*Instructions
Please show your work! You may lose points by simply writing in the answer. If the problem requires you to execute co Your homework should be submitted electronically on GitHub.
This problem set is due before 23:59 on Sunday December 4, 2022. No late assignments will be accepted.

*Question 1: Economics In this question, use the prestige dataset in the car library. First, run the following com

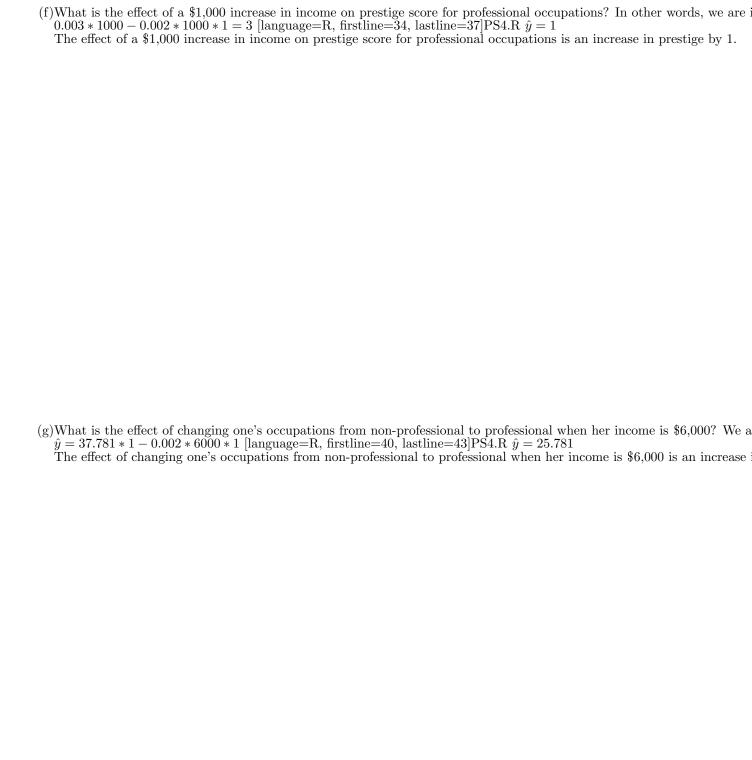
install.packages(car)

library(car)
data(Prestige)
help(Prestige)
We would like to study whether individuals with higher levels of income have more prestigious jobs. Moreover, we would

(a)Create a new variable professional by recoding the variable type so that profess	sionals are coded as 1, and blue and w
(b)Run a linear model with prestige as an outcome and income, professional, and	d the interaction of the two as predict I
	income
	professional_dummy
[!htbp] Regression Results with interaction: prestige income + professional_dumn	income:professional_dummy
[:http] Regression Results with Interaction. prestige—income + professional_dum	Constant
p-value of the coefficient for professional_dummy is smaller than 0.01, we can reject p-value of the coefficient for interaction of income and professionaldummy is small	Observations R^2 Adjusted R^2 Residual Std. Error F Statistic 11: Note: *p<0. et the null hypothesis that there is no er than 0.01, we can reject the null hy

(c) Write the prediction equation based on the result. $\hat{y} = 21.142 + 0.003x_1 + 37.781x_2 - 0.002x_1x_2 \\ x_1 \text{ for income, } x_2 \text{ for professional_dummy}$

(d)Interpret the coefficient for income. There is a positive and statistically reliable relationship between income and prestige score. When holding the effects of
(e)Interpret the coefficient for professional.
(e)Interpret the coefficient for professional. There is a positive and statistically reliable relationship between professional and prestige score. When holding the effective of the coefficient for professional and prestige score.



*Question 2: Political Science Researchers are interested in learning the effect of all of those yard signs on voting p

Below is the result of a regression with two variables and a constant. The dependent variable is the proportion of t

Notes: $R^2 = 0.094$, N = 131

(a) Use the results from a linear regression to determine whether having these yard signs in a precinct affects vote share (e. Hypothesis: $H_0: B_1 = 0vs.H_a: B_1 \neq 0$

Test-Statistics:

standarderror: 0.016, t = (0.042 - 0)/0.016 = 2.625, degree of freedom: n - 3 = 131 - 3 = 128 [language=R, firstline=1.625]

[language=R, firstline=56, lastline=58]PS4.R p-value=0.0097 < 0.05Conclusion: we can reject the null hypothesis that the slope of having these yard signs in a precinct is 0.

(b) Use the results to determine whether being next to precincts with these yard signs affects vote share (e.g., conduct a hy Hypothesis: $H_0: B_2 = 0vs. H_a: B_2 \neq 0$ Test-Statistics: $standarderror: 0.013, t = (0.042 - 0)/0.013 = 2.625, degree of freedom: n - 3 = 131 - 3 = 128 [language=R, firstline=P-value:$
[language=R, firstline=68, lastline=70]PS4.R $p-value=0.0016<0.05$ Conclusion: we can reject the null hypothesis that the slope of being next to precincts with yard signs is 0.
(c)Interpret the coefficient for the constant term substantively. When the precinct is not assigned lawn signs or the precinct is not adjacent to lawn signs, the vote share of this precinc
(d) Evaluate the model fit for this regression. What does this tell us about the importance of yard signs versus other factor. The R^2 of the model is 9.4%, which means 9.4% of the variations are explained by the yard signs, and the rest 90.6% of