HW
Q1
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$$E = -\sum_{n=1}^{N}\sum_{k=1}^{K} t \ln(y)$$

$$y = \frac{e^{a_k}}{\sum_j e^{a_j}}$$

$$\frac{dE}{dy} \cdot \frac{dy}{da} \Rightarrow$$

$$\frac{dE}{dy} \Rightarrow \sum_n \sum_k \frac{-t_{kn}}{y_{kn}} dy \quad \text{sum over } n \Rightarrow \sum_k^K \frac{t_k}{y_k} dy$$

$$\frac{dy}{da} \Rightarrow \frac{e^a}{\sum e^{a_j}}$$

since $t_{nk}$ 0 or 1 - given

& $\sum_{k=1}^{K} t_{nk} = 1$ - given

we can derive $\frac{dy}{da}$ to $\frac{e^{a_k}}{\sum e^j}\left(1 - \frac{e^{a_k}}{\sum e^j}\right)$

now $\frac{dE}{dy} \cdot \frac{dy}{da} = \frac{-t_n}{y} \cdot \frac{e^{a_k}}{\sum e^j}\left(1 - \frac{e^{a_k}}{\sum e^j}\right)$

$$= \frac{-t}{y} \cdot y(1-y)$$

$$= -t + yt$$

$$= yt - t \; ?$$