Gerrymandering Assignment

Solutions to gerrymandering: The position of the supreme court seems to be that it can not rule on gerrymandering because there is no clear criterion to judge gerrymandering. They suggest that states themselves legislate gerrymandering. For this assignment I would like you to attempt to make a mathematical recommendation and explain why your solution dramatically improves the current problem of gerrymandering.

In class we discussed using Monte Carlo methods to help with this problem and especially the reading written by Moon Dunchin might help you understand this approach to gerrymandering. Another approach we did not discuss much in class but that you could easily learn about via Wikipedia is the idea of wasted votes and the "efficiency gap" or "proportional efficiency gap".

`https://en.wikipedia.org/wiki/Wasted_vote`

I recommend centering your ideas around one or both of these methods. You might also consider mathematical ideas around compactness but we really did not discuss those and they can be a bit technical.

As you explain your solution you might come to technical points that you do not fully understand or questions that you have. Feel free to either reach out to me to ask about them or make this clear in your paper while still explaining the general reason why your solution works. For example, you might need to claim that Monte Carlo methods do in fact produce truly uniformly random districtings even though we did not really see why, we just waved our hands at it. You might also want to include a rebuttal or discussion of possible criticisms you expect someone might have of your proposed solution. Your essay could draw on real world examples and it could include illustrations to support its argument.

I'm giving this assignment because I think it will (i) help you clarify your understanding gerrymandering and potential solutions and (ii) give you practice writing about technical mathematical ideas in an accessible way. I will try to give you feedback both on the mathematical thinking you use and on the clarity of your argument and exposition.

In terms of who your audience is, I would either imagine writing to an actual state representative or you could write it to a friend who might have heard of gerrymandering but does not understand the subtleties.

Also, there are many (good) ways to tackle gerrymandering that are not mathematical at all but for our purpose of practicing using mathematical thinking let's restrict ourselves and pretend like we won't change the basic structure of districting or our voting system.