

# [Week 1 assignment](https://assignbuster.com/week-1-assignment/)

[Business](https://assignbuster.com/essay-subjects/business/)

The following gives the number of pints of type A blood used at Woodlawn Hospital in the past 6 weeks: Week Of Pints Used August 31 360 September 7389
September 14
410
September 21
381
September 28
368
October 5
374
a) Forecast the demand for the week of October 12 using a 3-week moving average.
[381+368+374]/3 = 374. 33 pints
b) Use a 3-week weighted moving average, with weights of . 1, . 3, and . 6, using . 6 for the most recent week. Forecast demand for the week of October 12.
381\*0. 1
38. 1
368\*0. 3
110. 4
374\*0. 6
224. 4
Forecast (October 12).
372. 9
c) Compute the forecast for the week of October 12 using exponential smoothing with a forecast for August 31 of 360 andα = . 2.
Week Of
Pints Used
Forecast
Forecasting error
Error\*0. 20
Forecast
August 31
360
360
0
0
360
September 7
389
360
29
5. 8
365. 8
September 14
410
365. 8
44. 2
8. 84
374. 64
September 21
381
374. 64
6. 36
1. 272
375. 912
September 28
368
375. 912
-7. 912
-1. 5824
374. 3296
October 5
374
374. 32296
-0. 3296
-0. 06592
374. 2636
The Carbondale Hospital is considering the purchase of a new ambulance. The decision will rest partly on the anticipated mileage to be driven next year. The miles driven during the past 5 years are as follows:
Year
Mileage
1
3, 000
2
4, 000
3
3, 400
4
3, 800
5
3, 700
\*Note: means the problem may be solved with POM for Windows and/or Excel OM.
a. Forecast the mileage for next year using a 2-year moving average.
[3, 700+3, 800]/2 = 3, 750 ml.
b. Find the MAD based on the 2-year moving average forecast in part (a).(Hint: You will have only 3 years of matched data.)
Year
Mileage
Two-year Moving Average
Error
/error/
1
3, 000
2
4, 000
3
3, 400
3, 500
-100
100
4
3, 800
3, 700
100
100
5
3, 700
3, 600
100
100
Totals
100
100
Mfile:///D:/Downloads/878980\_t2\_202013\_20econ11026\_20\_20assessment\_20question\_20. pdfAD = 300/3 = 100
c. Use a weighted 2-year moving average with weights of . 4 and . 6 to forecast next year’s mileage. (The weight of . 6 is for the most recent year.) What MAD results from using this approach to forecasting? (Hint: You will have only 3 years of matched data.)
Year
Mileage
Forecast
Error
/error/
1
3, 000
2
4, 000
3
3, 400
3, 600
-200
200
4
3, 800
3, 640
160
160
5
3, 700
3, 640
60
60
420
Forecasting for year 6 = 3, 740
MAD = 140[420/3]
d. Compute the forecast for year 6 using exponential smoothing, an initial forecast for year 1 of 3, 000 miles, and α = . 5.
Year
Mileage
Forecast
Forecast Error
Error\*0. 50
New Forecast
1
3, 000
3, 000
0
0
3, 000
2
4, 000
3, 000
1, 000
500
3, 500
3
3, 400
3, 600
-100
-50
3, 450
4
3, 800
3, 640
350
175
3, 625
5
3, 700
3, 640
75
38
3, 663
Total
1, 325
Therefore, forecast = 3, 663 miles.
4. 9
Dell uses the CR5 chip in some of its laptop computers. The prices for the chip during the past 12 months were as follows:
Month
Price per Chip
Month
Price per Chip
January
$1. 80
July
1. 80
February
1. 67
August
1. 83
March
1. 70
September
1. 70
April
1. 85
October
1. 65
May
1. 90
November
1. 70
June
1. 87
December
1. 75
a) Use a 2-month moving average on all the data and plot the averages and the prices.
Month
Price per Chip ($)
2-month moving average
January
1. 8

February
1. 67

March
1. 7
1. 735
April
1. 85
1. 685
May
1. 9
1. 775
June
1. 87
1. 875
July
1. 8
1. 885
August
1. 83
1. 835
September
1. 7
1. 815
October
1. 65
1. 765
November
1. 7
1. 675
December
1. 75
1. 675
b) Use a 3-month moving average and add the 3-month plot to the graph created in part (a).
Month
Price per Chip ($)
3-month moving average
January
1. 8

February
1. 67

March
1. 7

April
1. 85
1. 72
May
1. 9
1. 74
June
1. 87
1. 82
July
1. 8
1. 87
August
1. 83
1. 86
September
1. 7
1. 83
October
1. 65
1. 78
November
1. 7
1. 73
December
1. 75
1. 68
December + 1 Month

1. 70
c) Which is better (using the mean absolute deviation): the 2-month average or the 3-month average?
Month
Price per Chip ($)
2-month moving average
Error
Absolute
January
1. 8

