

IE 375 Production Planning, Fall 2020

Assignment: Case 1

Due: October 6, Tuesday, strict due-time: 23:00

Information on the case assignments:

- 1) Each case is 10%.
- 2) You are permitted to work together in groups of two students on the case assignments. If you prefer, you can work on the case alone, but this is not recommended.
- 3) Case 1 is an assignment for all sections of IE 375. Hence, students from different sections can be in the same group. Note that NOT all the case assignments will be for all sections.
- 4) Case 1 involves a lot of computations that should be handled as efficiently as possible. A similar computation may be required in different parts of the case. Therefore, you are strongly encouraged to use a spreadsheet or write a computer code for your computations. Please report the code that you use and the formulas that you implement. DO NOT simply submit the output of your code or spreadsheet.
- 5) Review the course material before you start. Cite sources used if any.
- 6) Present your results in such a way that you show your understanding of the solution approach as well as the solution. Your report should clearly reflect your knowledge and ideas so that somebody else (your peers or superiors) can easily follow and work on it for further needs.

Academic dishonesty (taken from IE 375 Course Information): You are not allowed to communicate with other groups, but instead you can contact the TA for your questions. The communication among the group members is essential and expected for the success of the outcome. Any violation of the above understanding will result in measures outlined in the student rules and regulations.

Submission information: Please send your solution as a pdf file to Izzet Egemen Elver (egemen.elver@bilkent.edu.tr) if you are in Section 1 and Parinaz Toufani (parinaz.toufani@bilkent.edu.tr) if you are in Section 2 or 3. If two group members are not in the same section, please send your solution to both TAs.

What is expected? How to study?

To answer the questions, you need to go over the course materials as well as the reading materials from the textbook. Make sure that you understand each case question and present your answers clearly. Questions are numeric and hence you have chances of making computational errors. In order to avoid the possibility of receiving no partial grade, present all the formulas that you are using and explain how you are proceeding with computations. If you use a computer code for your computations, report the code and explain how you are implementing the formulas clearly. Make sure that you present your findings clearly and neatly.

Luxe Glasses Part I

Luxe is a new optic store located in Florence which has been operating for a couple of years. Luxe is open for 6 days in a week and assume there are 48 weeks in a year. There are two types of glasses that Luxe sells: regular glasses and sunglasses. The distributor of the glasses is in China. It costs €3000 to place an order for regular glasses and €4000 to place an order for sunglasses. The lead time of the orders is expected to be six weeks. The orders of the regular glasses and sunglasses are independent from each other.

For the regular glasses, Luxe records the demand data daily. However, it is almost always the case that the ordering decisions are given over the weekend. Luxe purchases one regular glasses for €40 and it costs €8 to keep one regular glasses for one year in the inventory.

For the sunglasses, Luxe keeps the data of monthly sales. The unit cost of sunglasses is €60 and Luxe sells them for €150 per unit. Any unsold sunglasses on season is sold at discount for €40. The holding cost for sunglasses is €6 per unit per month.

Regular Glasses

- A) You are given the daily demand data about the last year's sales of regular glasses at the end of this document. Analyze the data to determine an appropriate method for forecasting weekly demands.

Steps (Following the “Note of Forecasting” course document):

- Consider different forecasting methods that are applicable for the given data. Determine the initial parameter values of these methods based on the data available in the first 36 weeks.
- Compare these forecasting methods by calculating the one-step-ahead forecast errors from week 37 through week 48. Use the MAD as the basis to compute forecast error. Find the most appropriate method and its parameter values.

- B) Using the best method found above, forecast the demand for week 49. Also, forecast the total demand over the lead-time (from week 49 through week 54).

Sunglasses

- A) You are given the monthly demand data about the last three years' sales of sunglasses at the end of this document. Analyze the data to determine an appropriate method for forecasting monthly demands.

Steps (Following the “Note of Forecasting” course document):

- Consider different forecasting methods that are applicable for the given data. Determine the initial parameter values of these methods based on the data available in the first two years.
- Compare these forecasting methods by calculating the one-step-ahead forecast errors in the third year. Use the MAD as the basis to compute forecast error. Find the most appropriate method and its parameter values.

- B) Using the best method found above, forecast the demand for January and February of the fourth year. Also, forecast the total demand over the fourth year.

Regular Glasses:

Week Day	1	2	3	4	5	6	7	8	9	10	11	12
Monday	23	23	20	24	21	27	24	19	21	22	23	20
Tuesday	16	19	21	21	22	16	21	19	18	24	18	19
Wednesday	28	24	22	22	23	18	22	21	17	20	22	22
Thursday	22	28	24	27	27	29	18	20	17	27	27	28
Friday	30	30	26	27	33	30	26	23	24	29	29	24
Saturday	26	23	21	30	29	28	29	23	30	22	25	22
Week Day	13	14	15	16	17	18	19	20	21	22	23	24
Monday	23	24	24	27	23	24	24	26	26	20	25	20
Tuesday	20	24	15	21	23	24	20	24	26	26	23	21
Wednesday	28	17	23	24	19	28	22	21	19	20	24	23
Thursday	28	21	23	25	31	25	26	27	31	26	25	21
Friday	30	19	29	29	27	24	30	23	24	26	28	22
Saturday	26	30	28	23	26	26	27	25	24	21	28	19
Week Day	25	26	27	28	29	30	31	32	33	34	35	36
Monday	28	22	27	22	26	23	21	21	21	22	19	20
Tuesday	22	20	25	24	25	29	25	15	16	27	21	24
Wednesday	19	21	20	23	24	26	19	24	25	20	21	18
Thursday	23	32	20	28	23	21	22	22	28	27	19	19
Friday	21	30	22	25	23	26	33	21	20	21	30	24
Saturday	30	25	25	26	24	34	17	31	30	22	22	31
Week Day	37	38	39	40	41	42	43	44	45	46	47	48
Monday	19	17	23	22	27	22	20	21	20	18	23	22
Tuesday	28	18	28	23	19	20	23	21	23	23	18	19
Wednesday	23	25	27	14	26	21	23	23	20	18	24	18
Thursday	22	30	27	27	26	32	24	21	15	31	19	36
Friday	26	25	29	21	27	24	29	33	22	23	25	33
Saturday	23	18	26	30	28	25	34	26	27	23	22	22

Sunglasses:

Month	Year 1	Year 2	Year 3
January	89	116	108
February	105	4	82
March	55	48	90
April	55	86	80
May	82	70	76
June	179	0	99
July	86	103	149
August	148	143	75
September	36	107	58
October	87	44	51
November	20	2	54
December	56	100	41