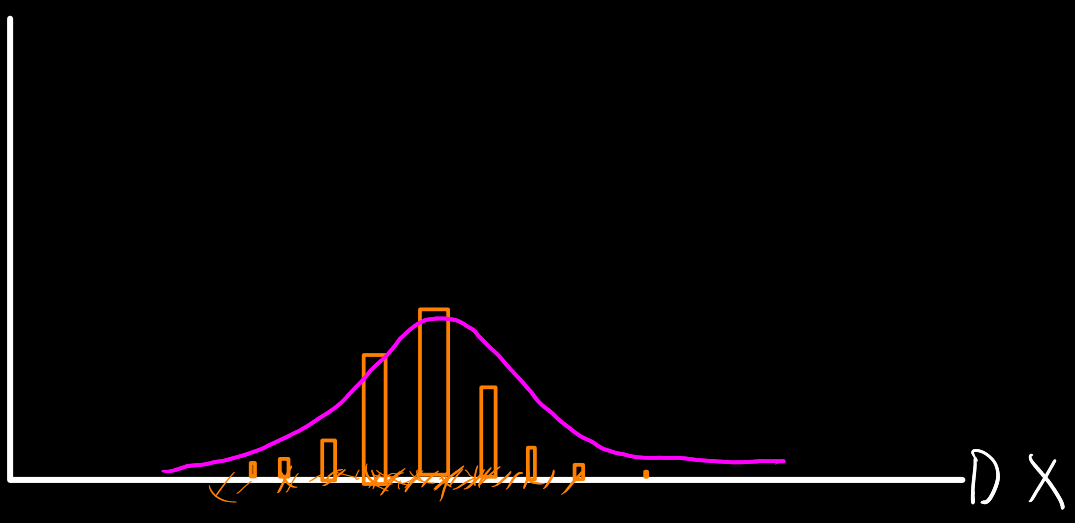
Sampling the univariate Normal



① Sampling the standard Normal $\mathcal{N}(0,1)$

↳ Box-Müller Transform

$$U_1, U_2 \sim \mathcal{U}(0,1)$$

"source of randomness"

$$X_1 = \sqrt{-2 \log(U_1)} \cdot \cos(2\pi U_2)$$

$$X_2 = \sqrt{-2 \log(U_1)} \cdot \sin(2\pi U_2)$$

$$X_1, X_2 \sim \mathcal{N}(0,1)$$

2 uniform samples → Box-Müller → 2 normal samples

② Sample the general Normal $\mathcal{N}(\mu, \sigma^2)$

$$X \sim \mathcal{N}(0,1)$$

$$Y = \mu + \sigma X$$

σ: standard deviation, NOT variance

$$Y \sim \mathcal{N}(\mu, \sigma^2)$$