

TOPIC 6: FORECASTING

Practice Problems

1. A firm has the following order history over the last 6 months.

<u>Month</u>	<u>Order</u>
February	120
March	95
April	100
May	75
June	100
July	50

- a. What would be a 3-month weighted moving average forecast for August, using weights of 8 for the most recent month, 5 for the month preceding the most recent month, and 3 for the month preceding that one?
- b. What would be a naïve forecast for August?
2. a. Given the following data, use exponential smoothing ($\alpha = 0.2$) to develop a demand forecast for period 6. Assume the forecast for the initial period is 5.

<u>Period</u>	<u>Demand</u>
1	7
2	9
3	5
4	9
5	13

- b. If the demand of period 6 turns out to be 12, what are the mean absolute deviation (MAD) and mean square error (MSE) of the forecasts?

3. The Don't-Drink-and-Drive mountain bike dealer in the Spokane area wants to be able to forecast accurately the demand for the Don't-Drink-and-Drive 2120 VT bike. From sales records, the dealer has accumulated the following data for the year 2001.

<u>Month</u>	<u>Sales</u>
January	9
February	7
March	10
April	8
May	7
June	12
July	10
August	11
September	12
October	10
November	14
December	16

- Compute a 3-month moving average forecast of demand for each month from April 2001 through December 2001.
- Compute a 5-month moving average forecast for each month from June 2001 through December 2001.
- Compare the two forecasts computed in parts (a) and (b) using MAD. Which one should the dealer use in the future?

4. The following is the demand for espresso beans at the espresso bar in the Bookie for fiscal year 2001.

Month	Actual Demand (lbs.)
July 2000	99.5
August 2000	130.0
September 2000	190.0
October 2000	200.0
November 2000	195.0
December 2000	125.5
January 2001	160.5
February 2001	189.5
March 2001	172.5
April 2001	236.5
May 2001	118.6
June 2001	101.5

- Given a demand forecast of 100.0 for July 2000, develop a demand forecast for the rest of fiscal year 2001 using exponential smoothing. Use a smoothing constant of .20.
- Using *your* forecasts from part a, what is the mean absolute deviation (MAD)?
- Using *your* forecasts from part a, what is the mean squared error (MSE)?

5. The following is the monthly sales of mugs of Budweiser at the Sports Page during 2001.

Month	Actual Sales (in 100s)
January	20
February	21
March	17
April	20
May	15
June	14
July	16
August	18
September	23
October	20
November	21
December	13

- Compute a 3-month moving average demand forecast for each month from April through December.
- Compute a 3-month weighted average demand forecast for each month from April through December, using a weight of 50% for the most recent month and 25% for the previous two months.
- Calculate the MAD for each of the above two methods.
- Calculate the MSE for each of the above two methods.
- Which method should be used in the future?

6. The following data represent the number of starting freshmen for each year since 1988 at Washington State University.

<u>Year</u>	<u>Freshmen</u>
1988	2328
1989	2584
1990	2233
1991	1864
1992	2039
1993	2440
1994	2481
1995	2530
1996	2301
1997	2291
1998	2978
1999	2487

- Compute a 3-year moving average forecast of starting freshman for each year starting with 1991.
- Compute a 3-year weighted average forecast of starting freshman for each year starting with 1991. For the most recent month use a weight of 50%, 30% for the next, and 20% for the third.
- Compute a 4-year moving average forecast of starting freshman for each year starting with 1992.
- Compute a 4-year weighted average forecast of starting freshman for each year starting with 1992. For the most recent month use a weight of 40%, 30% for the next, 20% for the third, and 10% for the last.
- Assuming that the Office of Admissions forecasted the demand for 1988 perfectly, calculate an exponential smoothing forecast for 1989 through 2000 using a smoothing constant of .50.
- Calculate the MAD of your forecasts for the previous 5 forecasting methods.
- Calculate the MSE of your forecasts for the previous 5 forecasting methods.