Team 2 – Declaration Feedback:

**Declaration:** V2X traffic platoon optimization that minimizes overall energy consumption cost while satisfying travel time constraints.

**Relevant Course Modules:** Optimization, Optimal Control, Mathematical Modeling

**Feedback:** Cool idea! The approach is very straightforward in my mind. You would build a mathematical model of the dynamics of the vehicle platoon and then optimize the control inputs to minimize energy consumption. Since the optimal control module will be introduced at the very end of the class, I will post the module 5 videos from last semester for you to review. Additionally, I would be happy to meet with your team to give you an overview of how to incorporate dynamic systems models into an optimization framework (after we finish module 3). It sounds like the modeling effort will be somewhat involved as you’re considering different power train models. Keep in mind that you are free to make some simplifying assumptions to make the modeling easier if one or more of the models is too complex.

There are a variety of optimal control approaches you could try for this problem. We will explicitly discuss LQR, but you could also use reinforcement learning or evolutionary strategies to tackle this problem. For the latter two cases, you will need a simulation environment so the controller can learn how to operate the platoon. This may be too complex for this project, but is something to keep in mind at this stage. I’d start on identifying the mathematical models first.

I hope this helps. Please let me know if you have any other questions or would like additional feedback.