

## STAT475: Data Analysis with SAS

### ASSIGNMENT #3

NOTE: You need to show you programs and your output. Be sure to use proper SAS syntax. Try not to waste paper. Use good variable names, data names etc. Be sure to include headers and comments.

1. Write a SAS MACRO called HYPO\_TEST that performs a one sample hypothesis test. It should read in a data set, a variable (say X), hypothesized value (say MU), and a significance level (say ALPHA), and type of alternate hypothesis (<, >, ne). It should use the usual t-test. It should first test whether the data is normal (using PROC UNIVARIATE NORMAL) Use Shapiro-wilks. It should issue a warning if the data is not normal  
The MACRO should print the data set name, variable name, mean, std, n, alpha, p-value, whether the data is normal, what test was tested, what test was used, and whether to reject or not reject the null hypothesis.

For example, it might print:

```
For the variable X on the data set XXX
MEAN is  XX.X   STD is  XX.X
NUMBER is  XX
ALPHA is  .XX   P-VALUE .XXX
```

```
H0: mu=XX vs H1: mu ne XX
```

```
The DATA is NOT approximately normal, interpret results
with caution
```

```
Using the usual t-test
DO NOT REJECT H0:
There is not enough evidence to reject H0.
```

In order to test your macro:

Generate a random sample of 30 from a normal distribution with mean=10 and std=2.  
Use you macro to perform a 2-sided test H0: mu=12 vs H1: mu ne 12, with alpha=.01.  
Use you macro to perform a 1-sided test H0: mu=12 vs H1: mu < 12, with alpha=.05.  
Be sure to print the results of your 2 macro runs.

2. Write a SAS MACRO program to divide a continuous variable into K equally spaced categories. Your MACRO should
  - i) read in a data set, a variable, and the number of categories
  - ii) compute the high and low values of the variable, and the width, for example, if k=4 and high=60 and low=20 then width=(60-20)/4=10
  - iii) compute a variable whose value is the category the observations belongs in
  - iv) print the number of observations in each category
  - v) make a nice histogram of the resulting counts (with nice title etc)

SHOW how to apply the MACRO to a random sample of size 200 from a Poisson distribution with mean 30. Make six equally spaced categories.