

Shannon's lower bound

- ▶ Assume p_T is “well behaved”. For example, IID.
- ▶ Let $T \rightarrow \infty$
- ▶ $H(p) \doteq \lim_{T \rightarrow \infty} \frac{H(p_T)}{T}$ exists and is called the per character entropy of the source p
- ▶ The expected code length for **any** coding scheme is at least

$$(1 - o(1))H(p_T) = (1 - o(1)) T H(p)$$

- ▶ The proof of Shannon's lower bound is not trivial (Can be a student lecture).