

**Matrix Algebra**  
**Markov Chains**  
**Homework 5**

1. If Joe has lunch one day, there is a 30% chance he will have lunch the next day and a 70% chance he will skip lunch the next day. If Joe skips lunch one day, there is a 80% chance he will have lunch the next day, and a 20% chance he will again skip lunch the next day.
  - (a) Write a transition matrix for this Markov process.
  - (b) One day, there is a 50-50 chance that Joe will eat lunch. What are the probabilities that he will/will not have lunch three days later?
2. Every day, Jane either runs for five miles or doesn't run at all. If she runs one day, there is a 50% chance she'll run the next day, and if she doesn't run one day, there is a 80% chance she'll run the next day.
  - (a) Write a transition matrix for this Markov process.
  - (b) If Jane runs on Monday, what is the probability that she will run on Friday?
3. Jerry reads one book a day; either a novel, a comic book, or a math textbook. If he reads a novel one day, there is a 20% chance he'll read a novel the next day, a 50% chance he'll read a comic book the next day, and a 30% chance he'll read a math textbook the next day. If he reads a comic book, there is a 40% chance he'll read a novel the next day, a 20% chance he'll read a comic book the next day, and a 40% chance he'll read a math textbook the next day. If he reads a math textbook, there is a 30% chance he'll read a novel the next day, a 60% chance he'll read a comic book the next day, and a 10% chance he'll read a math textbook the next day.
  - (a) Write a transition matrix for this Markov process.
  - (b) If Jerry reads a comic book on Monday, what is the probability that he will read a comic book on Wednesday?