

# Temperature Calculation: Step-by-Step

Given:  $\text{Logits} = [2.0, 1.0, 0.5, 0.2]$   
 $\text{Tokens} = [\text{"cat"}, \text{"dog"}, \text{"bird"}, \text{"fish"}]$

Step 1: Scale by  $T=0.5$  (MORE FOCUSED)  
 $\text{Scaled} = [4.0, 2.0, 1.0, 0.5]$   
 $\text{Softmax} \rightarrow [0.63, 0.19, 0.12, 0.05]$   
 $\rightarrow 73\% \text{ on "cat"} \text{ (VERY FOCUSED)}$

Step 3: Scale by  $T=2.0$  (FLATTER)  
 $\text{Scaled} = [1.0, 0.5, 0.25, 0.125]$   
 $\text{Softmax} \rightarrow [0.38, 0.17, 0.15, 0.09]$   
 $\rightarrow 38\% \text{ on "cat"} \text{ (CH FLATTER)}$

*Lower  $T \rightarrow$  More confident (peaky)*  
*Higher  $T \rightarrow$  More random (flat)*