February
1. 67

March
1. 7
1. 735
-0. 035
0. 03
April
1. 85
1. 685
0. 165
0. 17
May
1. 9
1. 775
0. 125
0. 13
June
1. 87
1. 875
-0. 005
0. 00
July
1. 8
1. 885
-0. 085
0. 09
August
1. 83
1. 835
-0. 005
0. 00
September
1. 7
1. 815
-0. 115
0. 12
October
1. 65
1. 765
-0. 115
0. 12
November
1. 7
1. 675
0. 025
0. 03
December
1. 75
1. 675
0. 075
0. 08
MAD
0. 08
Month
Price per Chip ($)
3-month moving average
Error
Absolute
January
1. 8

February
1. 67

March
1. 7

April
1. 85
1. 72
0. 13
0. 13
May
1. 9
1. 74
0. 16
0. 16
June
1. 87
1. 82
0. 05
0. 05
July
1. 8
1. 87
-0. 07
0. 07
August
1. 83
1. 86
-0. 03
0. 03
September
1. 7
1. 83
-0. 13
0. 13
October
1. 65
1. 78
-0. 13
0. 13
November
1. 7
1. 73
-0. 03
0. 03
December
1. 75
1. 68
0. 07
0. 07
MAD
0. 09
The 2-month average is better because it has a lower MAD, hence more accurate.
d) Compute the forecasts for each month using exponential smoothing, with an initial forecast for January of $1. 80. Use α = . 1, then α = . 3, and finally α = . 5. Using MAD, which α is the best?
Month
Price per Chip ($)
Forecast using exponential smoothing ( alpha = 0. 1)
Error
Absolute
January
1. 8
1. 8
0. 00
0. 000
February
1. 67
1. 8
-0. 13
0. 130
March
1. 7
1. 79
-0. 09
0. 087
April
1. 85
1. 78
0. 07
0. 072
May
1. 9
1. 79
0. 11
0. 115
June
1. 87
1. 80
0. 07
0. 073
July
1. 8
1. 80
0. 00
0. 004
August
1. 83
1. 80
0. 03
0. 026
September
1. 7
1. 81
-0. 11
0. 106
October
1. 65
1. 80
-0. 15
0. 146
November
1. 7
1. 78
-0. 08
0. 081
December
1. 75
1. 77
-0. 02
0. 023
MAD
0. 072
Month
Price per Chip ($)
Forecast using exponential smoothing ( alpha = 0. 3)
Error
Absolute
January
1. 8
1. 8
0. 00
0. 000
February
1. 67
1. 8
-0. 13
0. 130
March
1. 7
1. 76
-0. 06
0. 061
April
1. 85
1. 74
0. 11
0. 107
May
1. 9
1. 77
0. 13
0. 125
June
1. 87
1. 81
0. 06
0. 058
July
1. 8
1. 83
-0. 03
0. 030
August
1. 83
1. 82
0. 01
0. 009
September
1. 7
1. 82
-0. 12
0. 124
October
1. 65
1. 79
-0. 14
0. 136
November
1. 7
1. 75
-0. 05
0. 046
December
1. 75
1. 73
0. 02
0. 018

MAD
0. 070
Month
Price per Chip ($)
Forecast using exponential smoothing ( alpha = 0. 5)
Error
Absolute
January
1. 8
1. 8
0. 00
0. 000
February
1. 67
1. 8
-0. 13
0. 130
March
1. 7
1. 74
-0. 03
0. 035
April
1. 85
1. 72
0. 13
0. 133
May
1. 9
1. 78
0. 12
0. 116
June
1. 87
1. 84
0. 03
0. 028
July
1. 8
1. 86
-0. 06
0. 056
August
1. 83
1. 83
0. 00
0. 002
September
1. 7
1. 83
-0. 13
0. 129
October
1. 65
1. 76
-0. 11
0. 114
November
1. 7
1. 71
-0. 01
0. 007
December
1. 75
1. 70
0. 05
0. 046
MAD
0. 066
The Forecast using exponential smoothing using alpha = 0. 5 is better because it has the lowest MAD (Abraham & Leddolter, 2005).
4. 11
a) Use exponential smoothing with a smoothing constant of 0. 3 to forecast the registrations at the seminar given in Problem 4. 10. To begin the procedure, assume that the forecast for year 1 was 5, 000 people signing up. (Abraham & Leddolter, 2005).
Year
Registrations (000)
Forecast registrations (‘ 000) using exponential smoothing ( alpha = 0. 3)
1
4
5
2
6
4. 7
3
4
5. 09
4
5
4. 76
5
10
4. 83
6
8
6. 38
7
7
6. 87
8
9
6. 91
9
12
7. 54
10
14
8. 87
11
15
10. 41
b) What is the MAD?
Year
Registrations (000)
Forecast registrations (‘ 000) using exponential smoothing ( alpha = 0. 3)
Error
Absolute
1
4
5
-1. 00
1. 00
2
6
4. 7
1. 30
1. 30
3
4
5. 09
-1. 09
1. 09
4
5
4. 76
0. 24
0. 24
5
10
4. 83
5. 17
5. 17
6
8
6. 38
1. 62
1. 62
7
7
6. 87
0. 13
0. 13
8
9
6. 91
2. 09
2. 09
9
12
7. 54
4. 46
4. 46
10
14
8. 87
5. 13
5. 13
11
15
10. 41
4. 59
4. 59
MAD
2. 44
Reference
Abraham, B., & Leddolter, J. (2005). Statistical Methods for Forecasting. New York: Wiley.