

Due: Wednesday, March 16th (at the start of class)

References are to the course textbook, except as noted.

Reminder

The first midterm exam will take place on Monday, February 22nd.

Reading

For Monday, March 7th, Chapter 9 of Baker.

For Wednesday, March 9th, Section 9.4 of Sarker and Newton.

Assignment exercises to hand in

Questions 1 and 2 must be solved in a spreadsheet. To submit your answers, print the final spreadsheet and, list in writing the contents of any cells that have formulae in them along with the information entered into the “solver parameters” window.

1. Exercise 7.3.
2. Exercise 8.8.
3. This problem uses the data and objective (finding a minimum cost tour) from Exercise 9.3 in the textbook. For this exercise, you should submit working code along with typeset or written answers.
 1. Design an evaluation function, which, given a permutation of the 12 cities, returns the cost of touring the cities in that order.
 2. Build a function which (uniformly) randomly transposes two cities on a tour.
 3. Use these functions to run a simulated annealing algorithm that to find a low cost tour of the cities. Begin with the default (alphabetical) tour. Run it for 1000 steps, with temperature T decreasing with the number of steps as $T = 1001 - n$ where n is the step number. You should accept the new candidate if the objective improves; if it does not improve, you should accept with probability $e^{\frac{x_{old} - x_{new}}{T}}$.
 4. Repeat this experiment 20 times using different random seed. Discuss your results.
 5. Describe how you could tune this procedure to get better solutions and quicker.
 6. Solve Exercise 9.3 with Excel’s solver and compare this to the solutions obtained through simulated annealing.

Some other exercises you should try

Additional exercises from Chapters 7 and 8.