Final Exam Part II

You have three problems to complete. Please answer the questions first. Then upload your program and your results after you have answered the question for each problem.

PROBLEM 1:

A research study was conducted to examine the effectiveness of different fertilizers. A particular scrub was randomly assigned to one of three groups: Fertilizer A, Fertilizer B, and The Control (no fertilizer). After four weeks the height of the scrub was recorded:

Fertilizer A	Fertilizer B	Control
38	22	14
47	19	16
39	18	11
35	23	18
42	21	15

1. Show, using SAS, that all assumptions are met to do an ANOVA. Then do the ANOVA.
    a. State your conclusions making sure to speak to all pertinent information and assumptions.
        i. Assumptions
            1. Check for Equal variances (show output) (3 pts)
            2. Check for Normality (show output: Normal probability plot and boxplot) (3 pts)
        ii. State conclusion in the context of the problem. Just saying you reject or not reject or that the means are not equal, you will receive no points. (including why you made that conclusion based on your SAS output (show output). (3 pts)
        iii. If you reach the conclusion that the means are different, do a Tukey to analyze which means are different. Otherwise say that based on the ANOVA analysis, there was insufficient evidence to say the means are different. (3 pts)
2. Copy your code here (Remember to put in comments and titles, points will be taken off if you do not do this). (1 code, 1 pts comments (should have at least one comment))
3. Paste your output. (1 pts)

PROBLEM 2:

A random sample of 5 scrubs were measured. Their heights were recorded below.

Scrub Height
38
47
39
35
42

If your **FIRST** name ends with A -K Do number 1 (Sue ends in "e", I would do Number 1)
If your **FIRST** name ends with L- Q Do number 2
If your **FIRST** name ends with R-Z Do number 3
(example: My first name is Sue, so I would do number 1)
Part A is worth 3points
Part B is worth 3 points
Part C is worth 3 points
Upload Code with comments 2points
SAS Outpoint 1 points

1. (People whose first name end in A-K do this problem): Test to see if the mean height of the scrub has increased from 36.9 at a 0.05 significance level.
    a. Check to see if all assumptions are met.
    b. State your conclusion in the context of the problem. No points given if you do not answer in the context of the problem.
    c. Upload code and results.
2. (People whose first name end in L-Q do this problem): Test to see if the mean height of the scrub has decreased from 44.6 at a 0.05 significance level.
    a. Check to see if all assumptions are met.
    b. State your conclusion in the context of the problem. No points given if you do not answer in the context of the problem.
    c. Upload code and results.
3. (People whose first name end in R-Z do this problem):Test to see if the mean height of the scrub has changed from 37.2 at a 0.05 significance level.
    a. Check to see if all assumptions are met.
    b. State your conclusion in the context of the problem. No points given if you do not answer in the context of the problem.
    c. Upload code and results.

PROBLEM 3:

If the letter of your LAST name begins with A-M do the following input procedure plus as a seed for the number generator use the first 4 letters of your last name using the following code to find your unique seed (**xxxxxxxx**). The number in the seed will vary in length depending on the first four letters of your last name:
A-1, B-2, C-3, D-4,E-5, F-6, G-7,H-8,I-9, J-10, K-11, L-12, M-13, N-14, O-15, P-16, Q-17, R-18, S-19, T-20 U-21, V-22, W-23, X-24, Y-25, Z-26 (if your name is less than 4 letters just use as many letters as is in your last name.)

