

IE102 Fall 2018 Homework III - Due: October 30, Tuesday 17:00

IMPORTANT: READ BEFORE YOU START WORKING ON THE HOMEWORK

Information on Homework III

- Homework III is 2%. 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 EA307 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 Gül Çulhan if you have questions related to this HW:

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Question 1:

Suppose that a problem with decision variables x and y consists of the following objective function and constraints:

$$\begin{array}{ll}\text{maximize} & x + 5y \\ \text{subject to} & x + 2y \leq 5 \\ & 3x - 2y \geq 6 \\ & x - 4y \geq 0 \\ & x, y \geq 0\end{array}$$

- a) Draw the feasible region.
- b) Solve the problem graphically. What is the optimal solution and objective function value?

Question 2:

Suppose that a problem with decision variables x and y consists of the following constraints:

$$\begin{array}{l}x - y \leq 2 \\ y - 2x \leq 4 \\ x, y \geq 0\end{array}$$

- a) Draw the feasible region.
- b) Find a linear objective function for which the problem has a unique optimal solution and justify your answer by solving the problem graphically.
- c) Find a linear objective function for which the problem has alternative optimal solutions and justify your answer by solving the problem graphically. Provide two optimal solutions and objective function value.
- d) Find a linear objective function for which the problem is unbounded and justify your answer by solving the problem graphically.
- e) Can this problem be infeasible? If not, what do you need to do to make it infeasible?