MAT 118 Spring 2017
Homework #2
~~Due Friday, 2/10/17 in class~~ (snow storm)
Due Monday, 2/13/17 in class

Please show all of the steps you take to solve the problems.
Also, write your recitation section number!

Problems from the text: 2.1.2, 2.1.6, 2.1.8, 2.2.14, 2.2.18

In addition to those problems, please answer the following questions.

The class mascot election from HW #1, using *any* of the four voting methods we learned, was decided in favor for a dog. Nonetheless, the cat and turtle supporters, unhappy and relentless, argued that the outcome was unfair, despite the fact that none of the four fairness criteria were violated. The class thus divided itself into three factions, Team D, Team C and Team T, each with their own mascot of a dog, cat and turtle, respectively. The number of members on Team D, for example, was the number of people that voted "Dog" for top preference.

From this point on, whenever there was a class election, every member of a given team voted the same way. What used to be a "one person, one vote" system now effectively became a weighted voting system, in which each team is a *player*. The quota to pass a motion was set to be 32 votes.

A. Write down this weighted voting system in the notation $[q : w_1, w_2, ..., w_N]$.

B. Are there any dictators? Do any players have veto power?

C. Compute the Banzhaf power distribution of this system. Be sure to include a list of winning coalitions, the list of critical players, and the critical counts.

With some well-crafted arguments, Team T convinced five members of Team D that dogs are actually not so great. These five members decided to leave Team D and join Team T.

D. Write down the new weighted voting system in the notation $[q : w_1, w_2, ..., w_N]$.

E. Again, are there any dictators? Do any players have veto power?

F. Finally, compute the Banzhaf power distribution of the new system. Be sure, as before, to include a list of winning coalitions, the list of critical players, and the critical counts.