non-context-free language  $\{a^k b^k c^k \mid k \geq 0\}$ :

$S \rightarrow LT \mid \epsilon$	$LA \rightarrow a$
$T \rightarrow ABCT \mid ABC$	$aA \rightarrow aa$
$BA \rightarrow AB$	$aB \rightarrow ab$
$CB \rightarrow BC$	$bB \rightarrow bb$
$CA \rightarrow AC$	$bC \rightarrow bc$
	$cC \rightarrow cc$

With unrestricted grammars,  
we can always "swap"  
the position of two "capital variables"

$S \xrightarrow{q} ABC \xrightarrow{} BAC \xrightarrow{} BCA$

$AB \rightarrow BA$   
 $AC \rightarrow CA$

$ABCABAC$

$\downarrow$

$AAABBBCCC$

$\downarrow$

$aaabbbccc$

$S \rightarrow ABCS \mid \epsilon$

$AB \rightarrow BA$

$BA \rightarrow AB$

$BC \rightarrow CB$

$CB \rightarrow BC$

$AC \rightarrow CA$

$CA \rightarrow AC$

$A \rightarrow a$

$B \rightarrow b$

$C \rightarrow c$