Math 158 – Spring 2009
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warm-up # 4

Name: _____

Consider the multiple regression model:

$$\begin{aligned} E[Y] &= \beta_0 + \beta_1 X_1 + \beta_2 X_2 \\ Y &= \text{amount of money in pocket} \\ X_1 &= \#\text{ of coins in pocket} \\ X_2 &= \#\text{ of pennies, nickels, dimes in pocket} \end{aligned}$$

1. Describe the directionality of the two correlation values: between Y & X_1 and between Y and X_2. Explain.

2. Describe the directionality of the two β coefficients (β_1 and β_2) in the regression model. Explain.

Solution:

1. Because the amount of money necessarily goes up with more coins, Y and X_1 will be positively correlated. Similarly, Y and X_2 will be positively correlated.

2. The total number of coins is going to be a better predictor of total amount than the number of low coins. The coefficient on X_1 (β_1) will be positive. Given a certain number of coins total in the model, the number of low coins will actually have a negative effect on the model. So the coefficient on X_2 (β_2) will be negative.

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Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)   0.30724    0.46569   0.660 0.524321
num.coins     0.29648    0.05778   5.132 0.000443 ***
num.lowcoins -0.24629    0.06561  -3.754 0.003762 **
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Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1   1
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