STA 2201 Assignment 3

You will be asked to hand this one in at the *beginning* of class on Tuesday February 3d. Please show your calculations on the back of your printout.

Suppose you are interested in studying the robustness of the usual F-test for the equality of two variances, when the data do not actually come from normal distributions. In particular, suppose the two sample sizes are equal, the usual 0.05 significance level is employed, and the two samples are drawn independently from a Poisson distribution with parameter $\lambda = 2$. After you do the simulation, you plan to apply a two-sided Z-test without any continuity correction, to test the null hypothesis that the true Type I error rate of the test for equal variances is $\alpha = 0.05$. The size of your test on the Monte Carlo data will be 0.001.

If the true Type I error rate of the test for variances is $\alpha = 0.10$, you would like to be able to reject $H_0 : \alpha = 0.05$ with probability at least 0.99. What is the smallest Monte Carlo sample size that would accomplish this goal? Show your work, and do the appropriate calculations in R. Your final answer is a Monte Carlo sample size. Here's a way we can check our work. If we were trying to detect a true Type I error rate of $\alpha = 0.07$ instead of 0.10, I calculate that we would need a Monte Carlo sample size of 4,295.

Please notice that you are *not* being asked to carry out the simulation study. You are being asked to plan the Monte Carlo sample size for the simulation study.