IE 460 Comments on Homework #2

General Comments:

This homework is less demanding than the first one. The questions can be approached if you did the readings and/or followed the lectures.

My expectations when asking these questions were twofold:

1) Question 1: You should be able to model conceptual situations – no need to have numbers here. In approaching any real-life problem, this should be your first step: to conceptualize what is going on after you learn about the system. Without this navigation, the solutions you bring will not have a systemic effect but would be synonymous with putting a patch on the wound without any medicine.

2) Question 2: You should be able to implement algorithms you have seen but also understand when and how they may fail. You need to ensure computing number is done correctly and the comparison base is established correctly (costs associated with different approaches) so that any intuition can be demonstrated with the results.

The general comments that I have for HW#1 are valid here, as well.

Homework 2 statistics:

Average: 1.49 (out of 2), Standard Deviation: 0.65

Grades	**0**	**1**	**2**	**3**
# of students	6	8	22	1

Question 1

The question concerns a deterministic demand, infinite horizon serial system with three stages. In class, we saw how to deal with the two-stage problem. In the question, even though there were three stages, two of them were told to use the same lot size, and hence, the problem is, in my opinion, a straightforward extension of the one you have seen in class.

Part a) of the question asked you to write the decision variables.

Part b) of the question asked you to write inventory carrying cost. I didn't enforce a specific approach and allowed you to use standard holding cost or echelon-holding cost computations. Of course, if you had used the echelon stock concept, it would have been much more manageable.

Part c) asked you to write the average cost function. I am sure (without the grading) that some of you still need help with the notion of averages.

Finally, in Part d) you are asked to give a possible algorithm to solve for n, integer multiple of the lot size. The following is what I expected, the same approach we take to solve similar problems, where one variable is integer, and the other is continuous:

- Given n, solve for Q3. Note that this means you are also solving for Q1 and Q2. Call it Q3*.
- Substitute Q3*in ATC(.) to obtain ATC(Q3*, n)

- Find n* by (1) enumerate ATC(Q3*, n) for all possible n values and select the minimum, or (2) by showing a property (such as convexity) on ATC(Q3*, n) with respect to n, simplify the search in (1).

Note that this was an exam question in one of the previous years.

Comments regarding your performance and Grading:

- Most did not use added values in the calculations in this question.

- Some needed clarification while using value-added concepts in the calculations. You need to understand the meaning of added values to use them correctly.

- Most of you did not solve part d correctly. Please consider total cost is a function of n and Q simultaneously. You must take the partial derivative of TC in terms of both Q and continuous n consecutively and equate it to zero (first-order condition) to find their optimal values. Of course, we do it in steps and always remember that n is an integer.

- Grading: In general, if the formulas were not provided but the answers were clear (the numbers are explained in a way) and correct, no points were deducted. If formulas were provided, but there were some mistakes, and the final answers were incorrect, no points were deducted. Students who solved all four parts entirely or with minor errors got full points (2 points) from this question. Students who solved all four parts with fewer crucial mistakes or did not solve one of the parts received 1.5 points. Others got 1 point (out of 2) - for instance, incorrect usage of the echelon concepts. Receiving 0 points means that your solution is either entirely wrong or there is no solution.

Question 1 Statistics:

Average: 1.12 (out of 2), Standard Deviation: 0.46

Grades	**0**	**1**	**1.5**	**2**
# of students	7	16	5	9

Question 2

Part a) This is simply an implementation of the algorithm you have seen in class. Make sure that the ATC is computed in this case.

Part b), on the other hand, deals with a solution that handles both items independently. Solve, record the ATC's and compare it with the first one.

Why do you think Mr. Çokbilir was skeptical about solving the problem jointly? Looking at the numbers, we can see that demands differ significantly, whereas the unit costs are similar. Hence, if you solve for independent EOQ's, the cycle times you obtain will vary for the items. Thus, pushing the cycle times to be related with an integer (in other words, one being an integer multiple of the other) may not necessarily yield a lower total ATC.

Note that this was an exam question in one of the previous years.

Comments regarding your performance and Grading:

- Most needed clarification (and hence failed to approach correctly) about the correct approach in *part a* and used the Milkrun approach for solving, which caused some deduction in the points. The question statement showed that you should use the third approach in your solution to attain *m* values.
- Most did not calculate the base cycle time correctly.
- In part b, some did not compare the total cost of the independent and the coordinated cases.
- Grading: No points were deducted if both parts were correct or some minor mistakes were observed. In *part b*, if you did not compare the cost of the two approaches, you still received 1.5 points. Students who used the wrong algorithm received 1 point.

Question 2 Statistics:

Average: 1.23 (out of 2), Standard Deviation: 0.84

Grades	**0**	**1**	**1.5**	**2**
# of students	12	4	1	20