

## Twelfth Homework

1. Consider the four corners of a square connected by the sides. Each of the corners is also connected to the center. A frog starts at the center and jumps once per minute. What happens at each jump depends only on the location where the frog is sitting at the moment. It jumps to each site connected to the one where it is now with equal probability. That is, from the center, it can jump to each of the corners with equal probabilities. From a corner, it can jump to two of the neighboring corners (with probability  $1/3$  each) or to the center (with probability  $1/3$ ). Estimate, approximately, the probability that the frog will be in the center after 1000 jumps. Estimate, approximately, the proportion of time it will spend in the center during the first 1000 minutes.
2. Estimate, approximately, the probability of the event that the frog will be in a corner after 1000 minutes and will use the following 4 jumps to complete one rotation around the perimeter.
3. A die is rolled repeatedly and each result is recorded (to form a sequence of numbers, each number between 1 and 6). Calculate the probability that 4 immediately followed by a 5 will be recorded before 6 immediately followed by a 6.