These problems use the Plain M&Ms from the M&M candies data set (ID 1) from the Data Hoard, at http://stat.pugetsound.edu/hoard/datasets.aspx (so you’ll need to subset them yourself). Parts of problems labeled with an “s.” are to be submitted as part of your R script. Parts labeled with a “w.” are to be submitted as part of your (word-processed) write-up.

In your script, be sure to use set.seed(100) before you generate each bootstrap sample, so that we’ll all have the same results.

1.s. Generate 1000 bootstrap samples from the Plain M&M diameters in the data set (keeping the sample size the same). Do this “manually”, without using the boot package. Produce (separate) density plots of the sample mean and sample median of your bootstrap samples. Also, compute a bootstrap estimate of the standard error of the sample mean and of the standard error of the sample median.

1.w. Based on what you did in your script, compare and contrast the (bootstrap) distribution of the sample mean with that of the sample median for Plain M&M diameters. What reason(s) can you think of for why they might be similar or different (whichever they were)?

2.s. Find bootstrap 90% confidence intervals for the median Plain M&M diameter using 1000 bootstrap samples in the percentile, accelerated bias-corrected, and bootstrap-t methods. For these methods, you should use the boot package.

3.s. Find an 80% bootstrap confidence interval for the mean of Plain M&M diameters using 1000 bootstrap samples in the accelerated bias-corrected bootstrap method. Compute an 80% confidence interval using the normal approximation for the sample mean. Do this “manually”, even though it may be part of a bootstrapping command that you use too.

3.w. Explain how you computed the confidence interval with the normal approximation. Compare the two confidence intervals that you have obtained in this problem.