Assignment # 3 Barak Barclay March 5, 2019

CS 4730 Algorithmic Game Theory

Homework #3 Student: Barak Barclay

**Answers to homework problems:**

1. 1 goat should be owned per family to maximize total milk production to 10 (Nash equilibrium). With 1 goat per family, each family gets 1 bucket of milk. However, if one family decided to get another goat, that family would have about 1.81 buckets of milk, but the total milk production among all the families would be about 9.95. If each family is trying to optimize for themselves, could get more than one bucket of milk for their family until 7 total families decide to get 2 goats, but still the rest of the families that still only have 1 goat would still benefit from getting another goat even if it means reduces the number of buckets families get on average to less than 1. With family optimization, this would keep going until each family had 10 goats getting only 0.001 buckets of milk each with .01 buckets total (Nash equilibrium). The difference between total milk production in social and family optimization is 9.99 buckets of milk.