Flores, Paul Jos Mstc F. CSIT212 - F3 20/11/2024

Period	Month	Actual demand	2-month moving AVG	3-month weighted moving AVG.
1	Jan	37	-	-
2	Feb	40	-	-
3	Mar	41	(40+37)/2 = 38.5 or 39	-
4	Apr	37	(41+40)/2 = 40.5 or 41	(4x41+2x40+1x37)/7 = 40
5	May	45	(37+41)/2 = 39	(4x37+2x41+1x40)/7 = 39
6	Jun	50	(45+37)/2 = 41	(4x45+2x37+1x41)/7 = 42
7	Jul	43	(50+45)/2 = 47.5 or 48	(4x50+2x45+1x37)/7 = 47
8	Aug	47	(43+50)/2 = 46.5 or 47	(4x43+2x50+1x45)/7 = 45
1	Sep	56	(47+43)/2 = 45	(4x47+2x43+1x50)/7 = 46
10	Oct	-	(56+47)/2 = 51.5 or 52	(4x56+2x47+1x43)/7 = 52

2-month moving AVG.

MAD	MSE	MAPE	
-	-	-	MAD = 5.29
-	-	-	MSE = 40.43
|41-39| = 2	$(2)^2 = 4$	2/41 = 0.05	MAPE = 11.29
|37-41| = 4	$(4)^2 = 16$	4/37 = 0.11	
|45-39| = 6	$(6)^2 = 36$	6/45 = 0.13	
|50-41| = 9	$(9)^2 = 81$	9/50 = 0.18	
|43-48| = 5	$(5)^2 = 25$	5/43 = 0.12	
|47-47| = 0	0	0	
|56-45| = 11	$(11)^2 = 121$	11/56 = 0.20	
5.29	40.43	11.29	

2 + 4 + 6 + 9 + 5 + 0 + 11 = 37/7 = 5.29 (MAD)

4 + 16 + 36 + 81 + 25 + 121 + 0 = 283/7 = 40.43 (MSE)

0.05 + 0.11 + 0.13 + 0.18 + 0.12 + 0 + 0.20 = 79/7 = 0.1129 x 100 = 11.29 (MAPE)

3-month weighted AVG.

MAD	MSE	MAPE
–	–	–
–	–	–
–	–	–
$\|(37-40)\| = 3$	$(3)^2 = 9$	$3/37 = 0.08$
$\|(45-39)\| = 6$	$(6)^2 = 36$	$6/45 = 0.13$
$\|(50-42)\| = 8$	$(8)^2 = 64$	$8/50 = 0.16$
$\|(43-47)\| = 4$	$(4)^2 = 16$	$4/43 = 0.09$
$\|(47-45)\| = 2$	$(2)^2 = 4$	$2/47 = 0.04$
$\|(56-44)\| = 10$	$(10)^2 = 100$	$10/56 = 0.18$
5.50	38.17	11.33

MAD = 5.50
MSE = 38.17
MAPE = 11.33

$3+6+8+4+2+10 = 33/6 = 5.50$ (mad)

$9+36+64+16+4+100 = 229/6 = 38.17$ (MSE)

$0.08+0.13+0.16+0.09+0.04+0.18 = 0.68/6 = 0.1133 \times 100 = 11.33$ (MAPE)

Forecast with $\alpha = 0.7$

40

$(40 + 0.7(37-40)) = 37.90$

$(37.90 + 0.7(37.90-40) = 39.37$

$(39.37 + 0.7(41-39.37)) = 40.51$

$(40.51 + 0.7(37-40.51)) = 38.05$

$(38.05 + 0.7(45-38.05) = 42.92$

$(42.92 + 0.7(50-42.92) = 47.88$

$(47.88 + 0.7(43-47.88) = 44.46$

$(44.46 + 0.7(47-44.46) = 46.24$

$(46.24 + 0.7(54-46.24) = 53.07$ (Forecast for October)

Forecast with $\alpha = 0.7$

MAD	MSE	MAPE	MAD = 4.78
$\lvert(37-40)\rvert = 3$	$(3)^2 = 9$	$3/37 = 0.08$	MSE = 29.44
$\lvert(40-38)\rvert = 2$	$(2)^2 = 4$	$2/40 = 0.05$	MAPE = 10.56
$\lvert(41-39)\rvert = 2$	$(2)^2 = 4$	$2/41 = 0.05$	
$\lvert(37-41)\rvert = 4$	$(4)^2 = 16$	$4/37 = 0.11$	
$\lvert(45-38)\rvert = 7$	$(7)^2 = 49$	$7/45 = 0.16$	
$\lvert(50-43)\rvert = 7$	$(7)^2 = 49$	$7/50 = 0.14$	
$\lvert(43-48)\rvert = 5$	$(5)^2 = 25$	$5/43 = 0.12$	
$\lvert(47-44)\rvert = 3$	$(3)^2 = 9$	$3/47 = 0.06$	
$\lvert(56-46)\rvert = 10$	$(10)^2 = 100$	$10/56 = 0.18$	
4.78	29.44	10.56	

$3+2+2+4+7+7+5+3+10 = 43/9 = 4.78$ (MAD)

$9+4+4+16+49+49+25+9+100 = 256/9 = 29.44$ (MSE)

$0.08+0.05+0.05+0.11+0.16+0.14+0.12+0.06+0.18 = 0.95/9 = 0.10555$

$0.10555 \times 100 = 10.56$ (MAPE)

Since the tables are disconnected here are the summary:

The forecast for October is 51.5 (using the 2-month avg), 51.57 (using the 3-month weighted avg.), and 4.78 (using exponential smoothing). The most accurate one is the model using exponential smoothing. technique.