Parallel Computing CS5168

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**Assignment #2 – Ant-colony Simulation**

**New features:**

1. There are two colonies of ants: green and blue.
2. When the ant brings back food to their base, they spawn another ant.
3. Added aggression level to the ants. The higher the level, the more likely they will follow the other team’s pheromones.
4. Added a battle feature. When an ant comes across an opposing ant, they will be thrown into battle where only one will survive. The winner is determined by random.
5. Added a scoring system. When an ant kills an ant from the opposing team, they add 2 to their team’s score. When an ant brings food back, they add 1 to their team’s score.

**Concurrent algorithmic strategy**

1. When ants battle, the attacking ant’s thread will decide the winner and remove the loser from the world.
2. When an ant scores, whether through battle or bringing food home, the score is incremented atomically through the score ref.

**Consistency issues**

1. When an ant loses a battle, we are pretty sure it will kill off the thread. We do not understand Clojure enough to say this for certain, but from observation, it seems the thread will kill itself off when it cannot find its ant.
2. Because scoring is transactional based, the ref will take care of the concurrency issues when ants score at the same time. There is an overhead because a thread needs to manage it, but nothing major.

**Implementation**

<https://github.uc.edu/roset3/ant-colony>