Computer Science 107
Agent Based Modeling
Exam 1

Instructor: Mark Goadrich

January 29th, 2014
1-4 p.m. Wright 105

Read all questions carefully before beginning. You will have 3 hours to complete this exam. You may have one 3" x 5" notecard. You are not allowed to use your notes or textbook. You may use a calculator, and a computer for Google Documents to perform spreadsheet calculations, and if so, you must share this document with me. **Show all your work for full credit.** You are bound by the Honor Code for this exam, which you need to sign below.

Grade (out of 100) _____
Print Your Name _____

Honor Code

Signature _____

5 people answer the question "How many days does it take for Mercury to complete its orbit around the sun?" Their answers are 73, 85, 92, 94 and 124. The correct answer is 88.

Calculate the collective error and average individual error for the answers above.

What is the probability that the majority of a group of 7 people will correctly distinguish Coke and Pepsi in a taste test, if each person is correct 55% of the time?

Devise and demonstrate a situation with 60 voters and four candidates, in an election where a candidate who wins with the Borda Count method loses under the Instant Runoff method.

You have been appointed to the Student Government Election Committee, which is holding elections in March for new student body leaders. Which election method discussed in class would you recommend using for these elections and why?

The following 25 votes have been cast in an election. Is there a way to structure a series of pair-wise elections so that A is the ultimate winner? If so, describe this sequence of pairings, if not, show why not.

7 votes: A > D > C > B
8 votes: D > A > B > C
5 votes: C > D > B > A
2 votes: B > C > D > A
3 votes: C > B > A > D

The Coombs voting method is very similar to Instant Runoff, but the elimination method of candidates is slightly different. If one candidate does not have a majority of the first-place votes, the candidate with the **most last-place** votes is eliminated.

Given the above initial preferences of 25 voters, who would win in an election determined by the Coombs method, and why?