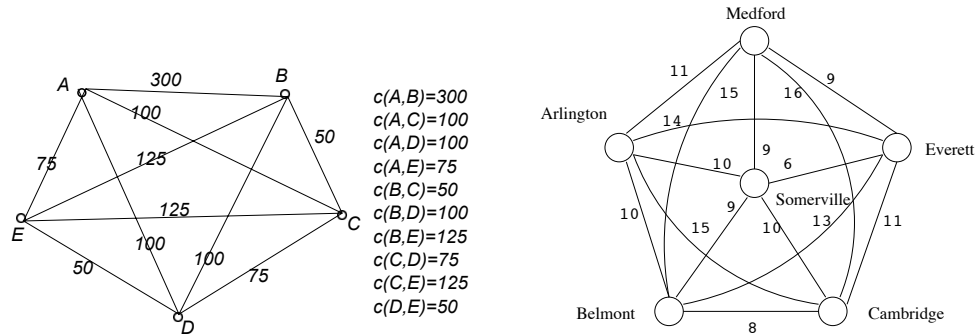


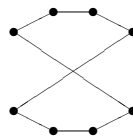
Homework #3, cs480, 30p, due: 11/20/17 at 11:59pm

The Traveling Salesman Problem (TSP) is a challenge to the salesman who wants to visit every location exactly once and return home, as quickly as possible. Each location can be reached from every other location, and for each pair of locations, there is metric that defines the travel time between them. Given the following two graphs



your task is to write Lisp functions to support hill-climbing to solve TSP for it.

- (2p) How would you represent the edge costs to support your code? Write the chosen data Lisp data structures for both graphs.
- (3p) Write a Lisp function *InitLoop* which takes an initial loop with all cities listed in alphabetical order and produces its random permutation. Your code must produce a real random shuffle of the initial loop.
- (5p) Write a Lisp function *LoopCost* which computes the cost for a given loop.
- (10p) Write a function *ImproveLoop* which takes a given loop and improves it if possible. The improvement should use *2-opt* heuristics which removes a pair of edges out of the loop and reconnects the loop to lower its cost if possible. There is only one way to reconnect a pair of edges to make a legal loop and it is shown in this figure



- (10p) Write a function *SolveTSP* which solves TSP given an input graph defined in part 1. Your code should use the functions written in parts 2-4.

Instructions for submission:

- Using script or dribble, you are to capture the output of a Lisp session in which you successfully load and execute your code, showing sufficient testing of your function(s). of execution of each of your functions. You will attach these results in your email (see next step) as "output.txt".
- Send a SINGLE email to ple13gmu.edu formatted in the following way:
 - the subject field of the email should read: CS480:HW3

- Please attach your lisp file in the email. The file should be called “yourNetIDHW3.lisp” where your netID is the first part of your GMU email (mine would be “zduricHW3.lisp”). The body should include:

 Your GMU net id

 Your name

 Homework #3

As a safety precaution, always CC yourself when you submit homework this way and keep it around until it has been graded and returned.

FINAL NOTE: we will test all code using MOSS.