

# Part 1: Simulation Exercise Instructions

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## Statistical Inference Course Project 1

### Overview

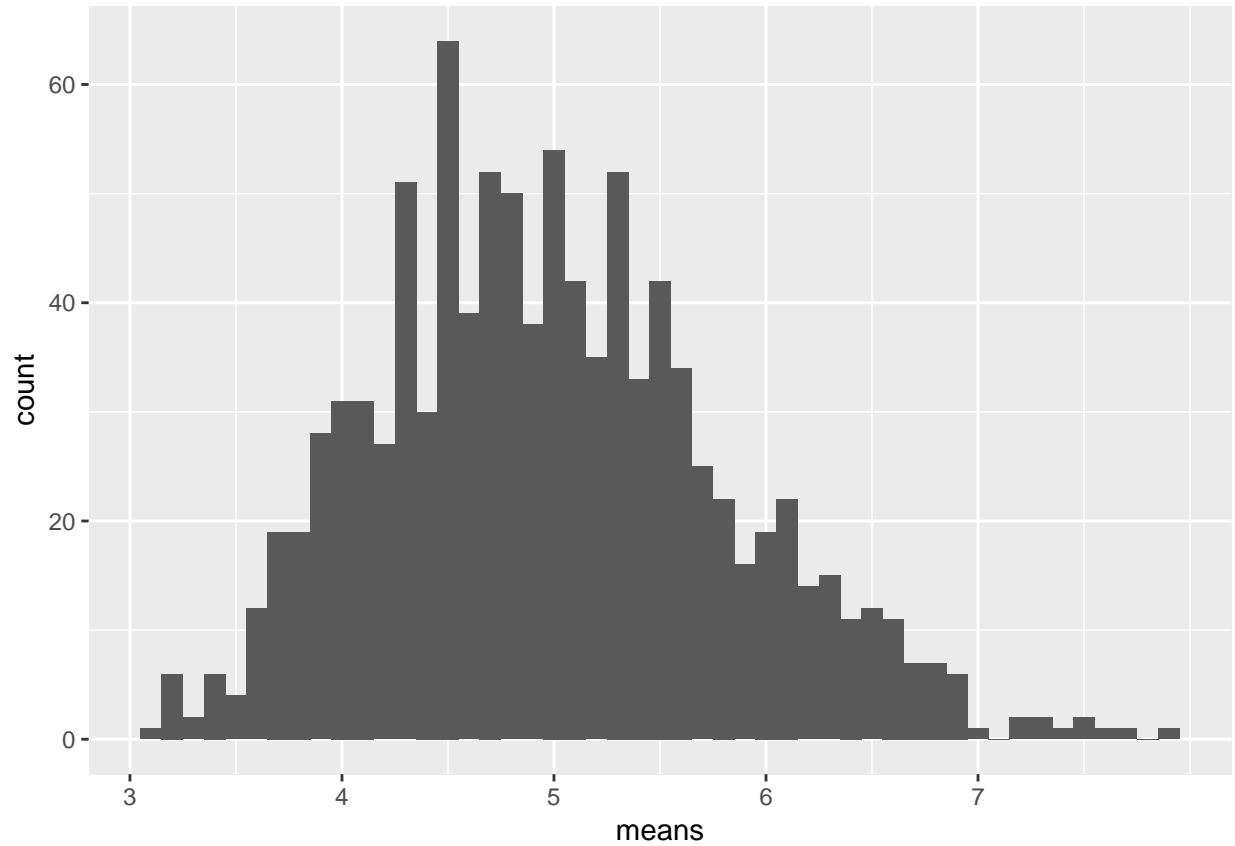
In this project I will investigate the exponential distribution in R and compare it with the Central Limit Theorem. The exponential distribution can be simulated in R with `rexp(n, lambda)` where `lambda` is the rate parameter. The mean of exponential distribution is  $1/\lambda$  and the standard deviation is also  $1/\lambda$ . Set  $\lambda = 0.2$  for all of the simulations. I will investigate the distribution of averages of 40 exponentials. Note that I will need to do a thousand simulations.

Illustrate via simulation and associated explanatory text the properties of the distribution of the mean of 40 exponentials. I should

Show the sample mean and compare it to the theoretical mean of the distribution. Show how variable the sample is (via variance) and compare it to the theoretical variance of the distribution. Show that the distribution is approximately normal.

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## Simulations



## Sample Mean Vs Theoretical Mean

- Sample Mean : 5
- Theoretical Mean : 4.9865083

## Sample Variance versus Theoretical Variance

- Sample deviation : 0.7905694
- Theoretical deviation : 0.8242282
- Sample Variance : 0.625
- Theoretical Variance : 0.6793521

## Distribution

