Repeated Play (cont.)

- $\mathbf{M}$ unknown
- for $t = 1, \ldots, T$:
  - Mindy chooses $\mathbf{P}_t$
  - Max chooses $\mathbf{Q}_t$ (possibly depending on $\mathbf{P}_t$)
  - Mindy's loss $= \mathbf{M}(\mathbf{P}_t, \mathbf{Q}_t)$
  - Mindy observes loss $\mathbf{M}(i, \mathbf{Q}_t)$ of each pure strategy i
- want:

$$\underbrace{\frac{1}{T}\sum_{t=1}^{T}\mathbf{M}(\mathbf{P}_t, \mathbf{Q}_t)}_{\text{actual average loss}} \leq \underbrace{\min_{\mathbf{P}}\frac{1}{T}\sum_{t=1}^{T}\mathbf{M}(\mathbf{P}, \mathbf{Q}_t)}_{\text{best loss (in hindsight)}} + [\text{“small amount”}]$$