**Data Modeling**

You are advised to spend no longer than 3 hours on this case study. The expected deliverables are:

1. Source code for building your model.
2. Written answers to the three questions below.

**Question**

The Octane data found in the attached spreadsheet (**Octane.csv**) show how three different materials in the feed stock and a composite variable describing processing conditions affect the octane rating of refined gasoline. Since higher octane is valuable to a refinery, we wish to build a multiple regression model to predict resulting octane depending on feed stock composition and processing conditions.

1. Generate an OLS model with all main effects included. Perform standard regression diagnostics on this model. What can you conclude?
2. Next, generate a subset model with the least significant main effect excluded. Compare these two models using all the model comparison techniques applicable. What can you conclude?
3. If your goal was to produce gasoline at an octane rating of 95, pick one set of operating conditions that would do so. Make sure that this operating condition set is within the scope of the model (that is, within the ranges for each variable used to build the model).