BF[3] project: At a basketball court, determine the number of shots someone makes out of 10 shots using three factors and two levels of each factor. The three factors could be: distances (free throw line distance – 15 ft., and three-point distance) type of shot (underhand and regular shot), and location of shooter (directly in front of the basket or near the sideline).

You will replicate each of the eight combinations twice. Choose the way to randomize the order of the combinations. If you do not want to do the basketball experiment, you are welcome to choose something else, but you should have eight combinations of the three factors with two replications for each combination.

When putting the data into excel or R the data structure should look something like this:



When performing the three-way ANOVA analysis and checking requirements, please use the following code:

BBModel.1 <- (lm(Shots.Made ~ TypeofShot\*Distance\*Location, data=Basketball))

Anova(BBModel.1)

par(mfrow=c(1,2))

plot(BBModel.1, which=1:2)

1. For the report, please include the following:
   1. Introduction
      1. What is your research question?
      2. What are the null and alternative hypotheses?

**You now have seven groups of null and alternative hypothesis, three main effects (TypeofShot, Distance, and Location), three two-way interactions, and one three-way interaction. The interaction hypotheses are written the same way as you have seen before but you need to distinguish the factors for each interaction for a group of hypotheses. One example is: Ho: No interaction between Type of Shot and Distance and Ha: Interaction between Type of Shot and Distance**

* 1. Data Collection
     1. How did you randomize?
     2. What was the factor(s) and response?
  2. Descriptive Statistics
     1. Numerical Descriptive Statistics (**favstats for the main effects which are TypeofShot, Distance, Location**)
     2. Graphical Descriptive Statistics(**only do boxplots for the main effects**)
     3. “Tell a story” based on what you see in your descriptive statistics
  3. Inferential Statistics
     1. Checking Requirements
     2. ANOVA table (**only the ANOVA table**)
     3. Decision rule (level of significance)

**Don’t worry about doing the six steps for each set of hypotheses. Just state whether you reject or not reject the null for each set of hypotheses.**

* 1. Conclusion
     1. General Conclusion of your results based on decision rule
     2. Why do you think you got the results you did?
     3. What would you have done differently?
     4. Any follow up studies that you would have done?