Example: So for my last name Chimilak, I would put 38913 for the seed part of this input statement RANNOR(38913).

```
DATA FINAL;

   DO STRAIN = 'A','B','C';
      DO I = 1 to 7 ;
            SPEED = RANNOR(XXXXXXXX)*5 + 20 + 4*(Strain EQ 'B')+ 5*(Strain EQ 'C') -
2*(STRAIN EQ 'A');
            React = (INT(RANNOR(XXXXXXXX)*5 + 10 + 2*(Strain EQ 'B')+ 3*(Strain EQ
'C') - (STRAIN EQ 'A')));
            Sleep = 12 - ((STRAIN EQ 'A')+ 3.5*(Strain EQ 'C')+ 2*(Strain EQ
'B'))*rannor(XXXXXXXX);
            OUTPUT;
         END;
      END;
   DROP I;
RUN;
```

1. Do a regression analysis that predicts speed (in minutes) using number of hours of sleep.
    a. Write you findings making sure you speak to all pertinent information and assumptions.
        - The p-value to the Analysis of Variance table from the PROC REG.(3pts)
        - The R^2 (3pts)
        - The p-value to the intercept and slope (2pts each)
        - The residual analysis (iid random variable)
            - speaking to the plot predictor vs residual (3pts)
            - speaking to the normal probability plot (3pts)
            - speaking to the boxplot (3pts) PLOTS = DIAGNOSTICS(STATS=NONE);
        - Answer the question, is this equation reliable, that is, should it be used or not based on the above information. (3pts)
    b. Copy your code here in part (a) of number 1 (Remember to put in comments and titles). (1 code, 1 pts comments (should have at least one comment)
    c. Paste your output. (1pts)
2. Give an electric signed statement: I affirm that I will not receive help from ANYONE on this project. This project is my work and my work only. If there is any indication that I have received help, I understand that I will receive a zero for my Final Exam. (1point)

If the letter of your LAST name begins with N-Z do the following input procedure plus as a seed for the number generator use the first 4 letters of your last name using the following code to find your unique seed (**xxxxxxxx**). The number in the seed will vary in length depending on the first four letters of your last name:
A-1, B-2, C-3, D-4,E-5, F-6, G-7,H-8,I-9, J-10, K-11, L-12, M-13, N-14, O-15, P-16, Q-17, R-18, S-19, T-20 U-21, V-22, W-23, X-24, Y-25, Z-26 (if your name is less than 4 letters just use as many letters as is in your last name.)

Example: So for my last name Chimiak, I would put 38913 for the seed part of this input statement RANNOR(38913).

```
DATA FINAL;

   DO STRAIN = 'A','B','C';
      DO I = 1 to 7 ;
            SPEED = RANNOR(XXXXXXXX)*5 + 20 + 4*(Strain EQ 'B')+ 5*(Strain EQ 'C') -
2*(STRAIN EQ 'A');
            React = (INT(RANNOR(XXXXXXXX)*5 + 10 + 2*(Strain EQ 'B')+ 3*(Strain EQ
'C') - (STRAIN EQ 'A')));
            Sleep = 12 - ((STRAIN EQ 'A')+ 3.5*(Strain EQ 'C')+ 2*(Strain EQ
'B'))*rannor(XXXXXXXX);
            OUTPUT;
         END;
      END;
   DROP I;
RUN;
```

1. Do a regression analysis that predicts Reaction time (React) (in minutes) using number of hours of sleep.
    a. Write you findings making sure you speak to all pertinent information and assumptions.
        - The p-value to the Analysis of Variance table from the PROC REG.(3pts)
        - The R^2 (3pts)
        - The p-value to the intercept and slope (2pts each)
        - The residual analysis (iid random variable)
            - speaking to the plot predictor vs residual (3pts)
            - speaking to the normal probability plot (3pts)
            - speaking to the boxplot (3pts) PLOTS = DIAGNOSTICS(STATS=NONE);
        - Answer the question, is this equation reliable, that is, should it be used or not based on the above information. (3pts)
    b. Copy your code here in part (a) of number 1 (Remember to put in comments and titles). (1 code, 1 pts comments (should have at least one comment)
    c. Paste your output. (1pts)

2. Give an electric signed statement: I affirm that I will not receive help from ANYONE on this project. This project is my work and my work only. If there is any indication that I have received help, I understand that I will receive a zero for my Final Exam. (1point)