STAT3001 Project

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Due Date: 30 November 2018

Directions: Work in groups of FOUR students. Show all work. No work, no credit.

Individuals can assess their health – at least in part – by estimating their percentage of body fat. Percent of body fat, age, weight, height, and ten body circumference measurements are presented for 50 men.[1] Since body fat is somewhat difficult to assess, fitting body fat to the other measurements using multiple regression provides a convenient way of estimating body fat for men using only a scale and a measuring tape.

The body density dataset includes the following variables listed from left to right:

- Fat: Percent body fat from Siri's (1956) equation
- Age: Age (years)
- Weight: Weight (kg)
- Height: Height (cm)
- Neck: Neck circumference (cm)
- Chest: Chest circumference (cm)
- Abdomen: Abdomen circumference (cm)
- Hip: Hip circumference (cm)
- Thigh: Thigh circumference (cm)
- Knee: Knee circumference (cm)
- Ankle: Ankle circumference (cm)
- Biceps: Biceps (extended) circumference (cm)
- Forearm: Forearm circumference (cm)
- Wrist: Wrist circumference (cm)

a. Develop a model that will provide a more reasonable prediction of percentage of body fat.

b. Perform a simultaneous test on the parameters of your model.

c. Assess the importance of each independent variable.

d. Find and report on the following:

   i. An estimate for σ.

   ii. Total variation, explained variation, and unexplained variation.

   iii. R^2 and interpret this value.

[1] The data is a sub-sample from Johnson, RW. (1996), "Fitting Percentage of Body Fat to Simple Body Measurements", *Journal of Statistics Education* 4(1).