Chapter ②

Assignment ③ Apassara V. 6104640575

Q1: Ans (i) there are several factors affecting the number of children ever born to a woman including income, age, etc.
It is correlated with the level of education. People who have higher education are elder.
Ans (ii) SLR4 is failure because u is correlate with education.

Q4: Ans (i) $\widehat{bwght} = 119.77 - 0.514(0) = 119.77$
$\widehat{bwght} = 119.77 - 0.514(20) = 109.49$
The effect of smoking on additional 20 cigarattes would cause an estimated 10.28 ounce (119.77 - 109.49) decrease in the infant birth weight.
Ans (ii) since the amount of cigarettes is the independent variable and the infant weight is dependent, it implied that there is a cause effect. Nevertheless, they contain other factors to be considered as well like genetics or parent's weight. Smoking habits can partially describe a baby's weight.
Ans (iii) $125 = 119.77 - 0.514\,cigs$
$cigs = -10.1750028$ that is impossible. The highest possible weight according to the model would be its β_0 or intercept which is 119.77 ounces.
Ans (iv) To get an accurate sample, we should consider more smokers to get more data points which would generate our regression less limited and more accurate. we need more sample variation in the explantory variable or SLR3 now since 55% of the sample smoke cigarette is zero ($cig = 0$). In addition, SLR2 means we need the sample to be a better represent. So we can develop our regression function so it is not as limited and will provide us possibly inaccurate data as same as in (iii).

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Q1: Ans (i) Yes, it does make sense since if you are top of the class, the "hsperc" will be low and top class usually get high "colgpa". Hence, it cause the negative coefficient.
Ans (ii) $\widehat{colgpa} = 1.392 - 0.0135(20) + 0.00148(1050)$
$= 1.392 - 0.27 + 1.554$
$= 2.676$
Ans (iii) $\widehat{colgpa} = 1.392 - 0.0135\,hspec + 0.00148\,sat$
Thus, increasing in SAT score for 1 mark will make the value of $\widehat{colgpa}$ changes for 0.00148
$\frac{\partial \widehat{colgpa}}{\partial sat} = 0.00148$
A is predicted to have a score of $0.207 = (140)(0.00148)$ higher
It's quite large if we consider the standard deviation.
Ans (iv) $0.5 = 0.00148(sat)$
$sat = \frac{0.5}{0.00148} = 337.837837$
we know that about 337.837837 in SAT score will make difference in 0.5 of a grade point

Q2: Ans (i) Yes, the higher the number of year, the lower the year of schooling. This is because of the budget constraint.
To hold other things constant, $1 = -0.094\,sibs$
$sibs = 10.638$ to reduce predicted years of education by one year
Ans (ii) If mother's year of schooling rise by 1, the predicted year of school would rise by 0.131
Ans (iii) Man A predicted year of education: $10.36 - 0.094(0) + 0.131(2) + 0.210(12) = 13.452$
Man B predicted year of education: $10.36 - 0.094(0) + 0.131(16) + 0.210(16) = 15.876$
The predicted difference is 1.864