THE UNIVERSITY OF TEXAS AT AUSTIN
McCombs School of Business

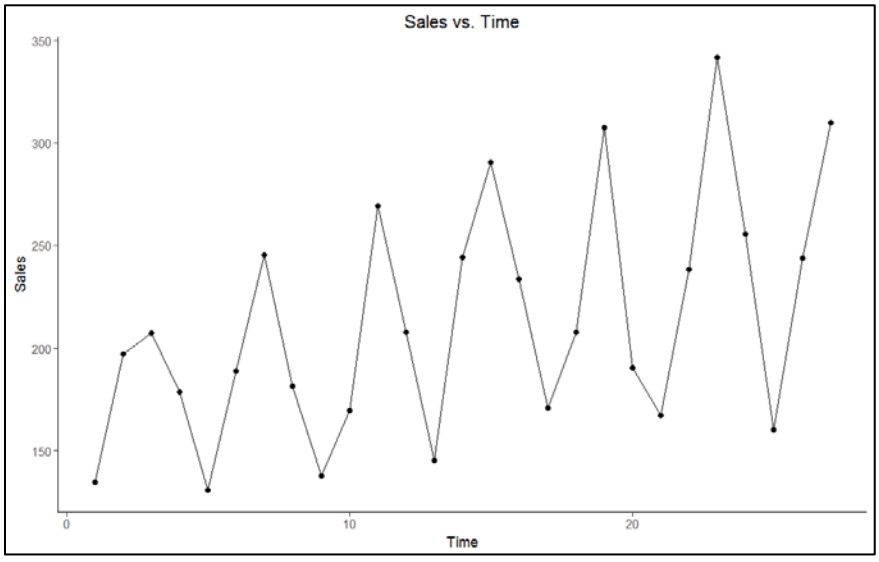
STA 372.5 **Spring 2018**

HOMEWORK #7 – Due Wednesday, April 4

Briggs and Stratton is the world's largest manufacturer of small, air-cooled engines for outdoor power equipment; the company also manufactures locks for use in automobiles and trucks. In the last fiscal year, approximately 93% of company sales (and about 96% of profits) were generated by engines and parts, and about 7% of sales (and about 4% of profits) came from the company's lock operations. Also, in the same year about 86% of the company's engines were used in walk-type power mowers, riding-type lawn mowers, garden tractors and tillers, snow-throwers, etc. Export sales accounted for about 20% of total sales. The company manufacturers and services automotive locks and related products for a variety of North American car and truck manufacturers.

Your assignment is to develop forecasts of the total sales of Briggs and Stratton Corporation for five quarters beyond the last sales observation available. You should also provide 80% confidence intervals for the first two forecasts.

Sales data, in millions of dollars, are available for the past 27 quarters and are plotted below. A strong seasonal pattern is present in sales as well as an upward trend. The data are available in the file STA372_Homework7_Question1.dat on the *Data sets* page of the Canvas class website. The file contains *Time* in the first column, Briggs and Stratton's sales in the second column, seasonally adjusted sales in the third column, and the seasonal indices used in the seasonal adjustment process in the fourth column. The seasonal indices are computed using a multiplicative model.



You should consider at least two strategies for modeling the pattern in the data and computing forecasts for future observations. You need to write a brief report (no more than one page) for upper management that explains simply and intuitively why you believe the model you chose will provide the best out-of-sample forecasts.

Also, you should write an appendix to the report in which you are more specific concerning the development of your forecasts and the assumptions you have made. The appendix should include the R output and graphs used to choose the appropriate model and to make the forecasts.

Some of the models we have considered up to this point of the semester include:

(1) Deterministic model;

(2) Deterministic model with a lagged dependent variable included;

(3) Simple exponential smoothing model;

(4) Holt's model; and

(5) Random walk model with drift.