

Homework Policies: You should give a brief and concise explanation for each question. Just writing down an answer with no explanation is usually not sufficient. If the homework requires output from Stata, incorporate that output into your written assignments. Homework is due at the *beginning* of class on the day indicated.

- (1) (1) A study found that the correlation between the educational level of husbands and wives in a certain town was 0.50; both averaged 12 years of schooling completed, with an SD of 3 years.
 - a. Predict the educational level of a man whose wife has completed 18 years of schooling.
 - b. Predict the educational level of a woman whose husband has completed 15 years of schooling.
 - c. Apparently, well-educated women marry men who are less well educated than themselves, but men marry women with even less education? This seems paradoxical. How can this be possible?

- (2) In 1964, Gordon Moore, one of the founders of Intel Corporation, predicted that the number of transistors on an integrated circuit chip would double every 18 months; this became known as Moore's Law. The Stata dataset *moore.dta*, contains the dates (*year*) and number of transistors (*transistors*) for Intel microprocessors from 1971-2000. The Stata dataset is on the course webpage.
 - a. Use Stata to produce a scatter plot showing how the number of transistors changes with time. Does the relationship appear to be linear?
 - b. Consider a transformation of the number of transistors variable. Using the "circle of powers" would you recommend a suitable transformation, say $Y_{\text{new}} = (Y_{\text{old}})^P$, should be based on powers greater than 1, or powers less than 1. Give a brief explanation of your reasoning.
 - c. Use Stata to generate two transformations (square-root and log) of the number of transistors:
 - i. $P=1/2$ or $Y_{\text{new}}=(Y_{\text{old}})^{0.5}$
 - ii. $P=0$ or $Y_{\text{new}}=\log(Y_{\text{old}})$

Produce separate scatter plots for each of the transformed variables against time. Which of the two transformations seems preferable for these data?

Famous Statistician of the Week**Who is this dude?**

William Edwards Deming
1900-1993

Why is he cool?

After studying electrical engineering at the University of Wyoming and mathematical physics at Yale, he began his career working for the Department of Agriculture. He developed statistical sampling techniques first used in the 1940 census, which he expanded for use in quality control, a subject on which he lectured in [Japan](#) after [World War II](#). Japan's highest honor within the business community is named for him, and he is the 1960 recipient of Japan's Second Order Medal of the Sacred Treasure. American companies were slow to adopt his theories of statistical process control, but by the 1980s he was welcomed warmly at business seminars nationwide.

Courtesy of <http://www.infoplease.com/ipa/A0771880.html>