Homework 8

Due May 28, 2014

Please make sure to explain your answers to each of the following questions. Remember: a correct numerical answer without explanation is worth no points! Write up your answers legibly and logically. All of the questions assigned are important exam practice (including the ones not to be turned in).

1. Section 11.1 Exercise 4

2. Section 11.1 Exercise 6

3. Section 11.3 Exercise 3

4. Section 11.3 Exercise 4

5. Section 11.2 Exercise 6 (you must interpret the results!)

6. Section 11.2 Exercise 27 (most of the problem is in understanding what it is asking)

7. Given the current state of the stepping stone model on the $n \times n$ grid, find the probability that it winds up all white versus all black (Hint: Use the previous question). This is Section 11.2 Exercise 32 (link to stepping stone demo: http://www.math.dartmouth.edu/~m20x11/test.html)

8. Section 11.3 Exercises 26, 27 and 28 (the chain in Exercises 27 and 28 is referred to as the "lazy chain" because it decides to stay put half the time)

Problems **not** to turn in:

1. Section 11.1 Exercises 1

2. Place a chess piece on an empty board and let it move at random (so that is equally likely to make any legal chess move). This defines a Markov chain where the current state is piece's position and the next state is the square it moves to. Determine whether the Markov chain is ergodic, regular or neither if the piece is a

   (a) king
   (b) queen
   (c) rook
   (d) bishop
   (e) knight

3. Section 11.2 Exercise 7

4. Section 11.2 Exercises 13 and 14

5. Section 11.4 Exercises 3 and 4