

- To improve reliability, use the BSC  $n$  times for a large  $n$ .

- Let

$$\begin{aligned} N_0 &= \# \text{ 0's received} \\ N_1 &= \# \text{ 1's received} \end{aligned}$$

- **Coding Scheme 2**

$$\text{Encoding} \quad \begin{cases} A \rightarrow 00 \cdots 0 \\ B \rightarrow 11 \cdots 1 \end{cases} \quad \text{Decoding} \quad \begin{cases} N_0 > N_1 \rightarrow A \\ N_1 > N_0 \rightarrow B \end{cases}$$

- If message is  $A$ , by WLLN,  $N_0 \approx n(1 - \epsilon)$  and  $N_1 \approx n\epsilon$  w.p.  $\rightarrow 1$ .
- Then  $N_0 > N_1$  because  $\epsilon < 0.5$ .
- Therefore decode correctly w.p.  $\rightarrow 1$  if message is  $A$  (similarly for  $B$ ).
- However,  $R = \frac{1}{n} \log 2 \rightarrow 0$  as  $n \rightarrow \infty$ . :(