

The source compression problem

- ▶ **Example:** “There are no people like show people”
 $\xrightarrow{\text{encode}} x \in \{0, 1\}^n$
 $\xrightarrow{\text{decode}}$ “there are no people like show people”
- ▶ **Lossless:** Message reconstructed perfectly.
- ▶ **Goal:** minimize expected length $E(n)$ of coded message.
- ▶ Can we do better than $\lceil \log_2(26) \rceil = 5$ bits per character?
- ▶ **Basic idea:** Use short codes for common messages.
- ▶ **Stream compression:**
 - ▶ Message revealed one character at a time.
 - ▶ Code generated as message is revealed.
 - ▶ Decoded message is constructed gradually.
- ▶ Easier than block codes when processing long messages.