

INSTRUCTIONS:

- A) Write your name on the first page of your homework
 - B) *For each answer*, include a:
 - a) summary output table and/or graphs, as appropriate
 - b) short statement about how you handled assumptions and those outcomes
 - c) short answer that clearly answers the question, based on the results.
 - C) Provide your code in an Appendix, organized so that we can relate it to questions
 - D) Submit a pdf (with your name in the file name).
1. [2 pts] A classical, agricultural experiment (wheat.txt) grew a variety of wheat with the same fertilizer amounts and water, but in three different soils, where randomly-selected fields were in either sandy, clay, or loam soils. Did clay and loamy soils yield significantly more wheat harvest (bushels/acre) than sandy soils? If so, by how much, on average?
 2. [3 pts] The most recent census (in censusrb.txt) shows population size in 2010 (`pop2010`), % of the 2010 population officially counted as living in poverty (`poverty`), and median household income (`med_income`) per each US county. It also shows whether a county was classified as red (`r` = Republican) or blue (`b` = Democrat) or unclear (`u`), based on the most recent presidential vote. Based on these data, is there any support for the oft-repeated claim that “red” and blue” counties are economically different? If so, how much do red and blue counties differ for each of these two measures? And how much of the variation in each measure (i.e., `poverty` and `med_income`) is "explained" by these simple analyses?
 3. [3 pts] Also using the censusrb.txt file: Do red and blue states differ significantly in population density, where red counties are supposedly more rural and blue counties are supposedly more urban? If so, what is the average (and standard deviation) of the difference in population between red and blue counties? And what % of variance in population density is “explained” by this political predictor?
 4. [2 pts] Some plant extracts *may* be anti-cancer agents. To cut through the hype, a randomized experiment was conducted with 3 plant extracts (Drugs A, B, & C) and controls (a placebo) – see cancer.txt for the data. Cultures of cancer cells were dosed with the same concentrations of all drugs and then the percent of cancer cells that died was counted. Did plant extracts cause significant cancer cell death compared to the placebo treatment? If so, which treatment worked best, and *how much* better?