Formal definition of regret

- **Over T iterations:** $\mu^\star =$ maximum mean among the arms (coins in this case)

- X_t be the outcome of the t-th coin toss

- **Regret over T iterations** is

$$\begin{aligned} \text{Reg}_T &= T \times \mu^\star - \text{Total expected reward} \\ &= T \times \mu^\star - \mathbb{E}[X_1 + X_2 + \cdots + X_T] \end{aligned}$$

Round robin exploration

- **Algorithm:** Uniformly toss the coins in a round robin manner
- **For every arm** a **,** $\mathbb{E}[N_a(T)] = \frac{T}{K}$
- $\mathrm{Reg}_T = \frac{T}{K} \sum_{a \neq a^\star} \Delta_a$ is **linear !**