

# SAS Tutorial for STAT 350 Lab 4

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## 1) Generate sampling distributions

The usefulness of the Central Limit Theorem (CLT) is through the averaging of random samples to simulate what is happening when many samples are taken from the same distribution. Even though you will just be running the provided code (with minor modifications), I will outline what is happening below:

- 1) Generate the appropriate number of SRSs of each of the distributions.
- 2) Average (by row) the appropriate number of SRSs and put into Column G. For example in the following table, we are averaging six different samples (columns) each with 5 SRS (rows).

	A	B	C	D	E	F
1	-0.30	-1.28	0.24	1.28	1.20	1.73
2	-2.18	-0.23	1.10	-1.09	-0.69	-1.69
3	-1.85	-0.98	-0.77	-2.12	-0.57	-0.40
4	0.13	-0.37	-0.33	-0.37	1.34	-0.09
5	-0.19	-0.51	1.97	0.87	2.38	-0.65

- 3) From column G, generate a histogram, QQ plot, mean and standard deviation.

### code:

```
*Code modified from www.stanford.edu/~kcobb/hrp259/lab1_EG.doc 6/20/2012: 4
pm;
%LET SRS=1000; *we are not changing this in this question;
%LET n=1; *this is the number of columns that are being averaged over;
%Let norm = rand ('Normal',0,1); *you will have to change this to the
correct distribution being asked for.;
```

```
data sampling;
do j=1 to &SRS by 1;
    avg=0;
    do i=1 to &n by 1;
        avg=avg+&norm; *change as appropriate for each different
                        distribution;
    end;
    avg=avg/&n;
    output;
    drop i;
end;
drop j;
run;
```

```
/* I would strongly suggest that you use a title similar to the one below so
you know which distribution and number of averages that you are using */
title1 'Normal Distribution: sample size = ' &n; *change the distribution as
appropriate, the number of repeats is automatic;
```

. . .

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The data that you want to analyze is in the variable 'avg'. You will need to include the rest of the code as appropriate to produce what is required in the assignment. Please see Lab 3 for details.

## 2) Generate random samples

In Lab 3, we have already discussed how to generate a normal distribution, exponential, Cauchy, and a uniform distribution. Be careful about the uniform and exponential distributions to be sure that you change the parameters appropriately. Note: For the exponential, the parameter in SAS is NOT  $\lambda$ , it is  $E(X)$ .

Use the following commands to generate the other two distributions in this lab:

```
%Let gam = rand ('Gamma',2);  
*Note: rand ('Gamma',2,1) also will work with SAS 9.4;  
  
%Let pois = rand ('Poisson',2);
```

Remember to use the appropriate data set when you are generating the normal quantile plot and the histogram. I would also suggest changing the title so that you know which plot this is.