1 STAT112: Computer Assignment 1

Use SPSS to do the computations. Print the SPSS output and submit it. Use the SPSS to answer the questions.

1. At the beginning of the semester, the difficulty of counting was illustrated by counting the number of e's on a page. Spring semester STAT51 students counted the number of e's, and they reported:

188	212	1432	318	209	243	378	233	250	247	290	201
306	232	267	300	240	400	402	212	308	296	280	200
405	241	257	290	265	379	311	379	300	380	215	375
427	1512	134	333	242	378	300	382	255	327	240	312
294	238	250	234	284	261	318	229	248	416		

   (a) Make a histogram.
   (b) Make a box plot.
   (c) What is the size of sample, n.
   (d) Compute the sample mean, $\bar{x}$.
   (e) Compute the sample median.
   (f) Compute the sample variance, s^2.
   (g) Identify any outliers.

2. Construct the correlation matrix of the following set of data found in Table 1:

Student	IQ	Anxiety	Exam Scores
1	140	14	42
2	130	20	44
3	120	29	35
4	119	6	30
5	115	20	23
6	114	27	27
7	114	29	25
8	113	30	20
9	112	35	16
10	111	40	12

Table 1:

(a) Which variables are positively correlated and which ones are negatively correlated?

3. Twelve judges at a county fair tasted three categories of sauerkraut: sweet, sour, and bitter and assigned scores to each. The 36 scores are given in the following set of data.

Sweet	Sour	Bitter
15.02	346.22	17.23
12.48	404.41	17.55
14.28	364.06	17.95
14.67	359.25	17.66
13.68	349.13	15.96
16.69	250.51	15.00
17.28	259.72	14.48
15.58	368.54	18.16
15.93	286.62	14.75
13.79	314.14	14.57
11.78	407.80	16.87
10.97	392.60	15.18

(a) Construct the correlation matrix.

(b) Which variables are positively correlated and which ones are negatively correlated?

4. The *effective buying income"* (EBI) of a family and the amount of money that a family spends on eating out according to a marketing economist are related by a linear fixed effects model. The following table of data show s the average EBI and the average expenditure on eating out for thirteen states in thousands of dollars.

State	1	2	3	4	5	6	7	8	9	10	11	12	13
EBI (x)	61	64	47	45	42	38	34	35	45	45	43	51	41
Eating out (y)	2.6	2.2	2.5	2.3	2.5	2.4	1.5	2.0	2.4	3.2	2.7	2.2	2.1

(a) Plot the data. Use EBI for the x variable and use Eating out as the y variable.

(b) Is there something obvious in the data?

5. (McClave 2.149 12th Edition; 2.153 13th Edition) Use the set of data given in the CD of the McClave textbook for problem 2.149 or 2.153. The name of the set of data is: CRASH.sav.

   (a) The variables, DRIVCHST and PASSCHST, refer to the chest g's which are recorded in the driver dummy chest accelerometers and passenger dummy chest accelerometers respectively. It makes sense that the DRIVCHST and PASSCHST should be highly correlated. Make a picture of DRIVCHST vs PASSCHST. Is there a positive or negative correlation between the two?

   (b) Find the correlation matrix for the following variables: WEIGHT, DRIVSTAR, DRIV-HEAD, PASSHEAD, DRIVCHST, and PASSCHST.

   (c) DRIVSTAR is a variable which contains the star rating of an automobile: 1=poor, ..., 5=excellent. DRIVHEAD contains the data for the Head Injury Criterion (HIC) of the driver. The higher the HIC, the more severe the head injury. DRIVCHST contains the measurements of the peak chest g's which the seat belt exerts on the driver's chest. Why do you think there is a negative correlation between DRIVSTAR and DRIVHEAD?

   (d) Honda Corporation hired a contractor to prove that smaller cars are safer than larger ones, that is, the lighter the car, the safer or equivalently the higher the star rating. (Because lighter cars consume less gasoline and because they are safer as Honda claims, regulations for requiring higher fuel efficiency will favor sales of Honda automobiles.) Make a picture of WEIGHT vs DRIVCHST. Interpret the picture. Is there merit to the contractor's claim?

   (e) Make a boxplot of DRIVCHST. Are there any outliers? In a New Car Assessment Program (NCAP) test, an automobile is pull by a steel cable to a speed of 35 m.p.h., released, and freely collides into a rigid wall. Accelerometers in the dummies record the forces on the head and chest. A chest g greater than 60 g's is considered to be severe enough to cause a death. Are there any NCAP tests which would result in the death of the driver, if a person had actually been driving the car?

   (f) Calculate the following descriptive statistics: min, max, 1st quartile, median, 3rd quartile, mean, variance, standard deviation, and number of observations for DRIVCHST.

   ## Recipes

   - Variable View → VAR00001 →x and VAR00002 →y, etc.

   - Graphs → Histogram → x → Variable

   - Graphs → Scatter → Define → x → XAxis and y → YAxis

- Graphs $\rightarrow$ Boxplot $\rightarrow$ Simple and Summaries of Separate Variables $\rightarrow$ Define move x $\rightarrow$ Boxes Represent

- Analyze $\rightarrow$ Descriptive Statistics $\rightarrow$ Frequencies move x, y, and z to Variables then $\rightarrow$ Statistics $\rightarrow$ check Quartiles, Mean, Median, Min, Max, STD, Variance, Range

- Analyze $\rightarrow$ Correlate $\rightarrow$ Bivariate move x y, and z to Variables