# Problem 1 Write-up

Trust the Stochastic Process
(Eli Katz, Avi Mahajan, James Stroud)

August 3, 2017

## 1 Simulation

Another method we used to

## 2 Part b: Testing the Hypothesis

(see `sample_out.txt` for sample outputs)

Let's assume that the null hypothesis is $H_0 : \mu = 0$, and the one-sided alternative hypothesis is $H_A : \mu > 0$, where $\mu$ is the average number of consecutive losses in a season, over *every* season, assuming the Warriors have a 80% chance of winning. Using our simulation code, we can generate a sample of $n = 1$ million simulated seasons and count the number of pairs of consecutive-losses in each. Through our simulation code, we find that the average number of consecutive losses per season in the sample is 3.2244, and the sample standard deviation is 2.0425.

Through our stats program, we find that the p-value is less than 0.00001 (it's actually less than $1 \times 10^{-8}$, but 0.00001 is the "accepted" level). That means that there is a less than 0.001% chance that we obtained can occur given the null hypothesis being correct. Thus we can reject the null hypothesis (of 0 consective losses) with a confidence level greater than 99.999%.

Even using a smaller sample of simulations, $n = 30$, we can reject the null hypothesis at greater than that same confidence level 99.999%

Therefore, we can pretty safely reject the hypothesis that the Warriors will not lose consecutive games (that is, they *will* likely lose consecutive games), assuming a win percentage of 80%.