- For $0 \leq \gamma \leq 1$, define the binary entropy function

$$h_b(\gamma) = -\gamma \log \gamma - (1-\gamma) \log(1-\gamma)$$

with the convention $0 \log 0 = 0$, as by L'Hopital's rule,

$$\lim_{a \to 0} a \log a = 0.$$

- For $X \sim \{\gamma, 1-\gamma\}$,

$$H(X) = h_b(\gamma).$$

- $h_b(\gamma)$ achieves the maximum value 1 when $\gamma = \frac{1}{2}$.