**To calculate closeness of scores:**

* **Cosine similarity: computes the similarity between 2 vectors. Not efficient to calculate pairwise similarity between coalitions of different CSs.**
* **Spent a lot of time to find a suitable similarity/closeness measure but non-of them is doing what I need. SD is the best fit for this purpose. SD for {85,75,65} is same as {10,20,30} and smaller than {10,20,30,40}. Meaning that, group1 and group2 are better in terms of the closeness. Because in group3 the difference between lowest and highest is higher than other groups.**
* **How to integrate SD into CV?**
* **Division by SD: sounds ok but SD can be 0 which requires a prevention (e.g. adding 0.1 to all SD values)**
* **Extraction of SD: higher SD will affect the CS value. V(C\_U) ranges from -5 (all violated) to 5 (all satisfied). SD ranges from 0 (all values are same) to 50 ({0,100} CPL). Therefore, V(C) = V(C\_u) – SD/10 such that both affect the coalition value equally. We can change the weights of utilities or sd if we want any of them to affect the result more than other.**
* **SD ranges between 0 and 50 (coalition = {0,50}) for LCC.** 
  + **C = {0,0} => SD=0 🡪 minimum value that SD can get**
  + **C={0,1} => SD=0.5**
  + **C={0,1,0,0,0} => SD=0.4 -> second minimum**
  + **C={0,1,0,0} => SD=0.43 -> third minimum**
  + **C={0,1,0} => SD=0.47**
  + **C={0,1,0,0,1} => SD=0.49**
  + **C={0,1,0,1} => SD=0.5**
  + **C={0,1,1} => SD=0.47**
  + **C={0,1,1,1} => SD=0.43**
  + **C={0,1,1,1,1} => SD=0.4**
* **Since we divide the sum of utility values to SD, it shouldn’t be zero. Based on the SD values above, if SD is zero, we will change it with 0.3. Because the second minimum value that SD can get is 0.4 and setting 0.3 as the minimum value is fair enough.**