STAT 420 Spring 2017
2GR, 2UG

Homework Extra Credit

(Due Friday, April 28, by 4:00 p.m.)

This is an OPTIONAL extra-credit opportunity for those who wish to receive additional points for homework grades.

Please submit your assignment *on paper*, following the Guidelines for Homework Write-Ups and Submissions. Please include your name (with your last name underlined), and your NetID at the top of the first page.

1. This is an extension of Problem 2 in Homework 10. You are to use R / R Studio for all computations and plots. Please copy and paste your results and printouts into Word or other word processor.

Use the `odor` data from the `faraway` package.

```
> library(faraway)
> data(odor)
> #View(odor)
> #?odor
```

(a) Fit a complete second order model with `odor` as the response and the first and second orders of the three other variables as predictors by including linear and quadratic terms AND the interaction terms. Perform the significance of the regression test. Use $\alpha = 0.10$. Report the value of the test statistic, the distribution of the test statistic under the null hypothesis, the *p*-value, and the decision.

Hint: The following R code could be helpful or used:

```
> fit = lm(odor ~ .^ 2 + I(temp^2) + I(gas^2) + I(pack^2), data = odor)
```

OR:

```
> fit = lm(odor ~ temp + gas + pack + I(temp^2) + I(gas^2) + I(pack^2)
              + I(temp*gas) + I(temp*pack) + I(gas*pack), data=odor)
```

(b) Fit a model with the same response, but now excluding any interaction terms. (Include all linear and quadratic terms.) (This is basically the model you were asked to fit in Problem 2(a) of Homework 10.) Compare this model to the model in part (a) using an appropriate test. Use $\alpha = 0.10$. Report the value of the test statistic, the distribution of the test statistic under the null hypothesis, the *p*-value, and the decision.

2. Write up your answers for the following questions. For lecture contents and material, please refer to the "Calendar & Content" link at our compass 2g course website. Hopefully, by answering these

questions, not only you can earn a few more points as extra credits, you can also get started to review and summarize what you have learned in this course and thus to prepare for Exam II (will be on May 2 Tuesday, during class).

(a) For all the contents we had learned starting from the first class up to the lecture material for February 21, as well as the lecture material for March 2, (i.e. the covered material in Exam I), which ONE topic or lecture do you like most? Use 30 to 60 words to explain.

(b) Regarding the lecture material for February 23 and all contents we have learned from March 9 through April 14, (i.e. from "Analysis of Variance (ANOVA)" up through "Model Selection", the covered material for the upcoming Exam II), which TWO topics or lectures do you like most? For each topic or lecture, use 30 to 60 words to explain (total 60 to 12 words).