

**Homework 6: Advanced Solution Concepts (Extra Credit)**

**Instructor:** *Sid Nadendla*

**Due:** *Dec 9, 2023*

**Problem 1 Correlated Equilibrium**

**5 pts.**

Every day, Alice drives from her house in the north to her job in the south along route 66. Bob drives from his house in the west to his job in the east along route 99. The two roads intersect in the middle of nowhere, where there are currently no stop-signs or traffic-lights. Alice and Bob like to get to work without delays, but they are averse to crashing. This means that they prefer to drive through the intersection without stopping if they can get through safely. Stopping and then proceeding safely through the intersection is preferred by both to crashing. The situation is summarized in the normal-form game below, where Alice is the row-player and Bob is the column-player.

	Go	Stop
Go	-100, -100	10, 5
Stop	5, 10	5, 5

- (a) Find all pure-strategy and mixed-strategy Nash equilibria of the game.
- (b) Show how the introduction of a traffic light can be modeled as a correlated strategy.
- (c) Design and show a contract based on traffic lights, whose correlated equilibrium improves the social welfare (sum of utilities of all players) of the game.