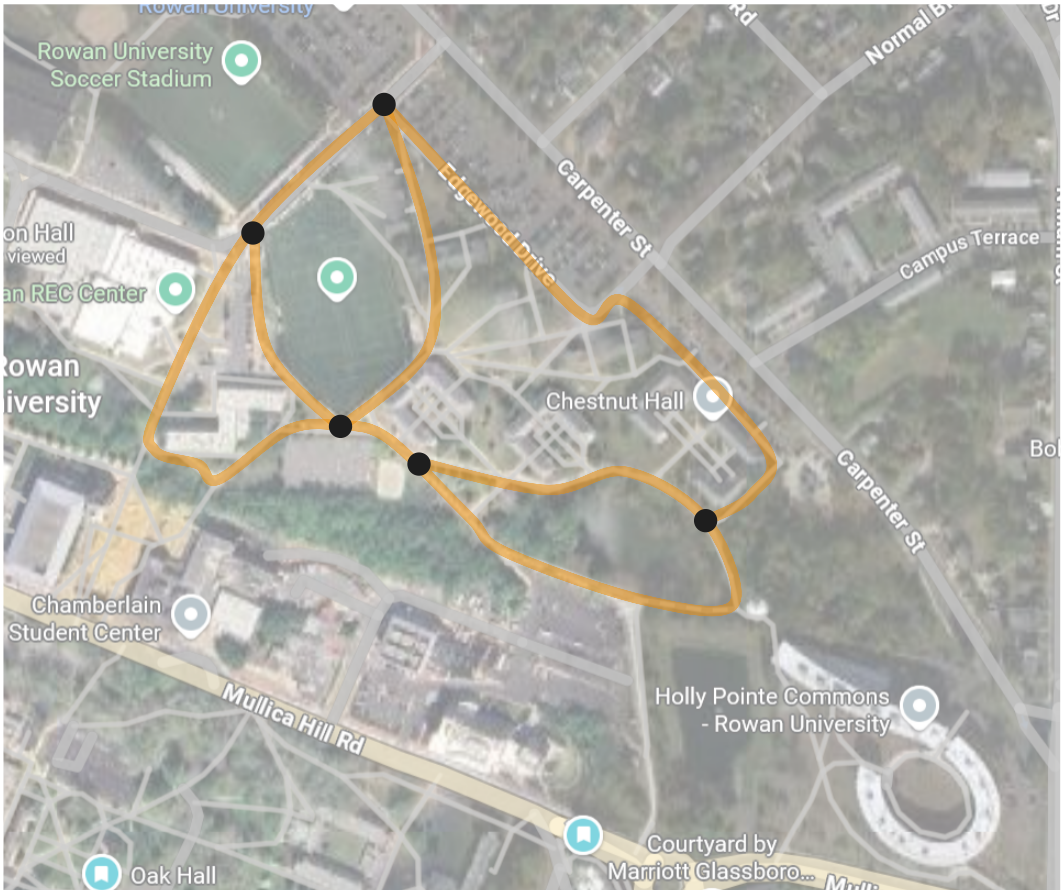
Lesson 9 — Eulerization, TSP, MST

Complete the problems below with proper justification.

Problems

Eulerization

1. Find an Eulerization of the dorm-patrol graph below.



2. To keep graduate students from staying too late in Robinson Hall, a security guard will patrol Robinson Hall. Find the most efficient route for the security guard to walk the three floors (each floor is basically a loop) and the four stairs (two stairs in the north wing, two in the south wing) and return to their starting point, with minimal retracing of their steps.

Travelling salesman problem (TSP)

35. The Brute-Force Bandits is a rock band planning a five-city concert tour. The cities and the distances (in miles) between them are given in the weighted graph shown in Fig. 6-43. The tour must start and end at *A*. The cost of the chartered bus in which the band is traveling is $8 per mile.

(a) Find the nearest-neighbor tour with starting vertex *A*. Give the cost (in $) of this tour.

(b) Find the nearest-neighbor tour with starting vertex *B*. Write the tour as it would be traveled by the band, starting and ending at *A*. Give the cost (in $) of this tour.

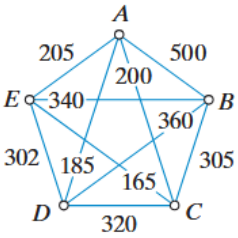
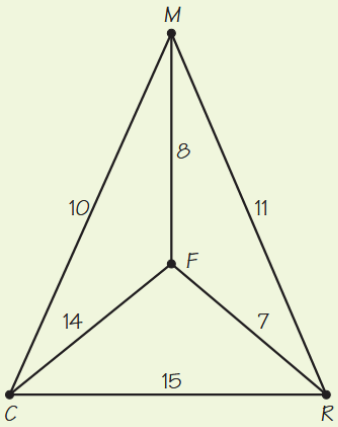


Figure 6-43

42. After a party at her house, Francine (*F*) has agreed to drive Mary (*M*), Rachel (*R*), and Constance (*C*) home. If the times (in minutes) to drive between her friends' homes are shown below, what route gets Francine back home the quickest?



Minimum spanning tree (MST)

62. A large company wishes to install a pneumatic tube system that would enable small items to be sent between any of 10 locales, possibly by using relay. If the nonprohibitive costs (in $100) are shown in the accompanying graph model, between which sites should the tube be installed to minimize the total cost?