

IE 375 Comments on Homework #2

General Comments:

A particularly important issue in this course should be formalism in expressions you write or present. I think that one of the most important assets you are going to have as engineers is your ability to structure and be able to express complicated problems. To express a difficult decision structure by use of a mathematical program, or a simulation model (computer program) or even with some inequalities are examples of an IE's contribution to hard problems. Similarly, your ability to formally express complicated structures makes you different from an ordinary, knowledgeable smart person, as with your equipment you can attack much harder problems. I want you to be careful with respect to this type of formalism in this course. Note that because of the idea of formalism, what you are expected to do can be summarized as follows:

- ✓ When a question is posed, express the question in mathematical (symbolic) terms. Note that you have to give definitions in case you are using parameters to specify quantities and of course decision variables (almost always this is the case! – if you are not sure what a parameter or a decision variable means LEARN). Note that you would get a considerable % of the total available grade in this exam if you have defined the decision variables used.
- ✓ Never start writing up a bunch of numbers without stating what you are doing. It is likely that you are going to have a mistake in writing those specific numbers, and hence it is always meaningful to specify abstractly the quantities you want to write (example: using a summation term, identifying an index properly, etc.).

Homework 2 statistics:

Average: 1.04 (out of 2, with bonus 3)

Standard Deviation: 0.83

Grade	3	2	1.5	1	0.5	0
# of people	2	7	5	13	2	11

Question 1

This is a standard question. You need to be quick in modeling and understand the output, so that you can focus on more relevant issues in planning.

Comments regarding your performance:

- In question 1, *part a*, some of you did not compute the aggregate demands in a correct way as you had doubts about the how and why we use aggregation and aggregate products. Please read the textbook and learn the definition of aggregate products.
- In question 1, *part b*, most of you wrote the model successfully. Some of you stated their models explicitly whereas some stated implicitly. Both are acceptable.
- In question 1, *part c*, many of you did not state the usage of shadow prices.
- In question 1, *part d*, many of you suggested solutions but few students only computed the cost of new solution. Please, read questions carefully and try to solve them completely.

- In question 1, *part e and part f*, you should consider the shadow prices and reduced costs from the sensitivity analysis. The other approaches did not get full points.

Grade	2	1.5	1	0.5	0
# of people	3	8	11	0	18

Question 2

This is a question that asks you to approach problems in a structured way. We are aware that any solution which is described like how we did in the problem is **inferior** to what you obtain in optimization. Nevertheless, you must be able to write structural inequalities so that you can describe what is asked analytically. This also helps in constructing constraints for mathematical programming problems. This is an example for the issue of formalism that we have in the beginning of this document.

Comments regarding your performance:

- In this question, most of you tried to make an LP model minimizing total cost although we expect a workforce plan satisfying some conditions such as not laying-off, hiring for each month or at the beginning of first month, and desired ending inventory. Some LP solutions satisfied these conditions and gave the right answers, but most of them did not.
- In the second part, you should define a variable for the number of hired workers at the beginning of first month and find its value by solving equations. Some of you tried to give values for this variable. We accepted consistent solutions hence regardless of your grade you should also review our procedure in the answer key.
- In the calculation of costs, some of you ignored the inventory levels at the end of each month, and some of you did not consider that a worker will produce all the quantity he can, regardless it is desirable or not. You should be careful about assumptions in the question.

Grades	2	1.5	1	0.5	0
# of people	6	9	7	7	11