MA4016 **Classification of Grammars**

Let $G = (\mathbf{\Sigma}, \mathrm{T}, \mathrm{S}, \mathrm{P})$ be a phrase structure grammar, where each production is of the form

$$w_1 \longmapsto w_2 \quad \text{or} \quad \mathrm{S} \longmapsto \lambda$$

The nonterminal symbols are $\mathrm{N} = \mathbf{\Sigma} \setminus \mathrm{T}$.

A grammar is classified according to the restrictions on its $w_1 \longmapsto w_2$ productions as follows

Type	Name	Restriction
3	(Regular)	$w_1 \in \mathrm{N}$ and $w_2 \in \mathrm{T}$ or $w_2 \in \mathrm{TN}$
2	(Context Free)	$w_1 \in \mathrm{N}$
1	(Context Sensitive)	$\|\|w_1\|\| \leq \|\|w_2\|\|$
0		No restrictions