Homework 1

1. A day care class consists of 16 children of ages three and four years old. We will refer to this class as the population, and we will identify each child by a number. The weight in pounds of each child is:

Child	Weight	Child	Weight	Child	Weight	Child	Weight
1	35	5	47	9	39	13	35
2	50	6	33	10	36	14	38
3	43	7	35	11	41	15	43
4	38	8	27	12	34	16	32

   (a) Draw a leaf and stem plot.
   (b) What is the range of the data?
   (c) Draw a histogram using an interval of 5.
   (d) Compute the population mean.
   (e) Compute the population variance.
   (f) Find the median.

   Rather than weigh all her children, the teacher decided to weigh just a few of them to save time. The night before, the teacher selected at random four names from the class roster. The names of these four children now constitute a sample of the population. Coincidentally, on the next day, all children were present for class, and no new children were added to the class. The roster, luckily, is in one-to-one correspondence with the population.

   The following four children were weighed:

Child	Weight
3	43
8	27
14	38
2	50

   (g) Compute the sample mean.
   (h) Compute the sample variance.
   (i) Find the sample median.
   (j) Compare these sample statistics with the population statistics to see how close they are to each other.

2. Prior to the 1970's, Iowa, Minnesota, and Wisconsin played a small role in world trade due to their economic policies but now they play an important role in the world economy. A table taken from *The Fleming Report, December 2000* of data in billions of dollars shows the relationship between mid-western America and industrial countries in terms of annual imports:

	1950	1960	1970	1980	1990	2000
Industrial Countries, x	39.8	85.4	226.9	1,370.2	1896	2,237.9
Middle America, y	21.2	21.7	25.5	248.4	534.8	819.4

(a) Compute the following: $\sum_{i=1}^{6} x_i$, $\sum_{i=1}^{6} x_i^2$, $\sum_{i=1}^{6} x_i y_i$, $\sum_{i=1}^{6} y_i$, $\sum_{i=1}^{6} y_i^2$

(b) Depict, that is, make a picture of the set of data which was taken from *The Fleming Report*.

3. Suppose two samples of the same size were drawn from the same population.

Account I	Account II
30	1
32	1
28	1
30	1
30	146

(a) Compute the sample mean, sample variances, ranges, and medians for both accounts.

(b) These accounts correspond to two different teams of five members who sell millions of dollars of contracts to the government. Which is the stronger of the two teams and explain your opinion? Or to put the question any way, which team would you hire based only on performance?

4. Use the statistics mode of your calculator to compute the sample mean and sample variance of the following data taken from STAT51 students:

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

5. Virginia Department of Transportation traffic engineers were compelled to measure the speed of traffic on a residential street in a Northern Virginia suburb because the residents complained enough to their elected officials about speeding vehicles on their street. Reluctantly, the engineers measured the speeds of the motor vehicles and from 1,729 vehicles in 24 hours, they reported that the average speed was 28 MPH. Since the posted speed limit is 25 MPH, the engineers concluded that "the traffic conforms to the posted speed limit"; therefore, no remedial action was taken. However, some residents obtained the raw traffic data and discovered that the speeds of three vehicles exceeded 65 MPH, that 15% of the vehicles traveled faster than 40 MPH, and that 80% exceeded 25 MPH. If you are a state legislator representing the community, would you conclude that both factions or one of them or neither were distorting the truth with descriptive statistics? Explain. (All of the numbers are reliable.)