

$X \sim \mathcal{N}(\mu, \sigma^2)$
 $f(x) = \frac{1}{\sigma \sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$
 $P(x \in [a, b]) = \int_a^b f(x) dx$

$\mu = \text{avg}$
 $M(D) = \text{avg}(D) + \text{Lap}\left(\frac{\Delta \text{avg}}{\epsilon}\right)$
 \therefore range?
 $\epsilon = 1$
 $\hookrightarrow M(D) = \text{avg}(D) + \text{Lap}(7)$
 $\in [0, 7]$

$N(0, 0.1)$ $\sigma = 0.1$
 $\text{Lap}(0.1)$ $\sigma = \sqrt{2} \times 0.1$
 $\approx 1 \times 0.1$
 $\approx N(0, 7)$

$M' = \text{avg}(D) + N(0, 7)$
 $\in [\text{avg} - 7, \text{avg} + 7]$
 with prob 68.3%

$X_i \sim \begin{cases} N(0, 5) & \text{if } B_i \text{'s } \text{val} = 0 \\ N(1, 5) & \text{if } B_i \text{'s } \text{val} = 1 \end{cases}$

$\theta \sim 1, \dots, n$

