

Sales code-For the weekly sales project, the code basically walks through the whole forecasting process step-by-step. First, it loads the 29 weeks of sales into a vector so R has something to work with. Then it uses rolling windows to calculate the 3-, 4-, and 5-week moving averages. That part smooths out the random ups and downs so you can see the general direction the sales are heading. After that, the code runs exponential smoothing with $\alpha = 0.5$, which is just a way of giving more weight to recent weeks without completely ignoring the older ones.

Once the forecasts are made, the code measures how accurate each method is using MSE, MAE, and MAPE. Those metrics basically tell you how far off the predictions were from the real numbers. Then it uses an optimization function to find the best possible α value for exponential smoothing, the one that gives the lowest MSE. Finally, it reruns the smoothing with that optimized α and compares all the methods to see which one actually performs the best. Overall, the code is just building forecasts, checking how good they are, and figuring out which approach makes the most sense for the data.

BA Chapter 8-For the Vintage Restaurant case, the code starts by loading the 36 months of sales from the textbook. Then it makes a time-series plot so you can actually see the trend and the seasonal pattern across the three years. After that, it fits a simple trend regression using the month number as the predictor. That gives you a straight-line model you can use to forecast all 12 months of Year 4, even though it doesn't account for seasonality.

To fix that, the code builds a second model that includes both the trend and monthly seasonal dummy variables. This one captures the repeating pattern in the data, like how certain months are always higher or lower. Using that model, it generates a full set of seasonally adjusted forecasts for Year 4. The code also calculates the forecast error for January of Year 4 by comparing the predicted value to the actual 295 the case problem gives you. At the end, it puts all the forecasts into a clean table so you can easily compare the trend-only model to the trend-plus-seasonality model. It's basically a full forecasting breakdown that shows how the restaurant's sales behave and which model does the best job predicting them.