# CS170 Discussion Section 13: *4/26*

## Commitment Scheme

A casino would like to allow people to play the game of roulette by calling in over the phone. In a game of roulette, a ball is spun around a wheel and randomly falls into one of 38 holes. The player wins if they guess which hole the ball will fall in (there are other winning conditions, we pick just this one). If the casino is not honest, they can lie to the player and tell them they always lose. Show how a commitment scheme can help.

## Streaming: Reservoir Sampling

(a) You have a length $n$ stream of numbers. You want to randomly select one number fairly (all numbers should have equal probability of being selected). However, you don't know what $n$ is beforehand, and you can only parse through the stream once! Design a $O(\log n)$ space algorithm that will randomly choose one element fairly.

(b) Same as part (a), except now you want to randomly select $k$ numbers, not just one.

## Chernitto's Educated Guess

Chernitto gets one try to guess a very important value. All Chernitto has at hand is an algorithm that yields a $\epsilon$-accurate answer with probability 0.6, and an inaccurate answer with probability 0.4. How can Chernitto give a $\epsilon$-accurate answer with a probability of at least 0.999?

## Project Check-In

If logistically reasonable, you are encouraged to check in with your TA on your project phase II progress so far.