

IE102 Spring 2017 Homework III - Due: March 28, Tuesday 17:00

IMPORTANT: READ BEFORE YOU START WORKING ON THE HOMEWORK

Information on Homework III

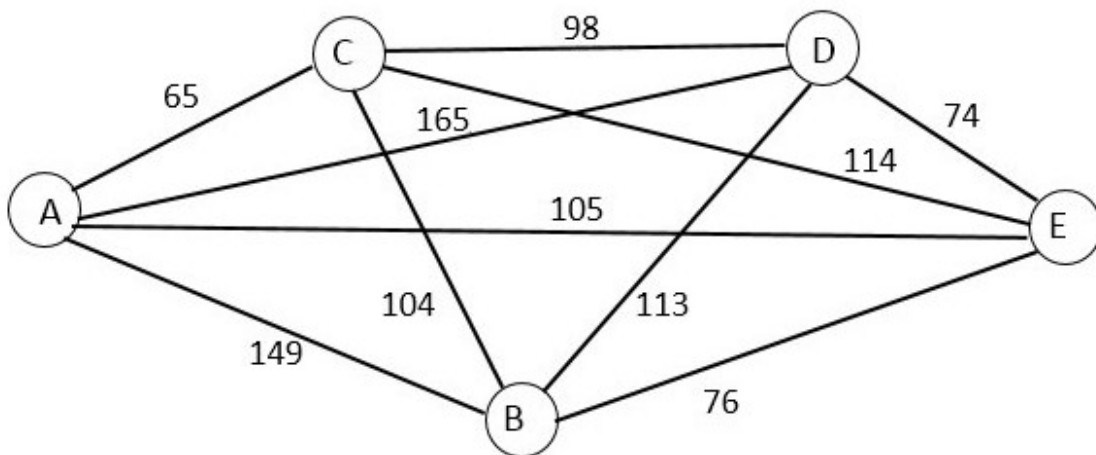
- Homework III is 3%. Make sure that you review course material before you start. Cite sources used if any.
- Homework assignment will be conducted in groups of 2. We randomly form the groups. You can find your group member and his/her contact information at the course website. **If you cannot reach your group member by all means, indicate this on the cover page of your submission.**
- Grading Policy: The homework grades will not be only based on the correctness of the answers provided, but on the perceived degree of effort on the returned assignment. There exists no motive for the students to copy the answers from someone else, since even without obtaining the correct answers one can obtain full credit. The grading scale for each question is 2 points (full effort), 1 point (some effort), and 0 (no effort or no submission).
- Academic Dishonesty (taken from IE102 Course Information): **Academic misconduct is not tolerated, and violations will be treated in accordance with the university policy.** For assignments: Discussion of the course material and working in groups are effective ways of learning. However, this does not mean that you can copy the assignment from one of your friends. You can discuss with your friends, but you should be alone, without any written solution in front of you, when you actually prepare your assignment. It is extremely important to understand the value of this exercise in the process of learning. Any violation of the above understanding will result measures outlined in the student rules and regulations.
- Submission Information: An assignment submission box will be placed in front of office EA327 on the morning of the submission date and will be removed at the time of the deadline. You need to put your assignment in the designated box before the submission deadline. **Submission via e-mail is NOT accepted.**

Contact TA Eren Özbay if you have questions related to this HW: eren.ozbay@bilkent.edu.tr

There will be an office hour prior to the submission deadline.

Question 1:

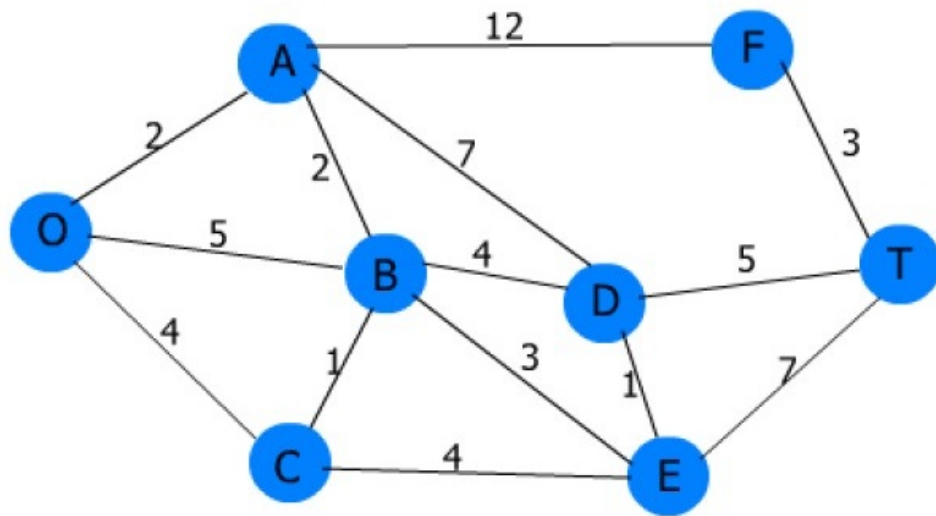
Consider the Traveling Salesman Problem (TSP) mentioned in class. Given the network below, where the numbers on the arcs represent the cost of traveling between corresponding vertices, answer the following questions.



- a) Is CDBEBAC a possible solution for the TSP problem? Why?
- b) Consider all Hamiltonian tours starting with ADB. Select the least cost tour by your choice of heuristic. What is the cost of that tour? Can that tour be the least cost tour? Why?
- c) Choose a vertex arbitrarily and apply Nearest Neighbour Heuristic. What is the cost of this tour? Is it better than the least cost tour you obtained in part (b)?
- d) Apply Greedy Heuristic. What is the cost of this tour? Is it better than the least cost tour you obtained in part (b)? In part (c)?

Question 2:

Using Dijkstra's algorithm find the minimum distance route from the origin node **O** to the destination node **T**. Note that the numbers on the arcs correspond to the distance between the two nodes it is connecting. Explain each step of the algorithm for full credit.



Question 3:

A jelly bean company wants to separate its different flavoured jelly beans to be produced in different machines so that the flavours do not get mixed up throughout the production process. For this purpose, they are about to procure new machines and dedicate them to only one type of jelly bean. Below you can find the cost matrix of producing each type of jelly bean in the corresponding machine. Assign production of each type of jelly bean to only one machine. Explain your steps thoroughly for full credit.

Machines \ Flavours	Blueberry	Bubble Gum	Lemon Lime	Marshmallow	Raspberry
Q	36	82	33	28	63
W	84	23	52	76	49
E	21	55	56	22	67
R	81	92	54	13	15
T	42	61	21	68	57
Y	53	28	78	15	46