

- Input random variable  $X$  takes values in discrete alphabet  $\mathcal{X}$ .
- Output random variable  $Y$  takes values in discrete alphabet  $\mathcal{Y}$ .
- Noise variable  $Z$  takes values in discrete alphabet  $\mathcal{Z}$ .
- $Z$  is independent of  $X$ .
- $\alpha$  is a function from  $\mathcal{X} \times \mathcal{Z}$  to  $\mathcal{Y}$ .
- The channel is specified by  $(\alpha, Z)$ .
- Input-output relation:  $Y = \alpha(X, Z)$ .