MA 1015: Homework #4

Question 1. Consider this weighted voting system: [18:6,4,4,3,2,1].

a) Are there any dictators?

b) Are there any voters with veto power?

c) Are there any dummies?

Question 2. In each part, invent a different example of a weighted system (like [?:?????]) having:

a) a dictator

b) someone with veto power

c) more than one voter with veto power

d) a voter with veto power, and at least one dummy

Question 3. Look up the numbers for the weights used in the US Electoral College system. (Try Wikipedia "United States Electoral College", scroll down to section "Current electoral vote distribution". The numbers have changed since the 2020 election.)

In each part, briefly explain (don't just say "yes" or "no"):

a) What is the quota in this system?

b) Is any state a dictator in this system?

c) Does any state have veto power?

d) Is any state a dummy?

Question 4. Compute the Shapley-Shubik power index for [15:10,7,3].

Question 5. Compute the Shapley-Shubik power index for [20: 25, 10, 3, 2]. (Hint: there is a shortcut for this one)

Question 6. Consider the weighted system [18: 8,8,5,4], with the voters called A,B,C,D.

a) Which voters are critical in the combination ABD?

b) Which voters are critical in the combination ABC?

c) Which voters are critical in the combination ABCD?