Chapter 13


13-1. The zero value for the degree of stenosis in the 10th observation is suspicious, which appears to be a missing value rather than 0% of stenosis; the zero value for the number of reactive nuclei at initial survey in the 12th observation is also suspicious, but it may well be a reasonable value, because there are other small numbers such as 1 and 2; the scatter plot seems to suggest that there is a very weak linear relationship; a regression analysis yields $\hat{\beta}_0$ = 22.2, $\hat{\beta}_1$ = 2.90, with F = 10.04 and p = 0.007; the 10th observation had the largest standardized residual and the 6th observation had the greatest leverage almost three times greater than the average leverage; eliminating the 6th observation, $\hat{\beta}_0$ = 21.2 and $\hat{\beta}_1$ = 3.05.


13-3. Using the last two digits of years, $\hat{\beta}_0$ = 61.1, $\hat{\beta}_1$ = -0.397 and $R^2$ = 87% for female and $\hat{\beta}_0$ = 112, $\hat{\beta}_1$ = -0.935 and $R^2$ = 99.6% for male; the projected year with the same percent of smoking = (112 - 61.1)/(0.935 - 0.397) = 94.61, suggesting that the percent of smoking for female and male would be the same some time in July 1994, if the current trends continue; it can be verified to see the two percentages will reach 23.54 at that time.


13-4. Eliminating the two largest blood pressure values (14th and 50th observations) and the two smallest values (22nd and 27th observations), $\hat{\beta}_0$ = 63.1, $\hat{\beta}_1$ = 0.726 and $R^2$ = 23.4%.


13-6. DBP is regressed on BMI, age, education and vitamin status; the estimated regression coefficients are 17.7 (intercept), 1.17 (BMI), 0.083 (age), 1.22 (education) and -3.06 (vitamin status), with $R^2$ = 34.5%; while the effect of education is substantial, the effect of age is minimal; DBP increases 1.17 per unit change in BMI, holding other variables in the equation equal; DBP is 3.06 lower for vitamin users than for nonusers holding other variables equal.